



Beyond Search:

AI-Powered Literature Review in the Age of Deep Research

Dr. Ali Shiri, Vice Dean, Faculty of Graduate & Postdoctoral Studies

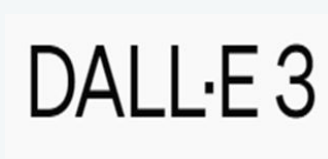
Kim Frail, Head, Teaching and Learning, Library and Museums

Janice Kung, Health Sciences Librarian
CARL Visiting Program Officer for AI & Library Services

LLMs/Models



Image generation



Video generation



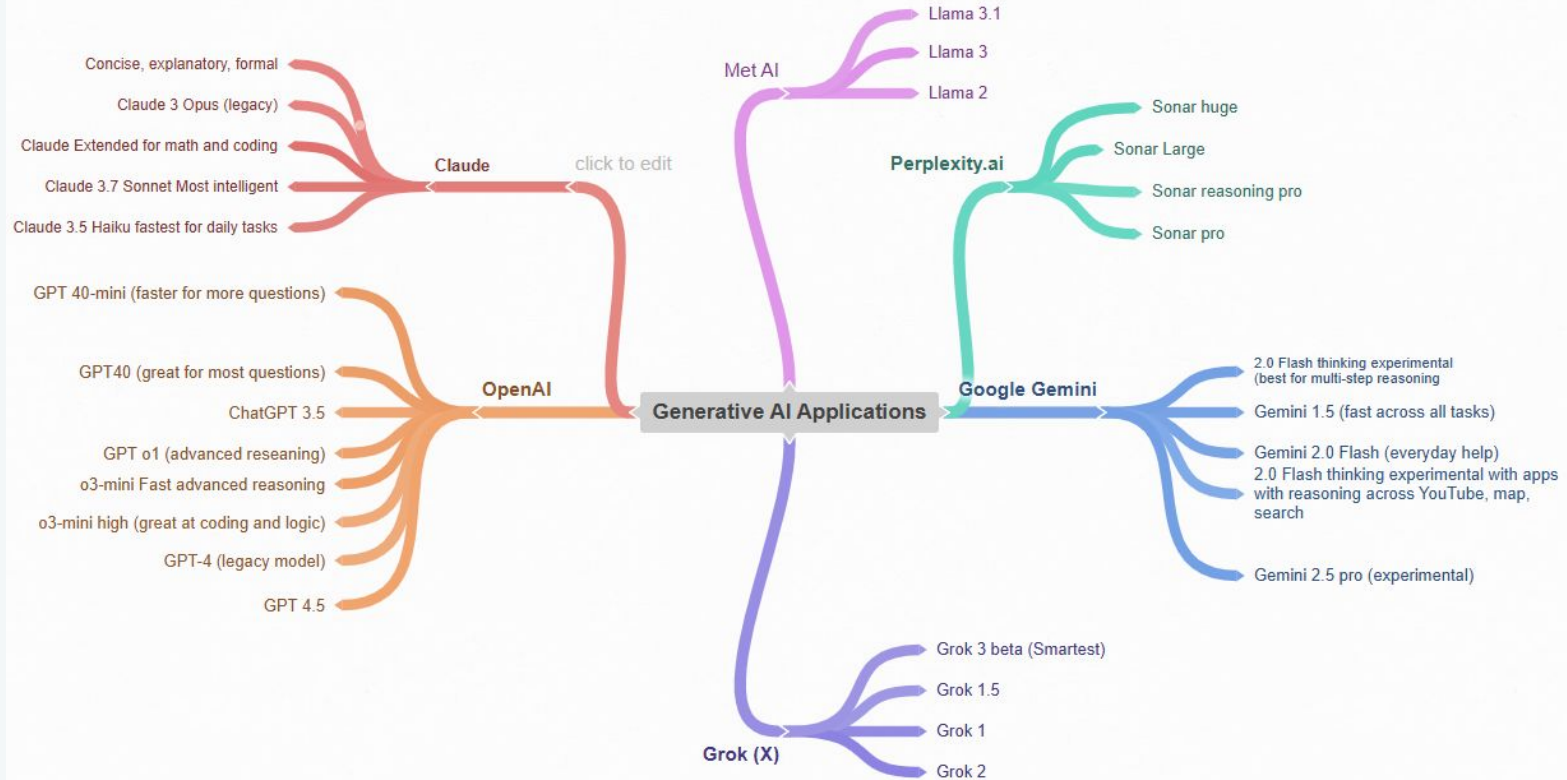
Sound generation



Podcast generation

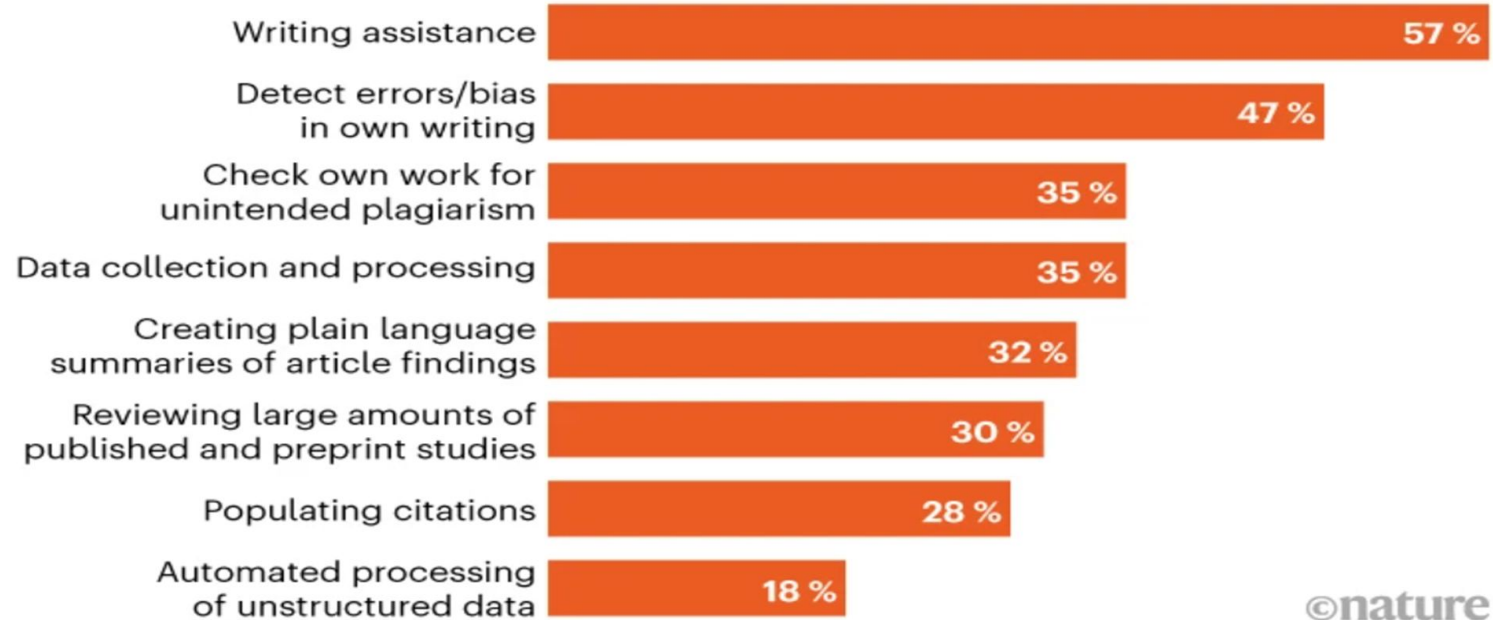


Bewildering Proliferation of Large Language Models



Generative AI Use Cases for Research

Q: Which, if any, of these represent use cases or solutions that are similar to anything you are already doing and/or have already tried with AI in the past?



Source: ExplanAltions report, Wiley

How Much Research Is Being Written by Large Language Models?

- Analysis of 950,965 papers published between Jan 2020-Feb 2024 on the arXiv, bioRxiv, and Nature portfolio journals
- **17.5% of computer science papers and 16.9% of peer review text** had at least some content drafted by AI.

A. Top 100 adjectives that are disproportionately used more frequently by AI

Table 2: Top 100 adjectives disproportionately used more frequently by AI.

commendable	innovative	meticulous	intricate	notable
versatile	noteworthy	invaluable	pivotal	potent
fresh	ingenious	cogent	ongoing	tangible
profound	methodical	laudable	lucid	appreciable
fascinating	adaptable	admirable	refreshing	proficient
intriguing	thoughtful	credible	exceptional	digestible
prevalent	interpretative	remarkable	seamless	economical
proactive	interdisciplinary	sustainable	optimizable	comprehensive
vital	pragmatic	comprehensible	unique	fuller
authentic	foundational	distinctive	pertinent	valuable
invasive	speedy	inherent	considerable	holistic
insightful	operational	substantial	compelling	technological
beneficial	excellent	keen	cultural	unauthorized
strategic	expansive	prospective	vivid	consequential
manageable	unprecedented	inclusive	asymmetrical	cohesive
replicable	quicker	defensive	wider	imaginative
traditional	competent	contentious	widespread	environmental
instrumental	substantive	creative	academic	sizeable
extant	demonstrable	prudent	practicable	signatory
continental	unnoticed	automotive	minimalistic	intelligent

LLM-enhanced Research Tools



Literature review,
extraction,
analysis



AI personal
research assistant



AI powered
Academic search
engine



SciSpace

Literature review,
extraction, analysis



Literature review &
analysis



AI assistant for
literature search



Explore academic
papers in a visual graph



Citation-based
literature mapping



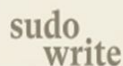
Summarize, analyze,
organize your research



AI-assisted
document analysis



Translation



AI writing tool



The AI-powered research platform to read, write, get answers and more

Literature review,
academic writer



AI-enhanced mind
mapping tool

What is Deep Research?

The use of Large Language Models, Retrieval Augmented Generation (RAG), and reasoning models to conduct in-depth, multi-step, and detailed extraction, analysis, and synthesis of academic information, empirical data, and perspectives from a broad range of sources to generate a final report with citations.

Conduct search

Analyze and
synthesize
information

Create a report



OpenAI. (2025). DALL-E 3 [Image Generator]. Retrieved March 17, 2025, from <https://chat.openai.com>

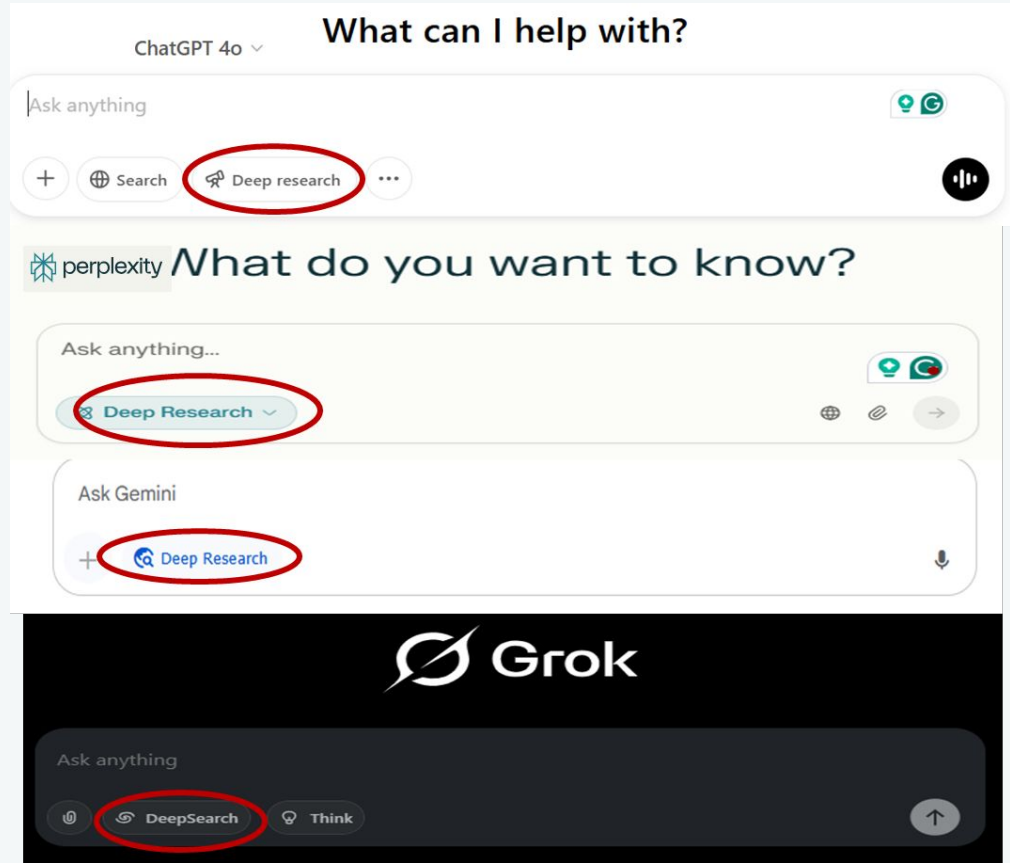
Deep Research: A New Generation of Research Tools

OpenAI

Perplexity.ai

Gemini

Grok

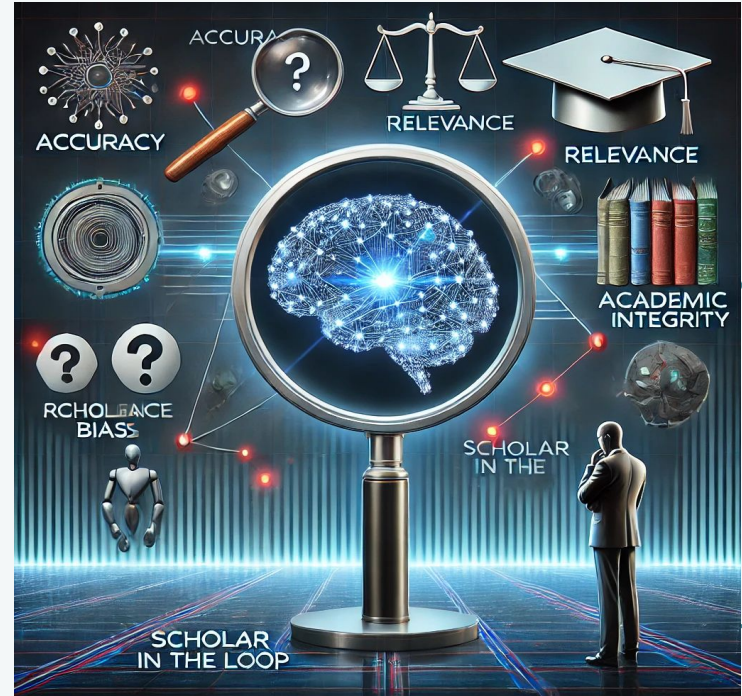


Deep Research: Key features

- Break-down a submitted research topic/question/prompt
- Narrow down or focus on a particular research question
- List academic and publicly available web resources
- Select and filter retrieved papers
- Demonstrate all or parts of the deep research process, namely searching, reading, reasoning, thinking, analyzing, synthesizing, generating report
- Show a progress bar and the time it takes to complete research
- Provide related and suggested questions from previous users

Deep Research: Big Issues

- Relevance consideration: Often the text of the analysis includes tangential / off-topic stuff.
- Asking a silly research question, will get you a silly answer. e.g. “banana peel stock market theory”
- Be careful about handing your cognitive work off to an AI bot.

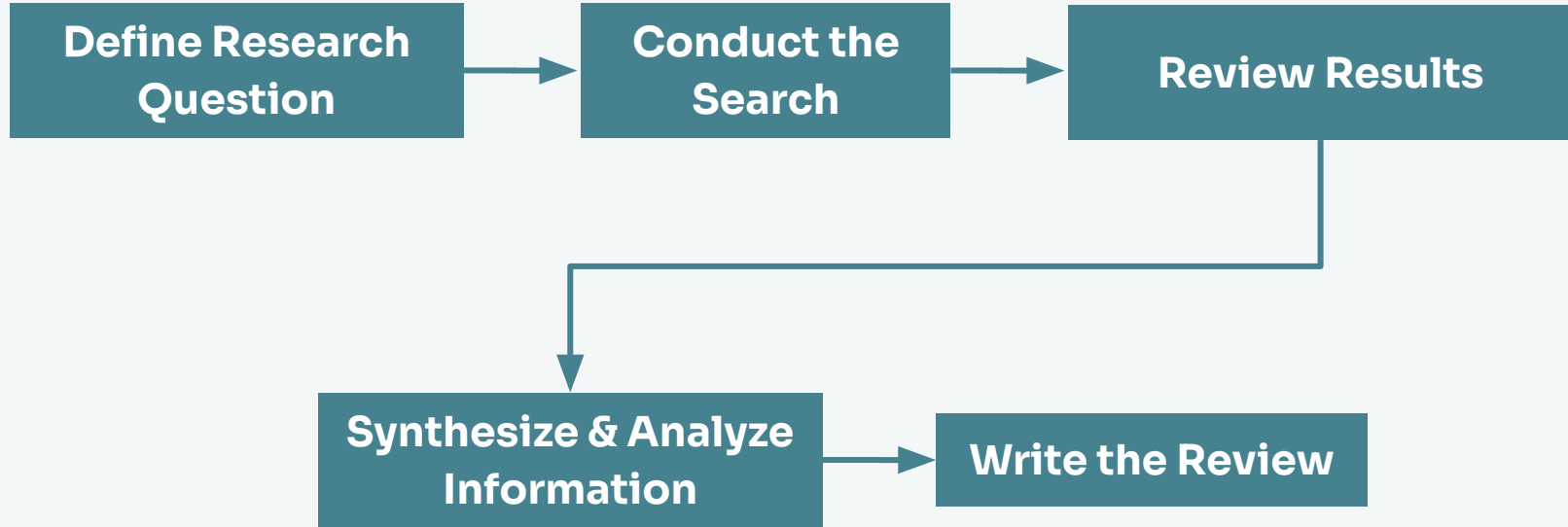


Using Generative AI in Research

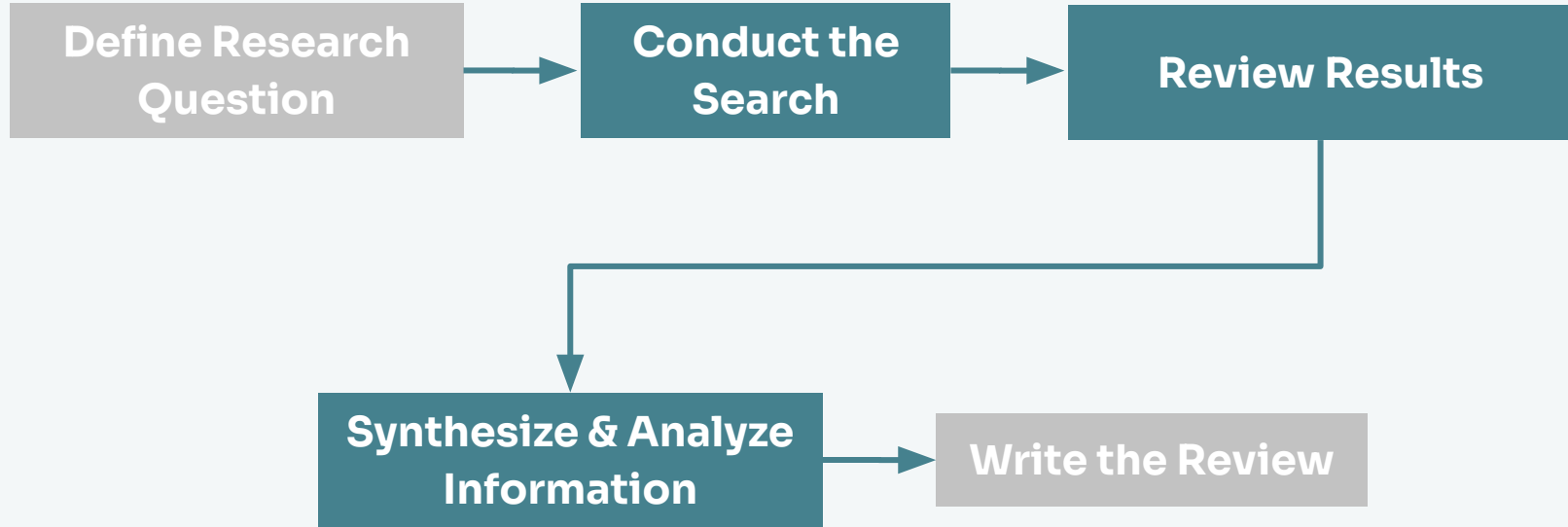
GPS GUIDELINES: Responsible and Ethical Use of Generative AI in Graduate Thesis, Research, and Writing

- Consider publishing/awards/grant opportunities
Examples: Elsevier policy -AI generated images/image enhancements, Canadian Federal funding via Tri-Agencies
- Importance of documenting AI at beginning & throughout project
 - The Artificial Intelligence Disclosure (AID) Framework

Literature Review Process



Literature Review Process



Conduct the Search & Review Results

Tools:

- Consensus
- Elicit
- Undermind

Build a search query (ChatGPT, Poe, CoPilot)

Conduct literature search

Explore similar articles through citation chaining

Organize literature

Synthesize & Analyze Information

Tools:


- Elicit
- Consensus
- NotebookLM

Extract key insights, summarize findings

“Asking questions” of a particular scholarly article or group of articles

Create comparison tables based on default and customized criteria like (e.g., methodology, sample size, or key results, etc.)

Filtering & ranking – Allows filtering studies by credibility factors like randomized control trials.

A person with long dreadlocks, seen from behind, is sitting in a meditative lotus position on a rocky outcrop. They are wearing a black long-sleeved shirt and black pants. The background features a vast, rugged mountain range with steep, rocky peaks and lush green vegetation. A thick layer of white mist or clouds fills the valley below the person. The sky is filled with dramatic, colorful clouds in shades of blue, orange, and yellow, suggesting a sunrise or sunset. The overall scene conveys a sense of tranquility and connection with nature.

What is the effect of daily mindfulness meditation on self-reported stress and cortisol levels in adults?



Elicit: Overview

- Find papers
- Get a research report
- Start a systematic review (Pro Only)
- Extract data from PDFs (upload/import from Zotero)
- List of concepts



Elicit: Plans

- Basic (student/casual exploration), Pro (researchers), Plus (professional researchers/systematic reviews) & Team (research teams working on systematic reviews) plans
- Data extraction limit based on plan; lots of features & upgrades not available in Basic (free) version
- Storage of uploaded papers unlimited
- Count towards limit when using for: Research Reports, Systematic Review and Extract Data from PDFs

See Elicit Help Centre for more details on [plans](#)



Elicit: Find Papers

- Searches unlimited
- Good for learning how to work with tables, columns, filters, chat, etc.
- Natural language search - keywords not needed
- Searches Semantic Scholar (125 million papers); open access & closed access
- Provides summary of 8 most relevant papers and a table with relevant comparison data plus option to add your own custom columns (2 with basic plan)

Elicit: Find Papers

📄 Get a research report

📄 Start a systematic review **PRO**

🔍 Find papers

Quick tools

📄 Extract data from PDFs

Upload papers

Select papers to extract information or upload additional papers. Papers you upload are stored in your library and are only visible to you.

+ Upload papers



🔍 List of concepts

Elicit: Find Papers

Mindfulness Meditation and Stress Reduction

What is the effect of daily mindfulness meditation on self-reported stress and cortisol le

Summary of top 4 papers

Copy

Research suggests that mindfulness meditation can have beneficial effects on stress levels in adults. Brief mindfulness training was found to reduce self-reported psychological stress reactivity, although it increased cortisol reactivity to social stress (Creswell et al., 2014). Higher self-reported mindfulness was associated with lower afternoon cortisol levels, and increases in mindfulness correlated with decreases in cortisol (Jacobs et al., 2013). A low-dose workplace mindfulness intervention resulted in significant reductions in perceived stress and improvements in sleep quality (Klatt et al., 2009). Similarly, a four-day mindfulness meditation program for medical students led to significantly lower serum cortisol levels, indicating reduced stress (Turakitwanakan et al., 2013). These studies demonstrate that even short-term mindfulness practice can positively impact both self-reported stress and physiological stress markers like cortisol. However, the relationship between mindfulness, stress perception, and cortisol levels is complex and may vary depending on the specific context and measurement timing.

Edit custom column

Tell Elicit more about this column to improve accuracy. [Get guidance and examples here.](#)

Column name

Study Design

Instructions (optional)

Describe the methodology used to conduct the study including interventions and other details. For example: Randomized Controlled Trial (RCT) with a waitlist control, parallel group design

Sort: Most relevantFiltersExport asUPGRADE8









Paper	Abstract summary	Study Design
<div><input type="checkbox"/></div> <div>Brief mindfulness meditation training alters psychological and neuroendocrine responses to social evaluative stress</div> <div><div>J. Creswell +3</div><div>Psychoneuroendocrinology</div><div>2014 · 314 citationsDOI</div></div>	Brief mindfulness meditation training reduces self-reported psychological stress but increases cortisol reactivity to social evaluative stress.	The study design was a random design. Participants were randomized to either receive the mindfulness training program or no training. Participants then complete the Perceived Stress Scale (PSS), and measures of physiological stress were collected.
<div><input type="checkbox"/></div> <div>Self-reported mindfulness and cortisol during a Shamatha meditation retreat.</div> <div><div>Tonya L. Jacobs +13</div><div>Health Psychology</div><div>2013 · 82 citationsSourceDOI</div></div>	Increases in self-reported mindfulness during a meditation retreat were associated with decreases in evening cortisol levels.	Observational study

Answer Structure

Any answerSpecifiedYes/No/Maybe


CancelSave

Elicit: Custom Column

<input type="checkbox"/> Effects of Low-Dose Mindfulness-Based Stress Reduction (MBSR-Id) on Working Adults  M. Klatt +2  Health Education & Behavior 2009 · 378 citations DOI 	 A low-dose mindfulness-based stress reduction program reduced self-reported stress and increased mindfulness in working adults, but did not affect cortisol levels.	The study design was a randomized controlled trial (RCT) with a waitlist control group, using a pre-post design with both self-reported and objective (salivary cortisol) measures.
<input type="checkbox"/> Effects of mindfulness meditation on serum cortisol of medical students.  W. Turakitwanakan +2  Journal of the Medical Association of Thailand = Chotmaihet thangphaet 2013 · 63 citations	A 4-day mindfulness meditation program decreased serum cortisol levels in medical students, but did not significantly affect self-reported mental health.	The study design appears to be a pre-post study, where a group of 30 medical students underwent a 4-day mindfulness meditation program, and their cortisol levels and mental health scores (as measured by the Thai GHQ28) were assessed before and after the intervention.
<input type="checkbox"/> Effects of a mindfulness-based intervention on mindfulness, stress, salivary alpha-amylase and cortisol in everyday life.  C. Aguilar-Raab +6  Psychophysiology	Mindfulness-based intervention reduced sympathetic and hypothalamic-pituitary-adrenal activation, as indicated by decreased salivary alpha-amylase and cortisol levels in daily life.	The study design was a parallel group design with an intervention group that received a 3-month mindfulness-based intervention (MBI) and a control group that did not receive the intervention. The study used an ecological momentary assessment (EMA) approach to measure mindfulness, stress, salivary alpha-amylase, and salivary

Elicit: Additional Steps

 Add a new step

4 papers selected 

 Create a new table from selected papers

4 papers

 Summarize abstracts for selected papers

4 papers

 Chat with papers Beta

4 papers

 Ask a new question and find papers

 Extract data from uploaded papers

 Get a list of concepts

Chat with papers Do any papers include suggestions for future studies of cortisol levels? Beta

Do any papers include suggestions for future studies of cortisol levels?

One of the papers does include a suggestion for future studies on cortisol levels and mindfulness.

The study by Jacobs et al. (2013) on self-reported mindfulness and cortisol during a Shamatha meditation retreat provides a specific recommendation for future research. The authors suggest that:

Future work should aim to replicate this finding in a larger cohort and determine stronger inference about causality by using experimental designs that include control-group conditions. 1

This recommendation is made in the context of their findings, which showed a relationship between self-reported mindfulness and resting cortisol output. The authors recognize the need for:

1. Replication with a larger sample size
2. Experimental designs with control groups to establish causality

These suggestions are aimed at strengthening the evidence for the link between mindfulness and cortisol levels, which could provide more robust insights into how mindfulness practices affect stress-related physiological responses.

|

4 papers

Use full text ? ☐

UPGRADE

Elicit: Chat With Papers



Elicit: Get a Research Report

- Generate a detailed report to answer your research question
- Export as PDF format; include references
- Quick, detailed understanding of your research topic
- Jumping off point for conducting more detailed research
- Subject data extraction allowance
- Screening & extraction limits also based on plan and affect data extraction allowance
- Basic = “Fast” > Screen top 50 papers - Extract from up to 10 papers

Elicit: Get a Research Report

 [Get a research report](#) [Start a systematic review](#) **PRO** [Find papers](#)

Quick tools

 [Extract data from PDFs](#)

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Select papers to extract information or upload additional papers. Papers you upload are stored in your library and are only visible to you.

[+ Upload papers](#) [List of concepts](#)

Daily Mindfulness Meditation and Stress Reduction

Elicit is building and refining understanding of the research. Your report will become available once all steps are complete. We will email kim.frail@gmail.com when your report is ready (less than 10 minutes).

Screen papers Completed in 1:17

View next

Papers screened in 10

Generating screening criteria and evaluating 50 papers.

Column	Definition	Criteria matches (yes/maybe/no)		
Population Age	Were all study participants adults (age ≥18 years)?	21	28	1
Intervention Type	Was mindfulness meditation the primary intervention, without combination with other major interventions (e.g., CBT, medication)?	39	5	6
Intervention Frequency	Did the intervention involve daily mindfulness meditation practice?	6	39	5
Study Duration	Was the intervention duration at least 2 weeks?	27	17	6
Outcome Measures	Did the study measure BOTH self-reported stress AND cortisol levels?	23	13	14
Study Design	Was the study a randomized controlled trial with either an active or passive control group?	28	3	19

Report

Status

Gather papers
50 papers found

Screen papers
10 papers included

Extract data
Capturing key metrics and findings from every paper

Generate report
Summarizing findings

Chat

Hang tight — you'll be able to chat with this report once it's generated

Column	Definition	Most recent extraction
Study Design	<p>Identify the specific type of study design used. Look in the methods section for details about:</p> <ul style="list-style-type: none"> - Randomized controlled trial (RCT) - Controlled clinical trial - Prospective or retrospective design - Parallel group or crossover design <p>If multiple design elements are present, list all. If unclear, note "design not clearly specified". Prioritize the most specific design description found in the text.</p>	Randomized controlled trial (RCT), Parallel group design, Prospective design
Participant Characteristics	<p>Extract the following details from the methods or participant description section:</p> <ul style="list-style-type: none"> - Total number of participants - Age range or mean age - Gender distribution - Specific population characteristics (e.g., university workers, older adults) - Inclusion/exclusion criteria <p>If any information is missing, note "[not reported]". Report numerical data with appropriate units and percentages where applicable.</p>	<ul style="list-style-type: none"> - Total number of participants: 30 - Age range or mean age: [not reported] - Gender distribution: [not reported] - Specific population characteristics: University workers (technical-administrative workers from a university in São Paulo, Brazil) - Inclusion criteria: High perceived stress (score ≥ 23 on PSS 14) - Exclusion criteria: Regular meditation practice (at least once a week in the past 12 months), engagement in psychotherapy or mental health counseling
Mindfulness Intervention Specifics	<p>Carefully document the following intervention details:</p> <ul style="list-style-type: none"> - Duration of mindfulness program (total weeks/months) - Frequency of sessions (e.g., weekly, daily) - Length of each session 	<ul style="list-style-type: none"> - Duration of mindfulness program: 6 weeks - Frequency of sessions: Weekly - Length of each session: 60-90 minutes - Specific type of mindfulness approach: Mindfulness-Based Cognitive Therapy (MBCT)

🔍 Identified 50 relevant papers using search

📋 Screened in 10 papers utilizing criteria

- Population Age
- Intervention Type
- Intervention Frequency
- Study Duration
- Outcome Measures
- Study Design
- Sample Size
- Intervention Duration

🎯 Extracted 60 data points covering

- Study Design
- Participant Characteristics
- Mindfulness Intervention Specifics
- Control/Comparison Condition
- Stress and Cortisol Outcome Measures
- Key Findings Related to Stress and Cortisol

Daily Mindfulness Meditation and Stress Reduction

Daily mindfulness meditation consistently reduces self-reported stress in adults but shows variable effects on cortisol levels.

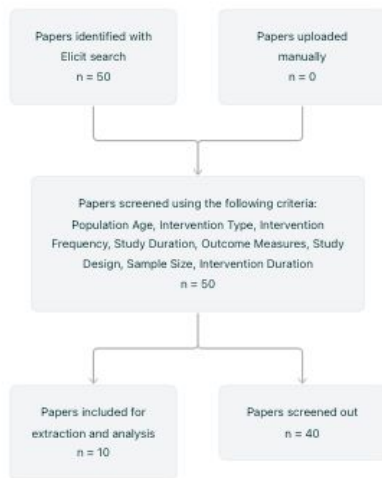
ABSTRACT

Daily mindfulness meditation appears to reduce self-reported stress in adults. * Ten controlled studies—nine randomized trials and one clinical trial—evaluated mindfulness interventions that typically lasted 2 to 8 weeks. * In eight studies that measured perceived stress (most commonly with the Perceived Stress Scale), four reported significant reductions (for example, one study noted that 61% of participants in the intervention group reported decreased stress compared to 48% of controls), while two noted reduced stress levels without statistical testing and two provided related improvements in anxiety, worry, or mindfulness skills. *

Cortisol-based outcomes were less consistent. * Five studies observed statistically significant reductions in cortisol—measured either via salivary, hair, or serum assays—with reported p-values ranging from ≤ 0.05 to < 0.01 . * In contrast, four studies found no significant changes and one reported cortisol decreases only in participants with high baseline levels. * Overall, the papers indicate that daily mindfulness meditation reliably lessens self-reported stress, whereas its impact on cortisol levels varies with intervention design, participant baseline characteristics, and measurement method. *

METHODS ▾

We analyzed 10 papers from an initial pool of 50, using 8 screening criteria. Each paper was reviewed for 6 key aspects that mattered most to the research question. [More on methods](#)



Paper search

Using your research question “What is the effect of daily mindfulness meditation on self-reported stress and cortisol levels in adults”, we searched across over 126 million academic papers from the Semantic Scholar corpus. We retrieved the 50 papers most relevant to the query.

Screening

We screened in papers that met these criteria:

- **Population Age:** Were all study participants adults (age ≥ 18 years)?
- **Intervention Type:** Was mindfulness meditation the primary intervention, without combination with other major interventions

(e.g., CBT, medication)?

- **Intervention Frequency:** Did the intervention involve daily mindfulness meditation practice?
- **Study Duration:** Was the intervention duration at least 2 weeks?
- **Outcome Measures:** Did the study measure BOTH self-reported stress AND cortisol levels?
- **Study Design:** Was the study a randomized controlled trial with either an active or passive control group?
- **Sample Size:** Did the study include at least 20 participants?
- **Intervention Duration:** Did the study examine effects beyond a single session (i.e., not just acute effects)?

We considered all screening questions together and made a holistic judgement about whether to screen in each paper.

Can export report as a PDF; editing requires paid access

Library 13



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Filter

Tag

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Paper

Mindfulness Meditation for Adolescents



Ryan Erbe +2

retrieve (1).pdf

03/28/2024

A Randomized Study of the Effectiveness of Mindfulness-Based Stress Reduction



Richard Bränström +2

retrieve.pdf

03/28/2024

A Randomized Study of the Effectiveness of Mindfulness-Based Stress Reduction



Richard Bränström +2

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03/28/2024

Psychosocial Stress and Cardiovascular Disease



Kenneth G Walton +6

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03/28/2024

Meditation Programs for Psychological Stress and Well-being A Systematic Review and Meta-analysis



Madhav Goyal +14

iol130131.pdf

03/28/2024

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Choose files →

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Paper

Mindfulness Meditation for Adolescents



Ryan Erbe +2

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03/28/2024

A Randomized Study of the Effectiveness of Mindfulness-Based Stress Reduction in Reducing Pain and Improving Quality of Life in Patients with Chronic Pain



Richard Bränström +2

retrieve.pdf

03/28/2024

A Randomized Study of the Effectiveness of Mindfulness-Based Stress Reduction in Reducing Pain and Improving Quality of Life in Patients with Chronic Pain



Richard Bränström +2

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03/28/2024

Psychosocial Stress and Cardiovascular Health



Kenneth G Walton +6

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Meditation Programs for Psychological Stress and Well-being A Systematic Review and Meta-analysis



Madhav Goyal +14

iol130131.pdf

03/28/2024

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before beginning
import

Extract data from PDFs

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[Sort](#)[Filter](#)[+ Upload papers](#)

Mindfulness Meditation for Adolescent Stress and Well-Being: A Systematic Review of the Literature with Implications for School Health Programs



 Ryan Erbe +2



retrieve (1).pdf



03/28/2024

A Randomized Study of the Effects of Mindfulness Training on Psychological Well-being and Symptoms of Stress in Patients Treated for Cancer at 6-month Follow-up



Elicit

- Provides guide for using content in your own work: [Citing Elicit](#)
- Warns against copying verbatim > AI Detection Software
- All Elicit citations should include URL & date
- Includes a link to sample papers citing Elicit



Elicit: Limitations

- Limited bibliographic info: paste title into Google Scholar to identify whether the paper is a journal article, conference paper, book chapter or thesis as needed.
- Performs routine tasks of literature review (e.g. data extraction) but not able to perform high-level cognitive functions that are required to create an understanding and synthesize the literature" (Whitfield and Hofmann, 2023: 204).
- According to Elicit, ~90% of info is accurate: identifies sources generated by LLMs
- Does not answer questions that are not written about in an academic paper. It tends to work less well for identifying facts and works less well in theoretical or non-empirical domains.
- Elicit works best with the prompt: What are the effects of ___ on ___? You do need to include a question mark in the search. It works less well for identifying facts.

(Birmingham City University Library, 2025)



NotebookLM

- Google product (requires personal Gmail account)
- AI model: Google Gemini
- Research and note-taking tool
- Generate summaries, explanations, and answers based on content uploaded by users
- Up to 50 files may be uploaded: PDFs, Google Docs, websites, YouTube, Google slides, audio files
- Audio feature (generate podcast) → “Deep Dive Conversation”

Add sources

Sources let NotebookLM base its responses on the information that matters most to you.

(Examples: marketing plans, course reading, research notes, meeting transcripts, sales documents, etc.)



Upload sources

Drag & drop or [choose file](#) to upload

Supported file types: PDF, .txt, Markdown, Audio (e.g. mp3)



Google Drive



Google Docs



Google Slides



Link



Website



YouTube



Paste text



Copied text



Source limit

0 / 50



Sources



+ Add source

Select all sources



Canada.ca_Mental Health - Coping With Stress.pdf



Harvard_Now and Zen.pdf



MayoClinic-_meditation_a_simple_fast_way_to_re...



NCCIH_Meditation and Mindfulness_Effectivenes...



mindfulness_based_stress_reduction_handbook...



Chat



Meditation for Stress Reduction: A Mayo Clinic Guide

5 sources

The provided texts explore the concept of **mindfulness** and its application in **stress reduction** and improving overall well-being. They explain **how stress impacts the body and mind**, and introduce various **mindfulness-based practices** such as meditation, mindful movement, and focused breathing. The sources also discuss **scientific research** demonstrating the **positive effects of mindfulness** on brain structure and function, as well as its potential to alleviate stress-related health issues and enhance mental clarity. Furthermore, one source offers a **structured eight-week program** for integrating mindfulness into daily life.

📌 Save to note



Add note



Audio Overview



Briefing doc

Start typing...

5 sources



How do these sources explain the physiological and psychological mechanisms of stress reduction?



Studio



Audio Overview



Deep Dive conversation

Two hosts (English only)

Customize

Generate

Notes



+ Add note



Study guide



Briefing doc



FAQ



Timeline



Saved notes will appear here


Save a chat message to create a new note, or click Add note above.

Sources




+ Add source


Select all sources ☒

 Canada.ca_Mental Health - Coping With Stress.pdf ☒

 Harvard_Now and Zen.pdf ☒

 MayoClinic-_meditation_a_simple_fast_way_to_re... ☒

 NCCIH_Meditation and Mindfulness_Effectiveness... ☒

 mindfulness_based_stress_reduction_handbook.... ☒

Chat



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 Save to note



 Add note

 Audio Overview

 Briefing doc

Start typing...

5 sources



How do these sources explain the physiological and psychological mechanisms of stress reduction?



Studio



Audio Overview



Deep Dive conversation

Two hosts (English only)

Customize

Generate

Notes



+ Add note

 Study guide

 Briefing doc

 FAQ

 Timeline



New note
Generating...



Sources



+ Add source

Select all sources



Canada.ca_Mental Health - Coping With Stress.pdf



Harvard_Now and Zen.pdf



MayoClinic-_meditation_a_simple_fast_way_to_re...



NCCIH_Meditation and Mindfulness_Effectivenes...



mindfulness_based_stress_reduction_handbook....



Chat



Meditation for Stress Reduction: A Mayo Clinic Guide

5 sources

The provided texts offer insights into **understanding and managing stress through mindfulness and meditation practices**. One source from Canada.ca suggests **physical activity and relaxation techniques** like deep breathing and hobbies as stress reducers. The Harvard sources feature **research and expert opinions** on how mindfulness and practices like yoga and meditation can **positively impact the brain and physical health** by reducing stress responses and even altering brain structure. Finally, the mindfulness handbook from Dublin City University provides a **structured eight-week program** with **detailed exercises** such as breath awareness, body scans, mindful eating, and movement to cultivate present moment awareness and reduce stress.

Save to note



Add note

Audio Overview

Briefing doc

Start typing...

5 sources



How do these sources explain the physiological and psychological mechanisms of stress redu



Studio



Audio Overview



Deep Dive conversation

Two hosts (English only)

Customize

Generate

Notes



+ Add note

Study guide

Briefing doc

FAQ

Timeline



Mindfulness and Meditation for Stress Reduction

Briefing Document: Understanding and Utilizing Mindfulness and Meditation for Stress Reduction This briefing document synthesizes...





Sources



+ Add source

Select all sources



Canada.ca_Mental Health - Coping With Stress.pdf



Harvard_Now and Zen.pdf



MayoClinic-_meditation_a_simple_fast_way_to_re...



NCCIH_Meditation and Mindfulness_Effectivenes...



mindfulness_based_stress_reduction_handbook....



Chat



Meditation for Stress Reduction: A Mayo Clinic Guide

5 sources

The provided texts offer insights into **understanding and managing stress through mindfulness and meditation practices**. One source from Canada.ca suggests **physical activity and relaxation techniques** like deep breathing and hobbies as stress reducers. The Harvard sources feature **research and expert opinions** on how mindfulness and practices like yoga and meditation can **positively impact the brain and physical health** by reducing stress responses and even altering brain structure. Finally, the mindfulness handbook from Dublin City University provides a **structured eight-week program** with **detailed exercises** such as breath awareness, body scans, mindful eating, and movement to cultivate present moment awareness and reduce stress.

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How do these sources explain the physiological and psychological mechanisms...



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Mindfulness and Meditation for Stress Reduction



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Briefing Document: Understanding and Utilizing Mindfulness and Meditation for Stress Reduction

This briefing document synthesizes information from five sources to provide a comprehensive overview of stress, its impact, and the role of meditation and mindfulness in coping with and reducing stress.

Source 1: Canada.ca_Mental Health - Coping With Stress.pdf (Health Canada)

Main Themes:

- **Stress is a normal part of life:** The document establishes that "Stress is a fact of daily life and is the result of both the good and bad things that happen."
- **Too much stress is harmful:** While normal, "Too much stress can cause serious health concerns."
- **Unresolved stress drains energy and leads to negative consequences:** If stress persists, "your body's need for energy will become greater than its ability to provide it. At this stage, you may experience insomnia, errors in judgement and personality changes. You may also develop a serious illness such as heart disease or be at risk of mental illness."
- **Recognizing stress symptoms is crucial:** The document lists various signs of being over-stressed, including "Feelings of irritability, sadness or guilt," "Change in sleep patterns," "Difficulty in concentrating or making decisions," and "Negative thinking."
- **Minimizing risk involves understanding, coping, and preventing stress:** This section provides practical strategies.
 - **Understanding:** Identifying stress triggers, whether major events, long-term worries, or daily hassles.
 - **Coping:** Emphasizing that "Because everyone is different, there is no single way to cope with stress." but suggesting identifying problems, working on solutions.



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How do these sources explain the physiological and psychological mechanisms of stress?



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Mindfulness and Meditation for Stress Reduction



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How do these sources explain the physiological and psychological mechanisms of stress reduction through meditation?

The sources explain the physiological and psychological mechanisms of stress reduction through meditation in several ways:

Physiological Mechanisms:

- **Relaxation Response and Hormonal Changes:** Mind-body practices like meditation are shown to reduce the body's stress response by strengthening the **relaxation response** and **lowering stress hormones like cortisol** ¹. This counteracts the effects of the stress response, which involves increased heart rate, blood pressure, and muscle tension ² ...

- **Gene Activity Modulation:** Research suggests that eliciting the relaxation response through meditation can temporarily change the activity of certain genes ⁴. This includes **switching off genes associated with chronic inflammatory responses** and **switching on genes linked with energy use, insulin release, maintenance of telomeres, and function of mitochondria** ⁵ ... These changes may contribute to various health benefits and help reduce the harmful effects of stress.

- **Brain Structure and Function Alterations:** Studies using neuroimaging have demonstrated that participation in meditation programs can lead to **measurable changes in brain regions associated with memory, sense of self, empathy, and stress** ⁷.

- **Increased Gray Matter Density:** Increased gray matter density has been observed in areas such as the **hippocampus** (important for learning and memory) and structures associated with **self-awareness, compassion, and introspection** ⁸. This increase in regions involved in emotional regulation, compassion, learning, and memory contributes to better emotional regulation ⁹.

- **Decreased Gray Matter Density:** Conversely, **decreased gray matter density has**

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



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- **Genetic Factors:** Some research suggests that genetic factors may influence the stress response. This includes variations in genes that affect the body's response to stress, such as the **switch in telomere length** and the **production of telomerase**, which can contribute to various health outcomes.
- **Brain Structure and Function:** Meditation has been shown to have a **positive effect on brain structure and function**, including **increased gray matter density** in areas associated with **attention, emotion, and stress regulation**. This can lead to **improved cognitive function** and **reduced stress levels**.

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Source guide

This information was prepared by the editors of the Harvard Health Publications division of Harvard Medical School.

It is excerpted from our Harvard Health Blog, available at health.harvard.edu/blog.

Now and Zen: How mindfulness can change your brain and improve your health Longwood Seminars, March 8, 2016

Content provided by Harvard Health Publications
health.harvard.edu

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What meditation can do for your mind, mood, and health

Dr. Anne Fabiny

Former Editor in Chief, Harvard Women's Health Watch

August 2014

Taking a few minutes to focus your mind each day can reduce stress, pain, depression, and more.

You can't see or touch stress, but you can feel its effects on your mind and body.

In the short term, stress quickens your heart rate and breathing and increases your blood pressure.

When you're constantly under stress, your adrenal glands overproduce the hormone cortisol. Overexposure to this

hormone can affect the function of your brain, immune system, and other organs.

Chronic stress can

contribute to headaches, anxiety, depression, heart disease, and even premature death.

Though you may not be able to eradicate the roots of stress, you can minimize its effects on your body.

One of the easiest and most achievable stress-relieving techniques is meditation, a program in which

you focus your attention inward to induce a state of deep relaxation.

Although the practice of meditation is thousands of years old, research on its health benefits is relatively

new, but promising. A research review published in JAMA Internal Medicine in January 2014

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...from being to being. Mindfulness meditation reduces stress from a constant state of 'doing' (planning, worrying) to a state of 'being' present with current experiences. This allows for a fuller appreciation of the present moment and reduces the grip of habitual thought patterns ²⁰.

- **Creating Distance from Thoughts:** By anchoring awareness in the breath and observing thoughts as they arise without judgment, individuals learn to create **distance and perspective in their thought processes**, realizing that thoughts are merely mental events and not necessarily facts to be obeyed ²¹.
- **Befriending Feelings:** Meditation encourages bringing an **affectionate and discerning awareness** to felt emotions and physical sensations, allowing individuals to be with unwanted emotions without making them worse ²².
- **Cultivating Acceptance:** Mindfulness practices cultivate **acceptance of the present moment**, including difficult situations and unpleasant feelings. This acceptance frees individuals from the struggle against reality, allowing for a more skillful response ²³.
- **Improving Self-Regulation and Resilience:** Meditation practices, particularly those affecting the anterior cingulate cortex (ACC), are associated with **superior performance on tests of self-regulation**, including resisting distractions and adapting behaviors. They also contribute to **increased resilience**, a key skill in managing stress ²⁴ ...
- **Reducing Pain Catastrophizing:** Mind/body programs including relaxation response training have shown a decrease in **pain catastrophizing** in patients with IBS and IBD, indicating increased resilience in the face of pain ¹⁵.

In summary, meditation reduces stress through a combination of physiological mechanisms that dampen the stress response, modulate gene activity, and alter brain structure and function, and psychological mechanisms that promote relaxation, enhance present moment awareness, foster acceptance, improve emotional regulation, and shift perspective towards stressful experiences.

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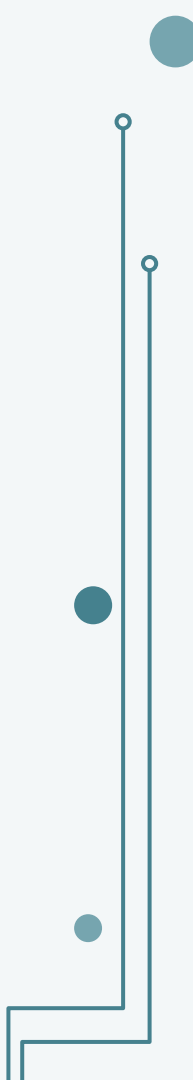
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Check with Library and/or the copyright office on a case by case basis (e.g., database & AI Tool).

See the Copyright slide for more details



Check other sources

Can you suggest some academic or Library databases to use for my topic?

Yes! Here are some academic and library databases that will be useful for researching the impact of meditation on stress reduction:

Multidisciplinary Databases

- **Google Scholar** (scholar.google.com) – A great starting point for finding academic articles, but be sure to check if your library provides access to full-text versions.
- **JSTOR** – Covers psychology, health sciences, and social sciences.
- **ProQuest Central** – A broad database covering medical, psychological, and social science research.

Psychology & Health Sciences Databases

- **PsycINFO** (via APA) – The best source for psychological studies on meditation and stress.
- **PubMed** – Covers medical and neuroscience research, including the physiological effects of meditation on stress.
- **ScienceDirect** – Includes studies from journals like *Consciousness and Cognition* and *Psychoneuroendocrinology*.
- **CINAHL** (Cumulative Index to Nursing and Allied Health Literature) – Useful for healthcare-related stress reduction studies.

Education & Social Sciences Databases

- **ERIC** (Education Resources Information Center) – If you're studying meditation's impact in educational settings (e.g., students, teachers).
- **Sociological Abstracts** – Useful for understanding social and cultural aspects of meditation and stress.

Library-Specific Databases

Your university library likely provides access to many of these databases. Try searching through your library's website or asking a librarian for assistance in finding full-text articles.

And Ask US for help at the Library!



Excellent! Let's craft some effective keywords for your research question: "What is the effect of daily mindfulness meditation on self-reported stress and cortisol levels in adults?"

We need to break down your research question into its core concepts:

1. Mindfulness Meditation:

- **Primary Keywords:**
 - Mindfulness meditation
 - Mindfulness
 - Meditation
 - Mindfulness-based interventions
 - Mindfulness-based stress reduction (MBSR)
- **Related Keywords:**
 - Vipassana meditation
 - Focused attention meditation
 - Open monitoring meditation

2. Self-Reported Stress:

- **Primary Keywords:**
 - Perceived stress
 - Self-reported stress
 - Psychological stress
 - Stress (general)
- **Related Keywords:**
 - Anxiety
 - Depression
 - Distress
 - Well-being (when used in a negative context, as in decreased well being due to stress)
 - "Perceived Stress Scale" (PSS) (if you want to look for studies that used that specific measurement tool)

3. Cortisol Levels:

- **Primary Keywords:**
 - Cortisol
 - Cortisol levels
 - Salivary cortisol
 - Stress hormones

- **Related Keywords:**
 - Anxiety
 - Depression
 - Distress
 - Well-being (when used in a negative context, as in decreased well being due to stress)
 - "Perceived Stress Scale" (PSS) (if you want to look for studies that used that specific measurement tool)

3. Cortisol Levels:

- **Primary Keywords:**
 - Cortisol
 - Cortisol levels
 - Salivary cortisol
 - Stress hormones
- **Related Keywords:**
 - HPA axis (hypothalamic-pituitary-adrenal axis)
 - Neuroendocrine response

4. Adults:

- **Primary Keywords:**
 - Adults
 - Adult population
 - Adults (age ranges, e.g., "young adults," "middle-aged adults")
- **Related Keywords:**
 - Humans (if you need to broaden your search)

Combining Keywords with Boolean Operators:

To maximize your search results, use Boolean operators (AND, OR, NOT):

- **AND:** Use "AND" to combine different concepts. For example: "mindfulness meditation AND cortisol levels AND perceived stress." This narrows your search to articles that contain all of those concepts.
- **OR:** Use "OR" to include synonyms or related terms. For example: "mindfulness meditation OR MBSR." This broadens your search to include articles that contain either of those terms.
- **NOT:** Use "NOT" to exclude specific terms. For example: "cortisol NOT animals" (if you want to exclude animal studies).

Example Search Strings:

- ("mindfulness meditation" OR "MBSR") AND ("perceived stress" OR "self-reported stress") AND "cortisol levels" AND adults
- "Salivary cortisol" AND "mindfulness" AND "psychological stress"
- "Mindfulness based stress reduction" AND "HPA axis" AND "adult population"
- "Meditation" AND "Perceived Stress Scale" AND "cortisol"

Other Resources

[Navigating Generative AI: Understanding, Applications, and Ethics](#)
(E.g., Module 3 - Writing good prompts)

[Trust in AI: Evaluating Scite, Elicit, Consensus, and Scopus AI for Generating Literature Reviews](#)

[Comparing Scite, Elicit, Consensus, Scopus AI in more detail](#) (with regards to Lit Reviews)

[Emerging AI Tools for Literature Review: Overview](#)

Shiri, A. (2025) “[Deep research](#)”: [A research paradigm shift](#). (2025, March 27). *Information Matters*, Vol. 5, Issue 3.

Birmingham city University Library. (2025, March 17). [Artificial Intelligence \(AI\) and the literature review process: Data extraction](#).



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Open access is fine but with licensed resources, it will be on a case by case basis on what the publisher allows.

March 2025

Note that the Canadian copyright legislation and vendor licensing models are still evolving to adapt to Generative AI tools so guidance in this area is subject to change

Thanks!

Questions?

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(see URL in chat)

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