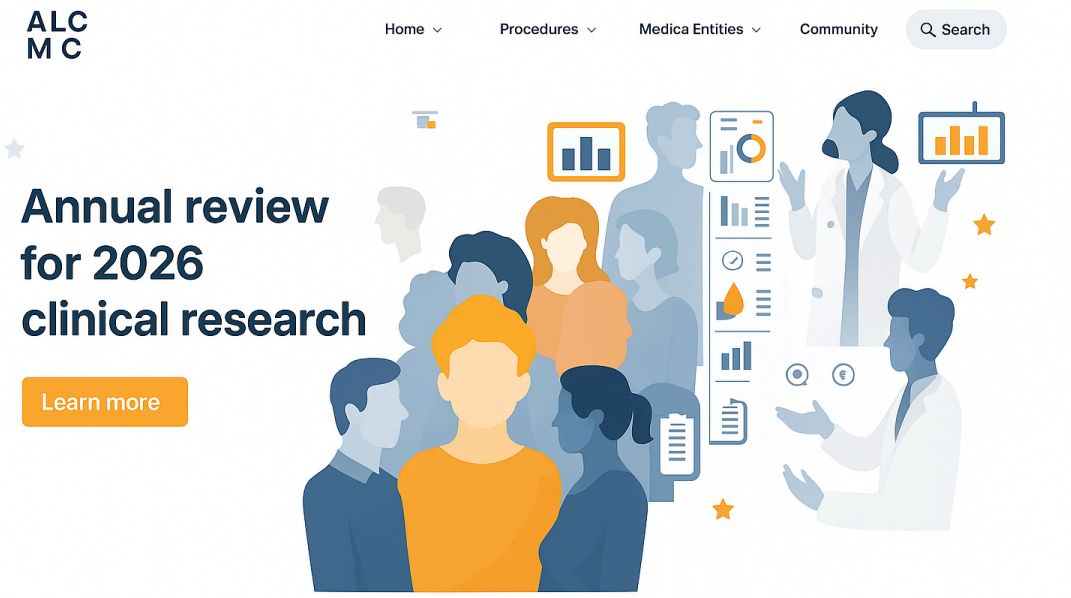
1 Billion Lives

Submission-Ready Research Study Proposal



1. Project Title

Validation Study of an Adaptive Perceptual Learning Intervention for Visual Encoding, Attention, and Cognitive Efficiency

2. Executive Summary

1 Billion Lives (IBL) seeks non-dilutive pilot funding to conduct a pre-registered validation study of a scalable, low-cost perceptual learning intervention designed to strengthen visual encoding, attentional stability, and cognitive efficiency. The proposed intervention, Mastering the Mechanics of Visual Encoding, is a self-administered adaptive online training program intended to support foundational perceptual-cognitive skills associated with reading fluency, attention, and learning efficiency.

The proposed study will assess feasibility, early efficacy, and implementation potential across one or more target cohorts, including individuals with dyslexia, ADHD, high-functioning autism spectrum disorder (ASD), and adults at elevated risk of cognitive decline. The long-term aim is to

generate rigorous evidence for a practical, equitable intervention that may complement existing educational, cognitive, and digital learning systems.

3. Abstract

This proposal outlines a pilot validation study of Mastering the Mechanics of Visual Encoding, a scalable digital perceptual learning intervention developed by 1 Billion Lives (IBL). The intervention is designed to strengthen visual encoding, attentional stability, and cognitive efficiency through adaptive, gamified online training. The study will assess feasibility, early efficacy, and implementation potential across one or more target cohorts, including individuals with dyslexia, ADHD, high-functioning ASD, and adults at elevated risk of cognitive decline. Using a randomised, waitlist-controlled design with blinded analysis and pre-registration, the study will generate proof-of-concept evidence to support future replication, external evaluation, and responsible scale-up.

4. Background and Rationale

Across education, workforce development, and age-related cognitive support, substantial resources are devoted to improving human capability and quality of life. Yet many individuals remain underserved by systems that do not sufficiently adapt to differences in perception, attention, and information processing. This challenge is particularly visible among individuals with dyslexia, ADHD, ASD, and those at elevated risk of cognitive decline.

IBL's central hypothesis is that targeted perceptual learning may strengthen visual encoding and attentional control in ways that support broader educational and cognitive outcomes. Rather than replacing existing instruction, therapy, or clinical care, the intervention is designed as a foundational digital training layer that may complement active learning, flipped classroom models, and supportive care pathways.

The need for scalable and accessible interventions is significant. Existing systems often rely on labour-intensive support models that are difficult to personalise and expensive to scale. A low-cost intervention that can be delivered online and evaluated rigorously may offer meaningful implications for quality of life, productivity, and long-term public expenditure.

5. Significance

This pilot study is designed to test whether a low-cost, scalable perceptual learning intervention can produce measurable benefits in populations that are often underserved by conventional systems. If validated, the model may support broader application across lifelong learning, workforce readiness, educational access, and age-related cognitive support.

IBL's long-term vision is to contribute to improved outcomes at scale across the lifespan. The immediate purpose of this research, however, is to generate careful proof-of-concept evidence through a rigorous, feasible, and ethically governed pilot study.

6. Innovation

- The study tests a low-cost, scalable digital intervention rather than a resource-intensive in-person model.
- It focuses on foundational perceptual-cognitive processes that may cut across multiple populations rather than a single narrow symptom category.
- It is designed for broad accessibility and digital deployment, increasing the possibility of real-world implementation.
- It aims to generate evidence relevant to both education and cognitive health, bridging sectors that are often studied separately.

7. Study Aims

- Aim 1: Evaluate the feasibility of recruiting, retaining, and assessing participants across selected study cohorts.
- Aim 2: Assess preliminary efficacy of the intervention on perceptual-cognitive and attention-related outcome measures.
- Aim 3: Establish a rigorous protocol suitable for replication, independent review, and scale-up.
- Aim 4: Generate proof-of-concept evidence to support future grant funding, partnerships, and broader implementation planning.

8. Hypotheses

Primary Hypothesis: Participants assigned to the intervention condition will demonstrate greater improvement than waitlist controls on selected perceptual-cognitive and attention-related outcome measures following the intervention period.

Secondary Hypotheses:

- Participants will demonstrate acceptable rates of engagement, adherence, and retention, supporting feasibility of broader implementation.
- Improvements in perceptual-cognitive task performance will be associated with gains in functional indicators relevant to each cohort.
- The intervention will prove feasible for equitable digital delivery across a range of devices and settings.

9. Study Population

The initial study will focus on one or more of the following target cohorts:

- Dyslexia: Meta-analytic estimates place prevalence around 7.1%, with practical estimates often ranging from 5-10% depending on diagnostic criteria.
- ADHD: Recent CDC data indicate that 10.5% of children in the United States had current ADHD in 2022, with 11.3% having ever received a diagnosis.

- Autism Spectrum Disorder (ASD): CDC ADDM surveillance data report approximately 1 in 36 children (2.78%) in the U.S. were identified with ASD based on 2020 surveillance, reported in 2023.
- Adults at elevated risk of cognitive decline: Adults aged 50-65 with family history of cognitive decline or subjective cognitive concerns may represent an important group for early supportive intervention.

10. Study Design and Methodology

The proposed validation study will use a randomised, waitlist-controlled design with blinded analysis, pre-registration, and an open materials and analysis plan where appropriate.

Cohorts

- Dyslexia: Post-literacy individuals documented or suspected cases . Reports indicate that up to 80-90% of individuals with dyslexia, particularly in schools, may not receive a formal diagnosis or the necessary support . Our plan is to partner with a public charity or institution to publish a screening test to reach the entire population . Splitting this cohort into two groups .
- ADHD: Individuals with a formal diagnosis consistent with current clinical guidelines.
- At-risk cognition: Adults aged 50-65 with family history of cognitive decline or subjective cognitive concerns, screened to exclude dementia.
- High-functioning ASD: Individuals with autism spectrum profiles appropriate for self-administered digital participation.

Intervention Overview

Mastering the Mechanics of Visual Encoding is a self-administered, adaptive perceptual training program delivered online via PC, laptop, or mobile device. The intervention uses gamified tasks to reinforce visual discrimination, attentional stability, perceptual integration, and cognitive efficiency.

Intervention Period

Participants will complete a 6-8 week adaptive training program targeting visual encoding, attentional control, visual discrimination, perceptual integration, and cognitive efficiency.

Primary and Secondary Outcomes

- Dyslexia-related outcomes may include reading-related visual discrimination, attentional stability, and task efficiency.
- ADHD-related outcomes may include sustained attention, response inhibition, and intra-individual variability on attention tasks.
- At-risk cognition outcomes may include processing speed, visual short-term memory, and perceptual-cognitive integration measures.
- ASD-related outcomes may include attentional regulation, task engagement, and perceptual processing consistency.

- Secondary outcomes may include participant adherence, usability metrics, self-reported or caregiver-reported functional changes where appropriate, digital biomarkers of sustained participation, and subgroup differences by age, device type, or baseline performance.

Data Quality and Integrity

The study will incorporate device calibration checks, embedded attention checks, tamper detection safeguards, secure event logging, blinded primary endpoint analysis, and independent advisory oversight.

Feasibility

- The intervention is digitally delivered and self-administered.
- Recruitment can be supported through educational, clinical, and community networks.
- The study design is appropriate for proof-of-concept work and can be implemented with remote data collection.
- Quality control procedures can be built directly into the platform.

11. Ethics and Risk Statement

This study involves a non-invasive digital training intervention and is expected to present minimal risk to participants. Potential risks include fatigue, frustration, screen-related burden, or reduced engagement over time. These risks will be mitigated through informed consent, clear participation guidance, flexible session design, monitoring of engagement signals, and appropriate withdrawal options. All study procedures will be subject to ethics review and data protection safeguards.

12. Funding Request and Budget Justification

IBL is requesting $50,000-$300,000 in non-dilutive support to fund the pilot validation study.

Requested funds will support participant recruitment and retention, participant compensation, ethics and governance processes, secure data infrastructure, platform quality assurance, statistical analysis, external advisory review, and reporting outputs such as a white paper or preprint.

Suggested budget framing: Minimum viable pilot: $50,000. Preferred pilot budget: $150,000. Full multi-cohort pilot: $300,000.

The current compensation model proposes a $150 base payment for participants who complete core study participation and minimal feedback requirements over a six-month period, with an additional milestone-based bonus for participants who meet extended engagement or outcome targets. Final bonus structures should be standardised before formal submission so that the budget narrative and compensation policy are fully aligned.

13. Timeline

- Week 1: Finalise protocol, submit IRB/ethics materials, complete pre-registration, recruit advisory board, and complete technical QA.
- Month 1: Enrol first cohort, conduct interim safety and engagement review, and complete initial data quality audit.
- Month 3: Complete primary enrolment across selected cohorts, conduct preliminary efficacy review, and lock adaptive tuning.
- Month 6: Complete primary endpoint analysis for early cohorts, conduct external advisory review, and prepare replication and scale-up recommendations.
- Month 12: Complete final analyses, prepare a public preprint or white paper, develop a replication roadmap, and initiate implementation partnership discussions.

14. Expected Deliverables

- A pre-registered study protocol.
- Feasibility and engagement findings.
- Preliminary efficacy results.
- A replication roadmap.
- A public-facing white paper and/or preprint.
- Recommendations for implementation partnerships and future grant applications.

15. Partnership Value

In addition to funding, mission-aligned partnerships would strengthen the quality and equity of the study. Access to networks such as school districts, clinics, community health organisations, neurodiversity advocacy communities, and Alzheimer's and cognitive health support organisations would materially support recruitment, external validity, and independent evaluation.

16. Conclusion

1 Billion Lives is seeking pilot grant funding to test a practical, scalable intervention at the intersection of education, cognition, and digital delivery. We believe the convergence of perceptual training, adaptive technology, and emerging AI creates a timely opportunity to investigate new pathways for improving human capability across the lifespan.

This research study proposal is intended as a rigorous first step: a proof-of-concept validation effort that can inform future replication, responsible scale, and longer-term implementation planning.