Financial reasoning under uncertainty: evidence, confidence and simulated experience

Research on financial education, taught school programs and adult risk tools examines exposure, evidence and confidence under uncertainty. It distinguishes simulated outcomes from understanding and retains contrary findings, without establishing Trade After Class effectiveness.

Research by Education Angel Group.
Education Angel Group is developing Trade After Class and has an interest in the proposed product. This review does not establish its effectiveness.

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Earlier editions

- Trade After Class: learning to explain risk without rewarding speculation

  Research edition reviewed: 2026-09-19. Revision: public-v1.

Prepared by Education Angel Group (EAG). Research synthesis date: October 12, 2026. EAG is developing Trade After Class and has an interest in its success. This review examines financial-learning and risk-communication evidence. It considers the planned product separately from the findings of other programs.

1. Understanding a result is different from predicting one

A rising balance can make a decision look successful without explaining why it changed. A loss can occur despite a reasoned choice. In a fictional learning activity, either result can provide something to examine: which assumption mattered, how much was exposed to it, and what the result does not reveal. The educational purpose is understanding those relationships, not finding a way to make every outcome favorable.

Several questions sit beneath that purpose. A learner can calculate a percentage change without understanding the uncertainty surrounding an event. Someone can recognize uncertainty while struggling to explain the arithmetic. Another person can give a confident answer that depends on a premise the situation never supplied. These are possible distinctions in reasoning, not measured frequencies of student misconceptions.

Practice makes it possible to separate a decision from the pressure of risking money. But removing financial stakes does not establish that the lesson is understandable or harmless. Fiction can still imply that a result predicts real markets, that a winner demonstrated investing skill, or that there is one best allocation for everyone. An educational comparison needs room to question those implications, including when its arithmetic is correct.

The evidence discussed below concerns different interventions: broad financial education, a taught school investment program, adult risk-communication tools and existing classroom resources. Their outcomes are not interchangeable. The central question is what they establish about learning to interpret exposure and evidence, and where uncertainty remains.

2. Financial education is a category, not a single lesson

Kaiser, Lusardi, Menkhoff and Urban's April 2020 working paper synthesizes randomized financial-education experiments with varied populations and interventions. It reports positive average knowledge and behavioral findings. The October 11 source appraisal retained substantial heterogeneity, self-reported behavioral measures and inconclusive long-run sustainability, including only six studies examining 24-month outcomes. Its final journal identity is 2022; this review does not substitute uninspected final tables for working-paper details. No average estimate is transferred to a market-learning activity. Kaiser et al., S1.

The distinction is important because a category can contain many educational jobs. Understanding an interest calculation, recognizing a risky claim and explaining a portfolio's exposure require different information. A sustained curriculum can provide practice and support that a brief exercise cannot. A favorable category finding supplies a reason to investigate these topics, not permission to promise broad financial capability from any activity carrying the same label.

Knowledge and behavior also require different observations. A person may explain a concept accurately but have no relevant real-life decision to make. Someone's later financial choice may depend on circumstances that were absent from the lesson. Neither situation makes knowledge irrelevant; it makes the learning claim narrower. This review does not establish how much instruction is needed for a particular age or whether a short fictional comparison changes later investing behavior.

A useful account of learning therefore names the concept and its limits. Explaining why a disclosed event affects two allocations differently is a concrete task. Selecting real assets, forecasting returns or deciding what another household should do is not the same task. The source evidence cannot turn the first into proof of the others.

3. Instruction and simulation can be bundled together

The 2009 Stock Market Game evaluation examined a fall 2008 U.S. grades 4-10 program with classroom instruction and extended play. Recruitment led to 823 assignments; 568 teachers confirmed participation, and 522 classrooms supplied investor-knowledge data. Positive investor-knowledge findings coexist with nonsignificant grades 7-10 mathematics results in some models. Table 22 uses treatment-on-treated estimates with pretest adjustment. Volunteer recruitment, attrition, curriculum-related measures and the FINRA Investor Education Foundation's funding qualify interpretation. This is evidence about a taught program, not an isolated trading mechanic, later profit or a navigation setting.
Learning Point Associates, S2.

A bundled result leaves an attribution question. Explanation, repeated practice, peer discussion and adult support can occur together. Even if the whole program produces a useful measured result, that does not identify which element was sufficient. Removing the instruction while retaining the market-like activity changes the educational arrangement. Retaining the activity's visual surface alone cannot carry the program's evidence with it.

Participation is part of this question rather than a detail outside it. Those who provide follow-up data can differ from those who were assigned an activity but did not complete the study. A finding among observed participants does not automatically explain what happened to everyone else. The appropriate denominator depends on the question being answered, and missing observations should not be described as proof of either success or failure.

This evidence supports taking facilitated practice seriously while keeping the role of teaching visible. It does not establish that a game is necessary for every learner. An explanation, table or discussion may address the intended concept without the same amount of navigation or preparation. That alternative is a substantive educational possibility, not an inferior version defined by having less technology.

4. Risk tools have important contrary findings

Lejarraga, Ranganathan and Wulff's 2024 article reports four online studies with 3,804 recruited participants. Main studies used UK adults whose first language was English, with repeated incentivized allocations. Expected advantages of the tested risk tool for risk taking and subjective risk representations were not consistently reproduced. Instruction, default and incentive variations retained null patterns, while some experience/environment contrasts and confidence differences remained. Collection dates were not verified, and this review did not analyze the linked raw data. These adult task results neither prove that all simulations fail nor estimate a school-age learning effect. Lejarraga et al., S3.

The findings make a general inference less secure: showing simulated outcomes is not, by itself, evidence that someone now understands risk better. A person can learn the controls, notice which outcome occurred or become more willing to choose an option without acquiring the intended understanding. Conversely,

recognizing uncertainty could lead someone to be less confident while giving a more careful explanation. Confidence and demonstrated reasoning deserve separate consideration.

More or less risk taking is not automatically an educational success criterion. Its meaning depends on the stated options and information. A lesson about uncertainty can be useful without encouraging a larger risky allocation. A learner who changes a choice needs to be able to explain the reason, rather than receive praise simply for moving in a preferred direction.

The school-program and adult-tool findings need not contradict each other. They concern different ages, settings, content and outcomes. Treating them as one pooled simulation verdict would conceal those differences. The defensible position keeps both the encouraging school evidence and the contrary adult evidence visible, without converting either into a prediction for a new product.

5. Exposure, diversification and model assumptions

SEC investor education distinguishes allocation across assets from diversification across and within categories. It also notes that several narrowly focused funds can overlap in their holdings; different names alone do not establish diversified exposure. Separate guidance states that diversification cannot guarantee protection in a falling market. These are conceptual explanations, not a classroom intervention study or a personal allocation recommendation. SEC, S4b, S4.

In a fictional example, the relationship has to follow from the actual assumptions. If two labels respond to the same event in the same way, the labels alone do not create a different exposure. If their responses differ, the result is conditional on those disclosed responses. Neither case supplies an event probability. A single modeled loss does not show how frequently a comparable real-world loss occurs.

Comparisons also depend on what is held constant. Changing an allocation while retaining the same event examines that particular exposure. Changing both the allocation and event answers a different question. A better outcome under one event does not establish a generally better strategy. The distinction can be explained without selecting real securities or turning an educational example into a recommendation.

Concentration and composition are similarly distinct. Two allocations can have the same largest share while placing that share in different holdings. Their results can differ under a specified event even though the maximum share has not changed. Describing the smaller loss as proof of reduced concentration would misstate the comparison. This is an analytical distinction, not a finding about how frequently students or investors make that error.

A transparent model makes it possible to ask what another event would change and which information is missing. That question need not end with a calculation. Without a justified probability or additional assumptions, acknowledging an unresolved comparison can be more accurate than inventing an expected return. Learning can include recognizing the boundary of an answer, rather than extending the model until it produces one.

6. Evidence reading and explanations of uncertainty

A financial statement, an authored scenario and an observed historical series have different source roles. A fictional event is evidence of the rule chosen for that activity; it is not an observation that the event occurred. Historical data describe a measured period; they do not provide a guaranteed next outcome. An assertion of expertise is different again from a reason that can be inspected.

This distinction gives evidence-reading practice a concrete purpose. A learner can identify what a claim depends on, whether the stated information supports it and what remains unknown. Possible tasks include separating a scenario's premise from its calculated consequence, identifying a missing period or considering another explanation. These are proposed reasoning activities, not tested outcomes or final rules for a product.

The same care applies to explaining a loss. The result might follow correctly from a disclosed model while leaving the learner's original reasoning unchanged. It might reveal a premise the learner had overlooked. Or it might expose an inconsistency in the activity. Those possibilities require different responses. A mistaken calculation is not the same as a reasonable decision with an unfavorable outcome.

Revision can make a reason visible, but it can also become trial and error aimed at improving a balance. Comparing the original explanation with a revised one can help identify what changed; the comparison is not proof of learning by itself. A copied justification, a remembered answer and an explanation that applies in another case remain distinguishable possibilities.

No study appraised here establishes a general effect of an evidence-reading activity on youth investing judgment. The value of this educational direction remains a question about the particular task, its sources and the learner's understanding. It should not be answered by making an example look like live financial software or by adding a claim of predictive ability.

7. Existing alternatives and useful learning comparisons

The CFPB's Summer 2022 nine-page investment-game guide is intended for ages 13-19, grades 9-12 and a 45-60-minute session. Learners consider imaginary-company scenarios, explain price changes and reflect; its wrap-up cautions against treating the day's highest result as tomorrow's winner. The separate student worksheet was not appraised here. The guide establishes an existing educational approach, not comparative effectiveness or a measured benefit. CFPB, S7.

CFPB also maintains a broader classroom-activity directory. The Stock Market Game's first-party teacher guide describes preparation, tracking, reflection and locally varying return/equity rankings. These descriptions establish provision rather than superiority, effects of competition or guaranteed local access. CFPB, S5, SIFMA Foundation, S6.

These alternatives mean that fictional consequences and reflection are not automatically distinctive features. A shorter guided comparison can be adequate for a specific concept. A wider curriculum may be appropriate when the educational goal requires more context. Comparing those choices requires attention to what learners receive, the support available and the total effort, not only whether the experience is interactive.

Question	Relevant observation	What it cannot establish alone
Is the model coherent?	Assumptions, arithmetic and stated consequence agree	Improved understanding
Can the learner explain exposure?	A reason connects the allocation to the disclosed event	A good real investment
Does reasoning transfer?	An unfamiliar case requires applying the idea	Long-term retention or real financial behavior
Is confidence appropriate?	Certainty is considered alongside reasoning and acknowledged limits	A benefit from higher confidence alone
Is the format useful?	Learning and total learner/adult effort are considered together	Superiority from completion or enjoyment

This table is an analytical synthesis, not a validated assessment instrument. An unfamiliar case immediately after practice can concern transfer without establishing retention. A delayed repeat can concern memory without requiring transfer. Real financial choices require their own context and observations.

Total effort also includes reading, numeracy support, explanation and recovery from confusion. The same visible choice can be easy for one learner and demanding for another. No age-, language-, disability- or classroom-specific burden estimate for the planned product is available in this review. Support should not be treated as failure, but its role should remain visible when describing what a learner could do independently.

The possibility of no added advantage remains important. A guided table that yields adequate understanding with less work can be a sufficient approach. Broader topic coverage, longer use or a higher fictional balance does not establish a stronger educational result.

8. Relevance to Trade After Class

Trade After Class is planned as a character-led market-learning room connecting two or three distinct activities, with equivalent direct accessible routes. Portfolio, event-response and evidence-reading tasks are candidates, not finalized mechanics. Fictional funds and disclosed synthetic, historical or delayed material are intended to support comparison and questioning, rather than a profit leaderboard.
EAG selected product direction, A0.

The research is relevant to interpreting exposure, distinguishing a modeled consequence from a forecast and considering confidence alongside explanation. It does not establish learning from room navigation or that the proposed combination works. A single explanatory portfolio example is not the whole product and does not approve a holding count, event rule or save behavior.

There is no real trading, brokerage, custody, personalized advice or conversion of fictional holdings into Runstr rewards. Practice does not require real household income or holdings, and a result is no student eligibility signal or proof of investing skill. Availability, permissions and save behavior remain unverified for the planned product. A later study would need its own appropriate authorization and data protections.

9. Methods and remaining limits

This is a focused topic-led synthesis, not a systematic review, meta-analysis or original participant study. Financial-education and provider-source appraisals completed on October 11 inform this synthesis. On October 12, the original school report and CFPB guide were downloaded and the relevant recruitment, outcome, limitation and teaching passages inspected. The adult risk-tool article's original publisher methods, results and discussion and SEC allocation guidance were reopened. A renewed IZA working-paper request timed out; its earlier full appraisal remains attributed, not refreshed by a failed request.

Source publication years, measured periods and review dates remain distinct. Final financial-education journal tables, the risk-tool raw data and the separate CFPB worksheet were not newly appraised. Targeted earlier correction searches do not establish comprehensive correction or retraction clearance. The reviewed source sets do not provide a common outcome, comparable intervention or pooled estimate for market-learning activities.

No interviews, classroom observations, Trade outcome measurements or direct evidence of youth speculative interest were collected for this report. Suitability for particular ages, enduring transfer, preparation burden and accessible task performance remain unverified. No financial or educational compliance certification is supplied. The current interpretation leaves room for adequate simpler instruction and for findings that narrow rather than endorse the product's ambition.

References

- **A0. Education Angel Group.** Trade After Class selected definition, October 12, 2026. Intended scope, not effectiveness evidence.
- **S1. Kaiser, Lusardi, Menkhoff and Urban.** Financial Education Affects Financial Knowledge and Downstream Behaviors, April 2020 working paper; 2022 journal identity. Prior methods, external-validity and long-run appraisal.
- **S2. Learning Point Associates.** The Stock Market Game Study: Final Report, 2009. Printed pp.9-10, 24-25 and 36-37; fall 2008 program, participation, models and limits. FINRA Foundation funding.

- **S3. Lejarraga, Ranganathan and Wulff.** Can simulated experience be harnessed to help people make investment decisions?, 2024, DOI 10.1017/jdm.2024.17. Sections 2.4, 3.1-3.5 and general discussion; raw data not analyzed here.
- **S4. SEC Investor.gov.** Diversify Your Investments, undated conceptual guidance, prior October 11 appraisal.
- **S4b. SEC Investor.gov.** Asset Allocation and Diversification, undated official conceptual guidance, October 12 access.
- **S5. Consumer Financial Protection Bureau.** Classroom activity directory, prior October 11 provision appraisal, not an efficacy study.
- **S6. SIFMA Foundation.** Stock Market Game teacher resources, prior October 11 first-party provision appraisal.
- **S7. Consumer Financial Protection Bureau.** Playing an investment game, Summer 2022 guide, pp.1-5. Separate worksheet not appraised.