

Who Benefits from Scientific Entrepreneurship Training?

Synthesis — v9

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Evidence map.

Question	Finding	Status	Paper angle
Who benefits more from T? (12 moderators, 480+ cells, 3 estimators)	All null. D7 two hits disappear under lasso-only ($p > 0.5$).	Null — robust	Null-as-contribution: SDM is a universal skill
Does variance change?	SD identical T vs C all periods (Bartlett $p = 0.29$).	Null	Strengthens null claim
Who sustains gains P1→P2?	Fade-out homogeneous; no moderator predicts maintenance ($p > 0.13$).	Null	No “persistent learner” type
Site HTE	Wald $p = 0.0006$ (Δ SI P1) but driven by implementation quality.	Closed	Replicates Jannace et al. appendix
Which SI dimension moves most?	Two families: empirical (evidence/eval/decision, $d \approx 0.5$, P1–P2 only) vs theoretical (theory/hp, $d \approx 0.33$, persists).	Finding	SDM design insight: empirical side more teachable
SI sub-index integration	Sub-indices tightly bundled in two clusters; training does not change correlation structure (T vs C r: 0.516 vs 0.525).	Finding	Learning is additive, not integrative
Which sub-index drives T→pivot?	Theory does not mediate (Sobel $p = 0.67$). Only empirical family mediates: evidence 16–25%, evaluation 18–27%, decision 17–22% (all $p < 0.05$).	Key finding	Mechanism: empirical learning → pivot
T→ Δ SI→pivot (overall)	Partial mediation 21–26% at P1–P2 (Sobel $p < 0.01$). Direct T effect survives ($c' \approx 0.12$).	Finding	Mechanism confirmed; unpublished
Control arm dynamics	60% of control founders have negative Δ SI at P1–P2. <code>future_ev_influence</code> predicts deeper decline ($p = 0.041$).	Finding	Training prevents deterioration
Pivot count/quality	+1.04 pivots (ATE, $p < 0.001$); +34pp P(≥ 2 pivots); category shifts toward substantive.	Replication	Confirms SMJ 2024 at individual level; not a new contribution
Learning \times retention	Higher Δ SI marginally → exit by P3 (T \times Δ SI $p = 0.085$).	Borderline	Learning liberates, not retains
HTE on sub-indices	<code>future_ev_influence</code> and <code>months_working_1</code> consistently moderate empirical sub-indices at P1 ($p < 0.02$); does not survive MHT correction.	Suggestive	Exploratory; not publication-ready
Cognitive battery (Diego)	17 items: risk/unc. aversion, learning orient., competitiveness.	Pending	Opens or closes HTE story

The two-family SI structure (key new finding).

Sub-index	ATE by period					Mediation	
	P1	P2	P3	P4	P5	%Med P1	%Med P2
<i>Empirical family:</i>							
Evidence coll.	+0.87*	+0.76*	-0.12	-0.25	-0.16	16%**	25%***
Evaluation	+0.77*	+0.79*	-0.05	-0.09	-0.27	18%***	27%***
Decision-mkg	+0.72*	+0.72*	-0.04	-0.21	-0.51*	17%***	22%**
<i>Theoretical family:</i>							
Theory / hyp. gen.	+0.33*	+0.37*	+0.20	+0.14	+0.40	2%	4%
Hypothesis-testing	+0.40*	+0.39*	+0.28	+0.37	+0.13	14%**	4%
SI Overall	+0.60*	+0.59*				21%***	26%***

Notes. Mediation = Baron-Kenny ACME / total c path ($T \rightarrow \text{pivot}$), Sobel test. * $p < 0.05$, ** $p < 0.05$ Sobel, *** $p < 0.01$ Sobel. All HC1-robust with site FEs and baseline controls.

Interpretation. The SDM programme teaches two distinct things simultaneously. (1) **Empirical capacity** (evidence collection, evaluation, decision-making): large immediate effect, rapidly decays after P2, drives pivot behaviour. (2) **Theoretical capacity** (hypothesis generation, theory formation): smaller effect, persists longer, does *not* drive pivots. The mediation result explains why the direct $T \rightarrow \text{pivot}$ effect survives ($c' \approx 0.12$): the theoretical capacity channel has a direct effect on behaviour not captured by ΔSI .

Pivot count: replication, not finding.

Training adds +1.04 pivots on average (count ATE, $p < 0.001$) vs +0.17 on the binary; +34 pp more likely to pivot ≥ 2 times (57.7% vs 24.1%); category distribution shifts toward substantive pivots (2–3). This **confirms** Camuffo et al. (SMJ 2024) at individual level — the nonlinear, focused-pivoting pattern was already established. It is not a contribution to claim it again. The value here is internal: the count outcome captures the effect better than the binary, and we should use it as a dependent variable in mediation and HTE analyses rather than as a standalone result.

Literature position.

- *MS 2020, SMJ 2024* (replication), *SS 2024, SMJ 2024* (Novelli): pivots documented as secondary outcome; nonlinear aggregate pattern established.
- **Not published:** formal $T \rightarrow \Delta SI \rightarrow \text{pivot}$ mediation; decomposition by SI sub-index showing theory does not mediate, only empirical family does.
- **Not published:** two-family structure of SI sub-indices and the asymmetric decay (empirical collapses, theoretical persists).
- **Not published:** prevention-of-deterioration story (60% control negative ΔSI).

Way forward.

Without Diego’s data, the paper can be written as a mechanism paper:

1. ATE: training works uniformly (null HTE across 12 moderators, 3 estimators).
2. What changes: the empirical sub-indices move most and mediate the pivot effect (evidence collection/evaluation/decision \rightarrow pivot, 16–27%).
3. Persistence: empirical gains collapse at P3; theoretical gains persist. The “fade-out” of the overall ATE is driven by the empirical family, not the theoretical.
4. Counterfactual: without training, 60% of founders deteriorate in scientific thinking. Training partly prevents a natural decay.
5. Pivot count as better outcome variable: use count (not binary) in mediation and HTE analyses going forward — it captures more variance. The aggregate replication of SMJ 2024 is not itself a contribution.

With Diego’s cognitive battery: same mechanism story + HTE on the cognitive moderators (the only untested family). Signal \rightarrow heterogeneity paper. Null \rightarrow the mechanism paper stands fully.

Scripts: 08-12: D5, D6, D7, exploration, site HTE 13-16: mediation, translation HTE, control dynamics, attrition HTE 17: 5 new angles (variance, trajectory, sub-index ATEs, pivot count, $\Delta SI \times$ attrition) 18: SI sub-index deep (trajectories, correlation, mediation by sub-index, HTE on sub-indices)
Data: ERC_RED_HMC_clean.dta ($N = 6,732$, 8 sites, 3 arms) All results labeled EXPLORATORY.