LOG ID	BOOK REFERENCE	RCT FILTER	CONFIDENCE TIER
SEC 3.8.1	CHAPTER 3: PROCESSOR (Conscious Management)	**ON**	**CONSENSUS**

AUDITED CLAIM

FEEDBACK LOOP OVERRIDE (DOPAMINE MANAGEMENT)

SYSTEMS MODEL — AS STATED IN THE BOOK

> Consciously attach the reward to the **effort itself**... triggering the **reward cascade** simply because the difficult task is being executed creates a highly sustainable processing loop.

VALIDATION QUERY

Does cognitively reframing rewards to focus on intrinsic effort rather than extrinsic outcomes increase sustained motivation and task persistence?

EMPIRICAL FINDING

Behavioral neuroscience demonstrates that cognitively reframing motivation away from extrinsic outcomes and toward **intrinsic effort** significantly enhances task persistence. Attaching internal reward to execution optimizes **dopaminergic regulation** for long-term endurance.

PRIMARY ANCHORS

- → **Vansteenkiste et al., 2005, Child Development**
- → **Mrazek et al., 2018, Journal of Experimental Social Psychology**

ABOUT THIS RECORD

Each claim in the book is decompiled from its IT metaphor into a naked, falsifiable scientific claim, then anchored to a **primary peer-reviewed source**. Claim and anchor are queried against the Consensus academic database (200M+ papers) under a fixed protocol — top-tier **Q1/Q2 journals only**, preprints excluded, human studies only. If a hypothesis fails the audit, the build is rejected: the AI generates the syntax; the peer-reviewed grid validates the physics.

CONFIDENCE TIERS

- **CONSENSUS ◀ this log** — broadly established, highly replicated mechanics.
- **EMERGING** — plausible, actively researched; no universal consensus yet.
- **EXPERIMENTAL** — contested, extrapolated, or purely theoretical.

RCT FILTER — Controlled Studies is ON for interventions (a forced action must beat a control) and OFF for mechanisms (so foundational neuroscience isn't blocked).

THE DREAM MACHINE

OPERATING SYSTEM FOR THE SOUL

You are complex biological hardware running outdated psychological software. *The Dream Machine* translates rigorous IT architecture — security auditing, network protocols, load balancing — into actionable, peer-reviewed models for mental resilience: debug burnout, configure a hallucination firewall against cognitive distortions, and patch your internal OS with hard logic and verified neuroscience.

INITIATE SYSTEM UPDATE

Ready to debug your own source code? Scan to access the cybernetic manual and reboot your cognitive architecture today. → **dreammachine.systems**

Yes, **intrinsic effort framing** generally **improves sustained motivation** and **task persistence**, but effects vary by context.

1. Introduction

Across this corpus, cognitively reframing motivation away from external outcomes and toward effort, mastery, autonomy, values, or internally meaningful goals generally increases persistence more reliably than purely outcome-focused or controlling reward structures. Foundational experiments showed that tangible rewards can reduce intrinsic motivation, while verbal feedback and competence-signaling rewards can increase it (Deci, 1971; Enzle & Ross, 1978). Later field and randomized studies extended that pattern: intrinsic goal framing improved conceptual learning through greater task involvement, growth-mindset and self-regulation reframing increased perseverance, and values-based framing outlasted monetary enhancement on transfer tasks (Vansteenkiste et al., 2005; Mrazek et al., 2018; Schneider & Arch, 2023).

The evidence is not one-sided. Some studies found that performance-contingent rewards can improve motivation and performance, especially when rewards signal competence, utility, or progress rather than mere compliance (Hendijani et al., 2016; Tsay et al., 2019). Other work shows that autonomy, choice, interest, self-efficacy, and meaningful value are recurring mechanisms that help sustain engagement over time, including in education, psychotherapy, and cognitively demanding tasks (Norbury et al., 2024; Yin et al., 2020; Linnenbrink-Garcia et al., 2018).

Does cognitively reframing rewards to focus on intrinsic effort rather than extrinsic outcomes increase sustained motivation and task persistence?

N = 6

Yes 100% · Possibly 0% · Mixed 0% · No 0%

FIGURE 1 Research consensus on intrinsic effort framing effects

The consensus is positive but not absolute. The strongest support is for reframing that increases autonomy, competence, values, or effort meaning; the weakest support is for claims that any reduction in extrinsic emphasis will automatically improve long-term persistence (Abraham et al., 2019; Mrazek et al., 2018; Bright et al., 2025).

2. Methods

This Deep Search synthesis was conducted over more than 170 million research papers indexed in Consensus, including Semantic Scholar, PubMed, and other scholarly sources. The search identified 4,535 directly relevant papers for the focal query, expanded through citation crawling and adjacent concept searches to a much larger candidate set, and then machine-filtered for controlled human studies. In total, 151 unique papers passed relevance screening, and the top 50 most relevant papers were included for detailed synthesis here.

Search Strategy

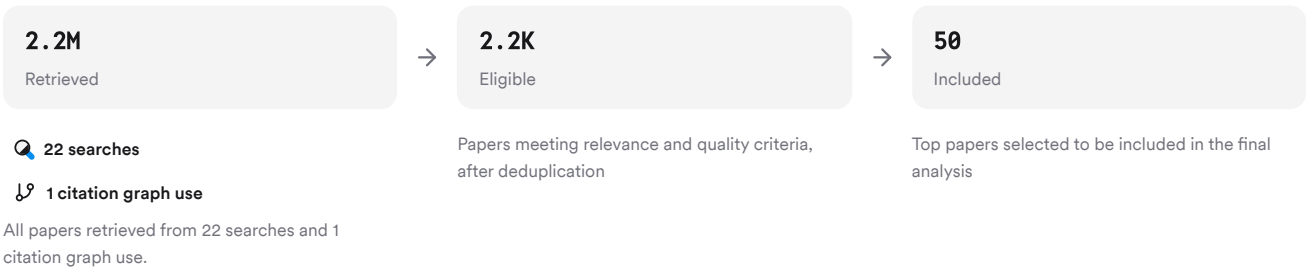

FIGURE 2 Deep search screening and inclusion process

The strategy combined foundational theory, reward-framing interventions, mindset and self-regulation studies, null findings, and cross-disciplinary motivation research.

3. Results

3.1 Key Papers

Three papers anchor this literature. Deci established the core distinction between controlling rewards and informational feedback, Vansteenkiste showed that intrinsic goal framing improves learning through task involvement, and Mrazek showed that reframing effort beliefs can increase perseverance on difficult tasks (Deci, 1971; Vansteenkiste et al., 2005; ■ Mrazek et al., 2018).

Paper	Summary
(Deci, 1971)	Money reduced interest; **verbal feedback increased it** (Deci, 1971)
(Ayabe et al., 2025)	**Intrinsic goal framing** improved conceptual learning (Vansteenkiste et al., 2005)
(Incekara-Hafalir et al., 2019)	Growth mindset increased **persistence and effort** (■ Mrazek et al., 2018)

FIGURE 3 Foundational papers in reward reframing research

3.2 Reward Framing Comparisons

Direct comparisons show that the effect depends on what the reward communicates.

Dimension	Effort or Intrinsic Framing	Extrinsic or Outcome Framing	Citations
Immediate interest	Often increases or is preserved	Often decreases with controlling money rewards	(Deci, 1971)
Learning transfer	Better conceptual or generalized effects	Shorter-lived or narrower effects	(Vansteenkiste et al., 2005; Schneider & Arch, 2023)
Persistence	Higher on difficult or impossible tasks	Less reliable	(■ Mrazek et al., 2018; ■ Burnette et al., 2020)
Competence signal	Supports motivation	Weak when reward is mere completion	(Abraham et al., 2019)
Autonomy	Usually helps sustain effort	Lack of choice weakens effects	(■ Triebner et al., 2024; Incekara-Hafalir et al., 2019)

FIGURE 4 Comparison of intrinsic and extrinsic framing effects

Key differences are consistent with cognitive evaluation and self-determination accounts. Rewards help most when they affirm competence or preserve agency, and they help least when they feel controlling or reduce behavior to payoff-seeking (Deci, 1971; Steinhorst & Klöckner, 2018).

3.3 Intervention Findings

Effort-focused reframing improved concentration and positive feelings in a difficult memory task, and in women it also improved later correction of low-confidence errors, suggesting task-level motivational benefits beyond the rewarded trials themselves (Abraham et al., 2019). Growth-mindset interventions increased task persistence in entrepreneurship students, and related work on self-regulation mindsets increased perseverance on impossible anagrams while changing fatigue attributions (■ Burnette et al., 2020; ■ Mrazek et al., 2018).

Values-based framing in exposure therapy reduced later anxiety and generalized better than monetary enhancement, while money only temporarily increased speech duration on the initial task (Schneider & Arch, 2023). In work settings, SMART goal-setting increased daily flow and engagement and kept flow more stable within the week, which is one of the clearer sustained-engagement patterns in the corpus .

3.4 Boundary Conditions

Not all studies favor intrinsic reframing over extrinsic incentives. A controlled experiment found that performance-contingent rewards and intrinsic motivation both improved motivation and performance, contrary to a strict undermining account (Hendijani et al., 2016). In gamified online learning, tangible redeemable rewards outperformed intangible rewards on intrinsic motivation, engagement, and exam performance, likely because they carried utility and competence meaning rather than acting as mere control signals .

Some manipulations also produced nulls or limited effects. Self-reference improved episodic memory but not semantic retrieval in semantic aphasia (Souter et al., 2021). A motor-learning study found no between-group differences in intrinsic motivation or retention across autonomy and performance-contingent practice conditions, possibly because very high task difficulty overwhelmed subtler motivational effects (Bright et al., 2025).

Results Timeline

Reward-framing research has moved from undermining-effect foundations to more nuanced mechanism testing.

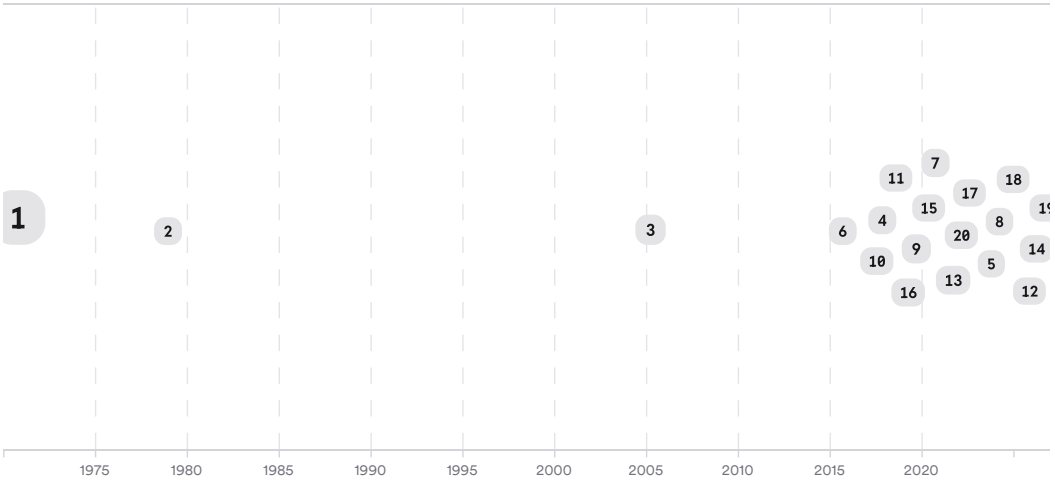

FIGURE 5 Timeline of reward framing findings; larger markers indicate more citations

The arc shows a shift from asking whether rewards are harmful to asking which kinds of framing preserve autonomy, competence, and persistence. Newer studies increasingly test values, mindset, interest, self-efficacy, and control as distinct mechanisms rather than treating motivation as a single construct (Deci, 1971; Mehta et al., 2024; Ayabe et al., 2025).

Top Contributors

Across this corpus, Edward Deci, Maarten Vansteenkiste, and Jennifer Burnette appear most prominently, while *Journal of Experimental Social Psychology*, *British Journal of Educational Psychology*, and *Behaviour Research and Therapy* are among the most recurrent journals represented here.

Type	Name	Papers
Author	E. Deci	[b045231568e45e64b88e2b14abefa1db]
Author	M. Vansteenkiste	[81e84ccef7f059f3afa175b9a6c08983]
Author	J. Burnette	[8d2252f2769858a89918ad8b30bf025c] [91749994db925895ad2497269729e808]

Type	Name	Papers
Journal	*Journal of Experimental Social Psychology*	[135b4a7c86235119970556089b37644f]
Journal	*The British Journal of Educational Psychology*	[91749994db925895ad2497269729e808]
Journal	*Behaviour Research and Therapy*	[c9c85b474bf35beaaeb71e2cbbe16853] [1deb34eb3c03589db8efd7651f66678f]

FIGURE 6 Authors and journals appearing most often

4. Discussion

The strongest claim this corpus supports is not that extrinsic rewards are always harmful, but that motivational reframing works best when it shifts perceived causality inward and makes effort feel self-endorsed, competent, or values-consistent. That pattern appears in foundational reward studies, intrinsic goal framing, growth mindset interventions, and autonomy-supportive teaching designs (Deci, 1971; Vansteenkiste et al., 2005; ■ Mrazek et al., 2018; ■ Triebner et al., 2024).

The literature is fairly strong on short-term motivation and moderate on sustained persistence. Several randomized or controlled studies show persistence gains, more difficult-task engagement, or better transfer over days to months, including growth mindset, imagery, science-persistence, and positive imagery or cognitive restructuring interventions (■ Burnette et al., 2020; Ji et al., 2021; Linnenbrink-Garcia et al., 2018; Cheng et al., 2025). But many studies still rely on self-report, narrow populations, or educational proxies rather than long-run behavioral persistence, and some effects are subgroup-specific or context-dependent (Abraham et al., 2019; ■ Burnette et al., 2020; Bennett-Pierre et al., 2024).

A second strength is nuance around mechanisms. Choice, self-efficacy, competence, interest, goal progress, and positive affect repeatedly emerge as mediators or correlates of sustained engagement (Norbury et al., 2024; Craske et al., 2023; Burnette et al., 2017; Nixon et al., 2022). A major limitation is that directly manipulating “intrinsic effort framing” is less common than manipulating adjacent constructs like values, growth mindset, or autonomy, so the answer depends partly on converging inference rather than many exact conceptual replications (Abraham et al., 2019; Schneider & Arch, 2023; ■ Astuti & Wangid, 2020).

Claim	Evidence Strength	Reasoning	Papers
Reframing toward **effort, mastery, or intrinsic goals** usually improves motivation and persistence.	Strong	Multiple controlled studies across education and behavior show better persistence, task involvement, or sustained engagement.	(Vansteenkiste et al., 2005; ■ Mrazek et al., 2018; ■ Burnette et al., 2020; Linnenbrink-Garcia et al., 2018)
Controlling tangible rewards can undermine intrinsic motivation.	Strong	Foundational experiments and later framing work converge when rewards are expected, tangible, and non-autonomy-supportive.	(Deci, 1971; ■ Enzle & Ross, 1978; Steinhorst & Klöckner, 2018)
Performance-contingent or competence-signaling rewards can preserve or increase motivation.	Moderate	Several studies show rewards help when they communicate competence, utility, or progress rather than simple control.	(Abraham et al., 2019; Hendijani et al., 2016)
Benefits on **long-term persistence** are real but less consistently measured.	Moderate	Some studies show persistence over weeks or months, but many outcomes are short-term or indirect.	(Cheng et al., 2025; Linnenbrink-Garcia et al., 2018; Steinhorst & Klöckner, 2018)

Claim	Evidence Strength	Reasoning	Papers
Simply replacing outcome focus with intrinsic framing **does not always help**.	Weak	Nulls appear under high difficulty, some populations, or when intrinsic manipulations are weak.	(Souter et al., 2021; Bright et al., 2025; Bennett-Pierre et al., 2024)

FIGURE 7 Key claims and evidence strength ratings

5. Conclusion

Overall, cognitively reframing rewards toward intrinsic effort, mastery, autonomy, or personal values does appear to increase sustained motivation and task persistence more often than focusing on extrinsic outcomes alone. The field has moved beyond a simple intrinsic-good, extrinsic-bad dichotomy toward a more precise view: what matters is whether rewards feel controlling or instead reinforce competence, choice, and meaning (Deci, 1971; Jiang et al., 2021; Steinhorst & Klöckner, 2018).

Research Gaps

The clearest gaps are long-term follow-up, direct tests of reward reframing itself, and broader generalization beyond student and lab samples.

Topic/Outcome	Long-Term Follow-Up	Direct Framing Manipulation	Diverse Clinical/Work Samples	Objective Persistence Measures
Effort-focused reward framing	2	3	1	2
Growth mindset and effort beliefs	4	6	3	3
Values and autonomy interventions	3	5	4	2
Gamified or competence-signaling rewards	4	5	2	4
Workplace and health persistence	2	2	5	3

Open Research Questions

Direct head-to-head tests remain limited, especially for sustained real-world persistence.

Question	Why
Does effort-focused reward framing outperform outcome-focused reward framing over six months in real educational or workplace tasks?	Most studies measure short-term motivation, leaving durable behavioral persistence uncertain.
Which mediator matters most for persistence: autonomy, competence, self-efficacy, values, or positive affect?	Current studies implicate several mechanisms, but rarely compare them within one design.
For whom does intrinsic reframing fail or backfire under high difficulty, low baseline interest, or clinical impairment?	Boundary conditions are evident, but subgroup-specific failures remain poorly mapped.

In answer to the question asked: yes, intrinsic effort framing generally increases sustained motivation and task persistence, but the benefit depends on preserving autonomy, competence, and meaningful engagement rather than merely downplaying outcomes.

References

Abraham, D., McRae, K., & Mangels, J. A. (2019). "A" for Effort: Rewarding Effortful Retrieval Attempts Improves Learning From General Knowledge Errors in Women. *Frontiers in Psychology, 10*. https://doi.org/10.3389/fpsyg.2019.01179

Astuti, L. P., & Wangid, M. N. (2020). The Effectiveness of Cognitive Restructuring Techniques in Improving Students Learning Motivation. *Islamic Guidance and Counseling Journal*. https://doi.org/10.25217/igcj.v3i2.658

Ayabe, H., Koike, T., Yoshioka, A., Izuno, S., Ogasawara, K., Tsuchimoto, S., & Sadato, N. (2025). Beyond the Undermining Effect: Extrinsic Rewards Preserve Neural Intrinsic Reward.. *Behavioural brain research*, 115996. https://doi.org/10.1016/j.bbr.2025.115996

Bennett-Pierre, G., Chernuta, T., Altamimi, R., & Gunderson, E. A. (2024). Effects of praise and "easy" feedback on children's persistence and self-evaluations.. *Journal of experimental child psychology, 247*, 106032. https://doi.org/10.1016/j.jecp.2024.106032

Bright, D., Smith, J., Kearney, P., & Runswick, O. R. (2025). Task difficulty promotes tactical learning but supresses the positive learning effects of autonomy and cognitive effort.. *Human movement science, 101*, 103354. https://doi.org/10.1016/j.humov.2025.103354

Burnette, J., Pollack, J., Forsyth, R., Hoyt, C. L., Babij, A. D., Thomas, F., & Coy, A. (2020). A Growth Mindset Intervention: Enhancing Students' Entrepreneurial Self-Efficacy and Career Development. *Entrepreneurship Theory and Practice, 44*, 878 - 908. https://doi.org/10.1177/1042258719864293

Burnette, J., Russell, M., Hoyt, C. L., Orvidas, K., & Widman, L. (2017). An Online Growth Mindset Intervention in a Sample of Rural Adolescent Girls. *The British journal of educational psychology, 88*, 428 - 445. https://doi.org/10.1111/bjep.12192

Cheng, C., Liu, M., Huang, Y., Qian, L., Zhou, Z., & Wei, L. (2025). An Exploratory Randomized Controlled Trial Comparing Positive Imagery Shifts and Cognitive Restructuring in Enhancing Behaviour Activation for Depression.. *Clinical psychology & psychotherapy, 32 4*, e70138. https://doi.org/10.1002/cpp.70138

Craske, M., Meuret, A., Echiverri-Cohen, A., Rosenfield, D., & Ritz, T. (2023). Positive affect treatment targets reward sensitivity: A randomized controlled trial. *Journal of consulting and clinical psychology, 91*, 350 - 366. https://doi.org/10.1037/ccp0000805

Deci, E. (1971). Effects of Externally Mediated Rewards on Intrinsic Motivation.. *Journal of Personality and Social Psychology, 18*, 105-115. https://doi.org/10.1037/h0030644

Enzle, M., & Ross, J. M. (1978). Increasing and decreasing intrinsic interest with contingent rewards: A test of cognitive evaluation theory☆. *Journal of Experimental Social Psychology, 14*, 588-597. https://doi.org/10.1016/0022-1031(78)90052-5

Hendijani, R., Bischak, D., Arvai, J., & Dugar, S. (2016). Intrinsic motivation, external reward, and their effect on overall motivation and performance. *Human Performance, 29*, 251 - 274. https://doi.org/10.1080/08959285.2016.1157595

Incekara-Hafalir, E., Lee, G., Siah, A. K., & Xiao, E. (2019). Incentives to Persevere. *Manag. Sci., 69*, 5378-5393. https://doi.org/10.2139/ssrn.4099896

Ji, J. L., Geiles, D., & Saulsman, L. (2021). Mental imagery-based episodic simulation amplifies motivation and behavioural engagement in planned reward activities.. *Behaviour research and therapy, 145*, 103947. https://doi.org/10.1016/j.brat.2021.103947

Jiang, J., Kusamoto, M., & Tanaka, A. (2021). Moderating Effects of Individual Differences in Causality Orientation on Relationships between Reward, Choice, and Intrinsic Motivation. *Frontline Learning Research*. https://doi.org/10.14786/flr.v9i3.751

Linnenbrink-Garcia, L., Perez, T., Barger, M. M., Wormington, S., Godin, E. A., Snyder, K. E., Robinson, K. A., Sarkar, A., Richman, L., & Schwartz-Bloom, R. (2018). Repairing the Leaky Pipeline: A Motivationally Supportive Intervention to Enhance Persistence in Undergraduate Science Pathways. *Contemporary educational psychology, 53*, 181 - 195. https://doi.org/10.1016/j.cedpsych.2018.03.001

Mehta, M., Butler, G., Ahn, C., Whitaker, Y., Bachi, K., Jacob, Y., Treadway, M., Murrough, J. W., & Morris, L. (2024). Intrinsic and extrinsic control impact motivation and outcome sensitivity: the role of anhedonia, stress, and anxiety. *Psychological medicine, 54*, 4575 - 4584. https://doi.org/10.1017/s0033291724002022

Mrazek, A. J., Ihm, E., Molden, D. C., Mrazek, M., Zedelius, C. M., & Schooler, J. (2018). Expanding minds: Growth mindsets of self-regulation and the influences on effort and perseverance. *Journal of Experimental Social Psychology*. https://doi.org/10.1016/j.jesp.2018.07.003

Nixon, P., Ebert, D., Boß, L., Angerer, P., Dragano, N., & Lehr, D. (2022). The Efficacy of a Web-Based Stress Management Intervention for Employees Experiencing Adverse Working Conditions and Occupational Self-efficacy as a Mediator: Randomized Controlled Trial. *Journal of Medical Internet Research, 24*. https://doi.org/10.2196/40488

Norbury, A., Hauser, T., Fleming, S., Dolan, R., & Huys, Q. (2024). Different components of cognitive-behavioral therapy affect specific cognitive mechanisms. *Science Advances, 10*. https://doi.org/10.1126/sciadv.adk3222

Schneider, R., & Arch, J. J. (2023). Values- versus monetary reward-enhanced exposure therapy for the treatment of social anxiety in emerging adulthood.. *Journal of anxiety disorders, 100*, 102788. https://doi.org/10.1016/j.janxdis.2023.102788

Souter, N. E., Stampacchia, S., Hallam, G., Thompson, H., Smallwood, J., & Jefferies, E. (2021). Motivated semantic control: Exploring the effects of extrinsic reward and self-reference on semantic retrieval in semantic aphasia. *Journal of Neuropsychology, 16*, 407 - 433. https://doi.org/10.1111/jnp.12272

Steinhorst, J., & Klöckner, C. (2018). Effects of Monetary Versus Environmental Information Framing: Implications for Long-Term Pro-Environmental Behavior and Intrinsic Motivation. *Environment and Behavior, 50*, 1031 - 997. https://doi.org/10.1177/0013916517725371

Triebner, N., Sonnauer, F., Rauch, M., Kersten, G.-M., Rauch, C., Mestermann, S., Bailer, M., Kornhuber, J., Utz, J., & Spitzer, P. (2024). Promoting motivation and reducing stress in medical students by utilizing self-determination theory – a randomized controlled trial in practical psychiatry courses. *BMC Medical Education, 24*. https://doi.org/10.1186/s12909-024-06181-9

Tsay, C., Kofinas, A. K., Trivedi, S. K., & Yang, Y. (2019). Overcoming the novelty effect in online gamified learning systems: An empirical evaluation of student engagement and performance. *J. Comput. Assist. Learn., 36*, 128-146. https://doi.org/10.1111/jcal.12385

Vansteenkiste, M., Simons, J., Lens, W., Soenens, B., & Matos, L. (2005). Examining the motivational impact of intrinsic versus extrinsic goal framing and autonomy-supportive versus internally controlling communication style on early adolescents' academic achievement.. *Child development, 76 2*, 483-501. https://doi.org/10.1111/j.1467-8624.2005.00858.x

Yin, J., Goh, T., Yang, B., & Yang, X. (2020). Conversation Technology With Micro-Learning: The Impact of Chatbot-Based Learning on Students' Learning Motivation and Performance. *Journal of Educational Computing Research, 59*, 154 - 177. https://doi.org/10.1177/0735633120952067