

Interventions for self-efficacy

Dialogue between Luis P. Priet and OpenAI's Deep Research

You said:

You are an expert researcher in psychology, especially educational psychology and doctoral education. What are the best evidence-based interventions to improve self-efficacy, especially in adults? pay special attention to interventions studied in doctoral and graduate education. Please provide the key references to the proposal/description of each of the interventions and its most solid evaluations.

ChatGPT said:

To provide the best evidence-based interventions to improve self-efficacy, particularly in doctoral and graduate education, could you clarify a few details?

1. Specific Focus: Are you interested in general self-efficacy or domain-specific self-efficacy (e.g., academic self-efficacy, research self-efficacy, teaching self-efficacy)?
2. Type of Evidence: Do you prefer meta-analyses, systematic reviews, or empirical studies with experimental or quasi-experimental designs?
3. Intervention Format: Are you looking for structured programs, mentoring/coaching interventions, cognitive-behavioral approaches, or technology-enhanced interventions?
4. Time Frame: Should the studies be recent (e.g., last 10 years), or are older seminal works also relevant?
5. Geographical Scope: Should the studies focus on a particular region or be globally representative?

Let me know your preferences so I can refine the research accordingly.

You said:

Focus separately on both general self-efficacy and (domain-specific) research self-efficacy. Consider all types of evidence: meta-analyses and systematic reviews preferred, but most importantly consider adult populations (rather than children or teenagers). Consider all types of interventions. Consider all time frames (date of publication) and no particular geographical scope (globally representative).

ChatGPT said:

Great, I will gather evidence-based interventions to improve self-efficacy, focusing separately on general self-efficacy and domain-specific research self-efficacy in adult populations, particularly within doctoral and graduate education. I will prioritize meta-analyses and systematic reviews but also include high-quality empirical studies with experimental or quasi-experimental designs. All types of interventions will be considered, without limitations on publication date or

geographical scope. I'll compile the key references and summaries of their effectiveness. I'll get back to you once the research is complete.

Research completed in 5m · 35 sources

Improving Self-Efficacy in Adult Graduate Populations: Evidence-Based Interventions

Self-efficacy, defined by Bandura as one's belief in their ability to succeed in specific situations, is a crucial factor in graduate and doctoral education. High self-efficacy correlates with better stress management, persistence, and performance [pmc.ncbi.nlm.nih.gov/pmc.ncbi.nlm.nih.gov](#). Fortunately, research shows that self-efficacy can be strengthened through targeted interventions. Below, we review evidence-based approaches to boost general self-efficacy (overall confidence in handling challenges) and domain-specific research self-efficacy (confidence in performing research

tasks) among adult learners, especially graduate and doctoral students. We prioritize meta-analyses, systematic reviews, and rigorous studies, and we note the original development of key interventions alongside their most robust evaluations.

Interventions for General Self-Efficacy in Graduate Students

General self-efficacy can be enhanced through multi-component programs, skills training, mentorship, and cognitive-behavioral techniques that improve students' overall confidence and coping abilities. Effective interventions often draw on Bandura's four sources of efficacy (mastery experiences, vicarious modeling, social persuasion, and psychological states)^{[pubmed.ncbi.nlm.nih.gov](#)}. Indeed, a systematic review found that programs providing performance feedback (mastery evidence of past success) and vicarious experiences (observing peers succeed) produced the largest self-efficacy gains, whereas standalone verbal encouragement had weaker effects^{[pubmed.ncbi.nlm.nih.gov](#)}. Below we outline proven approaches:

- **Structured Psychoeducational and Skills Programs:** Many successful interventions are structured as multi-week workshops or courses teaching stress management, study skills, and positive mental health practices. An integrative review of 10 studies concluded that programs 8–12 weeks long, incorporating psychoeducation, positive mental health content, and regular homework practice, were most effective at strengthening college students' general self-efficacy^{[pmc.ncbi.nlm.nih.gov](#)}. Typical programs include sessions on time management, resilience, mindfulness, and coping strategies. For example, Terp et al. implemented a 10-week cognitive-behavioral stress management program for nursing students and found that one year later the intervention group had significantly higher self-efficacy and stress-management competency than controls^{[pubmed.ncbi.nlm.nih.gov](#)}. Similarly, a U.S. study at Yale introduced a curriculum-based mental health course for graduate students: in a randomized trial it significantly improved students' general self-efficacy by the end of the program compared to a control group^{[pmc.ncbi.nlm.nih.gov](#)}. Common elements in these programs are training in relaxation techniques, meditation, guided imagery, and other self-regulation skills delivered in group sessions led by psychologists or trained facilitators^{[pmc.ncbi.nlm.nih.gov](#)}. The emphasis on active skill practice and reflection (often via homework exercises) helps translate new coping skills into the sense of mastery that builds self-efficacy^{[pmc.ncbi.nlm.nih.gov](#)}.
- **Cognitive-Behavioral Interventions:** Approaches grounded in cognitive-behavioral therapy (CBT) are frequently used to improve self-efficacy by reframing unhelpful thoughts and gradually building coping skills. Many of the structured programs above have a CBT core. For instance, Recabarren et al. (2019) and Farrer et al. (2019) tested

multi-component CBT-based interventions (in-person and online, respectively) for university students, incorporating techniques like cognitive restructuring, stress inoculation, and mindfulness practice^{pmc.ncbi.nlm.nih.gov}. These studies, compiled in the integrative review, showed that eight-session group CBT workshops led by professionals can enhance general self-efficacy (alongside reducing anxiety and distress) when implemented with sufficient dosage and engagement^{pmc.ncbi.nlm.nih.gov}. Key to CBT's impact is guiding students through mastery experiences (e.g. successfully using a new coping strategy) and providing feedback, which directly bolsters their confidence^{pubmed.ncbi.nlm.nih.gov}. In practice, CBT-oriented interventions have addressed issues like test anxiety, impostor feelings, and time management, all with the aim of increasing students' belief in their ability to handle academic challenges.

- **Mentoring and Coaching for Confidence:** Supportive mentoring and coaching can improve general academic self-efficacy by offering social encouragement and role modeling. While mentorship is often domain-specific, some programs pair graduate students with mentors or coaches to work on goal-setting, motivation, and problem-solving more broadly. Research suggests that peer mentoring during the transition to graduate school yields benefits such as reduced stress and greater academic confidence^{researchgate.net}. For example, a systematic review of peer mentoring in higher education found improvements in newcomers' social integration and self-beliefs, including self-efficacy^{researchgate.net}. Mentors (whether faculty or peers) provide vicarious learning and verbal persuasion – two of Bandura's sources – by sharing their own experiences and affirming the mentee's capabilities. One classic study by Campbell & Campbell (2007) noted that undergraduate protégés in a faculty mentoring program reported stronger academic self-efficacy than non-mentored peers (along with better grades), highlighting the potential of mentoring relationships to bolster confidence. In graduate education, formal coaching programs (e.g. academic life coaching or productivity coaching) have similarly reported increased self-efficacy, though high-quality experimental evaluations in this area are still emerging. Overall, establishing a supportive mentor–mentee relationship that combines personal support with guided skill development is considered a best practice for fostering self-efficacy^{eric.ed.gov}.
- **Technology-Enhanced Interventions:** Digital platforms are being used to deliver self-efficacy interventions at scale. Online modules, mobile apps, and virtual peer groups can provide flexible support, though results have been mixed. On one hand, online psychoeducational programs (such as the “Uni Virtual Clinic”) have been trialed to improve student well-being and self-efficacy, but some RCTs showed little added benefit over controls^{pmc.ncbi.nlm.nih.gov}. On the other hand, using social media or virtual groups for support has shown promise. A study by Ribeiro et al. (2020) delivered a guided self-esteem and confidence-building intervention via a Facebook group for nursing students and observed gains in psychological resources (self-esteem, optimism), indirectly supporting self-efficacy^{pmc.ncbi.nlm.nih.gov}. A more direct example is the “Shut Up & Write!” approach adapted to Zoom: early-career researchers who joined a 12-week virtual writing accountability group not only became more productive but also reported significant improvements in writing self-efficacy (measured by pre/post surveys)^{pmc.ncbi.nlm.nih.gov}. This suggests that well-designed online communities and e-interventions – especially those that facilitate active

engagement, peer modeling, and feedback – can improve self-efficacy. Technology can also reinforce CBT techniques (through interactive exercises or just-in-time prompts) and extend the reach of mentoring (e.g. e-mentoring programs). While more meta-analytic evidence is needed on long-term effectiveness, these tools are a valuable complement to in-person support, particularly for distance learners or busy adult students.

Key Takeaway: For general self-efficacy, the strongest evidence supports multi-modal programs that span several weeks and combine information, skill practice, and social support.

Interventions grounded in CBT and stress management reliably boost students' confidence to cope (e.g. 10-week training improved nursing students' self-efficacy a year later [pubmed.ncbi.nlm.nih.gov](#)).

Mentoring and coaching provide relational support that further reinforces efficacy beliefs, especially when mentors encourage autonomy and acknowledge progress. Even online and hybrid interventions can be effective if they actively engage students in mastery experiences and peer support. In designing programs, researchers emphasize incorporating positive mental health content, experiential learning, and homework, which together create the mastery and feedback cycles needed to strengthen general self-efficacy [pmc.ncbi.nlm.nih.govpmc.ncbi.nlm.nih.govpmc.ncbi.nlm.nih.gov](#).

Interventions for Domain-Specific Research Self-Efficacy

Research self-efficacy refers to confidence in performing research-related tasks (e.g. formulating questions, conducting experiments, analyzing data, writing and publishing) and is vital for graduate students' success as emerging scholars [Frontiersin.orgfrontiersin.org](#). Interventions to improve research self-efficacy often overlap with professional development in graduate training. The literature highlights several effective strategies:

- **Explicit Research Skills Training:** Formal training in research methods and skills can significantly enhance students' efficacy in those domains. For instance, Lachance et al. examined incoming bioscience PhD students and found that after a semester of coursework and lab rotations, students showed marked improvements in research-skills self-efficacy, especially in areas covered by their first-year experimental design course [pmc.ncbi.nlm.nih.govpmc.ncbi.nlm.nih.govpmc.ncbi.nlm.nih.gov](#). Students attributed their increased confidence to hands-on laboratory experience, structured coursework, and feedback from faculty and peers [pmc.ncbi.nlm.nih.gov](#). This aligns with other findings that mastery experiences in research (like successfully completing a research project or analyzing data oneself) are among the most powerful ways to build self-efficacy [pubmed.ncbi.nlm.nih.gov](#). In one quasi-experimental study in a counseling master's program, Meade (2019) implemented a self-efficacy-focused

pedagogy in a research methods course. The intervention group engaged in guided research experiences (e.g. designing mini-studies, interpreting data with feedback) while the control group received standard instruction. By course end, the intervention section reported higher research self-efficacy and research knowledge gains than the control, demonstrating that even pedagogical tweaks within required research courses can bolster students' confidence in doing research [eric.ed.gov/eric.ed.gov](#). Together, these studies underscore that structured research training (courses, workshops, or research practica) which provides gradual mastery and feedback is an evidence-based approach to raise research self-efficacy in graduate students.

- **Writing and Communication Interventions:** Because scholarly writing is a core research activity and a common anxiety point, several interventions target writing self-efficacy as a subset of research efficacy. The “Shut Up & Write!” (SUAW) program is a notable example: it’s a structured peer writing session model originally developed to increase writing productivity and confidence. A recent evaluation with medical trainees and junior faculty demonstrated that participants in a 12-week SUAW intervention had significant pre–post gains in writing self-efficacy (along with improved writing habits) [pmc.ncbi.nlm.nih.gov](#). They practiced writing in focused sprints and shared goals, which served as mastery experiences and peer modeling opportunities. Another study supporting writing-focused interventions found that providing graduate students with a writing course emphasizing self-regulation strategies led to improved writing self-efficacy and reduced writing apprehension (Pool, 2018). Beyond SUAW, universities have implemented writing boot camps, thesis writing circles, and communication workshops. These typically report subjective improvements in students’ confidence to articulate their research. While many such programs are evaluated via pre/post surveys or qualitative feedback rather than controlled trials, the consistency of positive reports suggests they help address a critical domain-specific efficacy. Key components include setting achievable writing goals, regular feedback or sharing, and demystifying the scholarly publishing process – all of which reinforce a sense of capability in writing. Given the link between writing self-efficacy and research output [pmc.ncbi.nlm.nih.gov;pmc.ncbi.nlm.nih.gov](#), investing in these interventions can have cascading benefits for graduate students’ research progress.
- **Mentoring and Research Coaching:** Mentorship is repeatedly highlighted as a determinant of research self-efficacy. Graduate students who receive effective mentoring from advisors or experienced peers tend to develop stronger confidence in conducting research. In a longitudinal study spanning 5+ years, Paglis, Green & Bauer (2006) found that doctoral students who reported more adviser mentoring early in their PhD had higher research self-efficacy later on (controlling for initial ability) [eric.ed.gov/eric.ed.gov](#). Notably, mentoring was associated with greater research productivity as well, suggesting that increased self-efficacy translated into tangible performance [eric.ed.gov](#). The quality of mentoring matters: A survey by Overall et al. (2011) revealed that students felt most confident in research when their supervisors balanced guidance with autonomy support – i.e. providing clear task-related help while also encouraging students to think and act independently [eric.ed.gov/eric.ed.gov](#). Those receiving high academic support and high autonomy had the highest research self-efficacy, whereas a more directive or unsupportive style was linked to lower self-efficacy [eric.ed.gov/eric.ed.gov](#). These findings have inspired interventions to train mentors in

supporting self-efficacy. For example, the *Entering Mentoring* program (Pfund et al., 2014) is an evidence-based mentor training curriculum that teaches faculty how to foster mentees' confidence and skills. A recent adaptation by Butz et al. (2018) used social-cognitive theory principles to train 166 STEM research mentors on strategies to promote trainees' research self-efficacy [pmc.ncbi.nlm.nih.gov/pmc.ncbi.nlm.nih.gov](#). Mentors reported increased skill in supporting students and intended to change their mentoring practices to better build mentee confidence [pmc.ncbi.nlm.nih.gov](#). Although that study focused on mentor outcomes, it reflects a growing emphasis on interventions at the mentor level to ultimately benefit students' self-efficacy. Additionally, some graduate programs have instituted peer mentorship or coaching groups (pairing senior grad students or postdocs with newer students) to create safe spaces for asking questions and learning by example. Overall, the strongest evidence comes from correlational and longitudinal studies like Paglis (2006) showing mentoring's positive impact [eric.ed.gov](#), bolstered by controlled trials of mentorship-enhancement initiatives now underway.

- **Strengths-Based and Identity Development Programs:** An emerging approach to boosting research self-efficacy is helping students recognize and leverage their personal strengths in the context of research. In a 2024 study, Ferguson & Lockman implemented a strengths-based professional development program for biomedical PhD students, focusing on identifying individual talents and mapping them to research tasks [frontiersin.org](#). Through workshops and reflective exercises, students gained confidence that their natural strengths (e.g. analytical thinking, creativity, collaboration) made them capable scientists [frontiersin.org](#). Qualitative themes showed participants felt more self-aware and confident about contributing to their research teams after the program [frontiersin.org](#). While this was not a randomized trial, it suggests that interventions building a positive researcher identity (seeing oneself as a competent researcher) can increase self-efficacy. Other identity-focused interventions include seminars on impostor syndrome (to reframe self-doubt) and communities for underrepresented students to share experiences and role models. These typically use cognitive-behavioral and social support techniques to help students reinterpret challenges and internalize a sense of belonging and capability in research. For example, mindfulness-based groups for graduate students have been linked to improved self-efficacy in coping with research stress [pmc.ncbi.nlm.nih.gov](#). Strengths and identity approaches are relatively new, but they complement skill-focused training by addressing the belief side of self-efficacy – helping students affirm “Yes, I can do this” in their research domain.

Key Takeaway: To improve research-specific self-efficacy, interventions should target the authentic experiences of doing research and the support surrounding those experiences. Hands-on research training (courses, labs, projects) that provides mastery experiences with feedback is fundamental – it directly grows confidence by building competence [pmc.ncbi.nlm.nih.gov](#). Beyond that, supportive mentorship is a critical amplifier: students thrive when advisors and mentors actively nurture their independence and acknowledge their progress [eric.ed.gov/eric.ed.gov](#). Supplementary

programs like writing groups and strengths-based workshops can address specific facets (such as writing or researcher identity) that contribute to a student's overall research self-efficacy^{pubmed.ncbi.nlm.nih.gov/forfundersin.org}. The most robust evidence (from meta-analyses of behavior-change techniques and longitudinal studies) aligns with Bandura's theory – providing concrete mastery opportunities and credible role models/mentors is the surest way to bolster efficacy beliefs^{pubmed.ncbi.nlm.nih.gov}. For graduate educators, this means creating structured yet empowering environments: rigorous training coupled with encouragement and autonomy, so that doctoral and graduate students build both the skill and the confidence to excel in research.

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- (Additional sources as cited in text above)

Explain a bit more the four sources of self-efficacy by Bandura. Give examples in the context of doctoral students

Bandura's Four Sources of Self-Efficacy: Application to Doctoral Students

Albert Bandura (1977, 1997) identified four primary sources that influence self-efficacy: **(1) Mastery Experiences, (2) Vicarious Experiences, (3) Social Persuasion, and (4) Physiological & Emotional States**. These sources determine an individual's belief in their ability to succeed in specific tasks. In the context of doctoral education, these sources play a crucial role in shaping students' confidence in conducting research, teaching, and completing their dissertations. Below, I explain each source with examples from doctoral education.

1. Mastery Experiences (Direct Successes or Failures)

This is the most powerful source of self-efficacy. It refers to **learning through direct experiences**—successfully completing a task builds confidence, while repeated failures can weaken it. The key is **progressive mastery**, where students take on increasingly complex tasks with adequate support.

Examples for Doctoral Students:

- Successfully conducting a **pilot study** or collecting and analyzing data for the first time boosts research self-efficacy.
- **Defending a dissertation proposal** and receiving approval from the committee reinforces confidence in research abilities.
- Teaching a seminar or giving a conference presentation for the first time can be intimidating, but a positive experience strengthens **teaching and communication self-efficacy**.
- Submitting an article to a journal and getting **constructive but encouraging peer review feedback** fosters a sense of capability.
- **Failing an experiment but successfully troubleshooting and solving the problem** reinforces persistence and confidence.

✓ **Best practice:** Structure the PhD journey so students experience **early successes** (e.g., writing short literature reviews, practicing with small research projects) before tackling large tasks like dissertations.

2. Vicarious Experiences (Observational Learning)

Watching others—especially **peers or mentors**—succeed at a task can enhance self-efficacy. Seeing **similar others** (people at a comparable skill level) succeed makes students believe, “If they can do it, I can too.”

Examples for Doctoral Students:

- Attending **research seminars** where more advanced PhD students present their work can help newer students visualize their own research progress.
- Observing a **peer successfully defend their dissertation** reassures students that the process is manageable.
- Seeing a fellow student **publish a paper** motivates others by demonstrating that publication is achievable.
- Watching a faculty mentor or senior colleague confidently handle **conference Q&A sessions** provides a model for public speaking.
- Participating in **writing groups or Shut Up & Write! sessions** where peers work through challenges shows that struggles with academic writing are normal—and solvable.

✅ **Best practice:** Facilitate **mentoring and peer observation opportunities** where doctoral students can observe others tackling research, writing, and teaching successfully.

3. Social Persuasion (Encouragement & Feedback)

This source of self-efficacy refers to **verbal and non-verbal feedback** from others. Encouragement, positive reinforcement, and constructive feedback from advisors, peers, and colleagues can enhance confidence, whereas discouragement can weaken it.

Examples for Doctoral Students:

- An advisor **providing encouraging feedback** (“This is a strong draft—keep going!”) can boost students' confidence in academic writing.
- A conference audience **nodding and engaging** during a student's presentation reinforces their belief in their ability to communicate research effectively.
- Constructive but supportive peer review (e.g., “This section is strong, but you could clarify your argument here”) helps doctoral students improve without feeling inadequate.
- **Imposter syndrome interventions** (workshops where students share doubts and mentors normalize them) can counteract negative self-talk.
- **Networking at conferences** and hearing senior researchers express interest in a student's work provides reassurance and motivation.

⚠️ **Caution:** Negative social persuasion—such as an overly critical advisor or dismissive feedback—can significantly lower self-efficacy.

✅ **Best practice:** Train faculty and peer mentors to provide **balanced, constructive feedback** that highlights strengths while guiding improvements.

4. Physiological & Emotional States (Managing Stress & Anxiety)

How people interpret their **physical and emotional reactions** to tasks can influence self-efficacy. High anxiety, stress, and negative emotions can lower self-efficacy, while positive emotions and stress-management strategies can enhance it.

Examples for Doctoral Students:

- Feeling extreme **nervousness before a conference presentation** might lead a student to believe they are not a good speaker—lowering self-efficacy.
- Experiencing **chronic stress during dissertation writing** may create a belief that they “can’t handle” the demands of research.
- Successfully using **mindfulness, relaxation techniques, or self-care** before an oral defense can reinforce self-efficacy by reducing anxiety.
- A student who experiences **burnout** may doubt their ability to complete the PhD, whereas one who maintains **healthy work–life balance** may feel more capable.

✓ **Best practice:** Teach doctoral students **stress management techniques** (mindfulness, self-care, and structured work plans) so they can regulate their emotions and **not misinterpret normal stress as incompetence**.

Conclusion: Strengthening Self-Efficacy in Doctoral Students

To improve self-efficacy among PhD students, universities and advisors should create structured **opportunities for mastery, observation, encouragement, and stress management**:

Bandura’s Source	How to Strengthen It in Doctoral Education
Mastery Experiences	Scaffold success by assigning small research projects before the dissertation; provide structured skill training.
Vicarious Experiences	Encourage peer mentoring; create opportunities to observe skilled researchers.
Social Persuasion	Provide constructive, encouraging feedback; normalize impostor syndrome discussions.
Physiological States	Teach stress-reduction techniques; reframe stress as normal rather than as a sign of incompetence.

By applying these principles, doctoral students can develop **stronger research, writing, and academic self-efficacy**, increasing their resilience and success in graduate education.