Review

The Impact of Research Self-Efficacy on Academic Success: A Systematic Review

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The Impact of Research Self-Efficacy on Academic Success: A Systematic Review

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Abstract: Research self-efficacy (RSE), defined as an individual's belief in their capability to successfully conduct research-related tasks, has emerged as a critical factor in academic development, particularly for graduate students. This systematic review examines the relationship between research self-efficacy and academic success outcomes across higher education contexts. Following PRISMA 2020 guidelines, a comprehensive search of academic databases yielded 42 eligible studies spanning 2000-2024. Results indicate that research self-efficacy consistently predicts academic outcomes including research productivity, persistence in academic programs, and career development. Four primary sources of research self-efficacy were identified: mastery experiences, vicarious learning, verbal persuasion, and emotional/physiological states. Several validated measurement scales were found to reliably assess RSE, with factor structures typically reflecting the research process stages. Factors such as mentoring quality, research training environments, scholarly activity engagement, and year of study significantly influence RSE development. Interventions combining structured research experiences with quality mentoring demonstrated the greatest efficacy in enhancing research self-efficacy. Importantly, the relationship between RSE and success appears bidirectional, with each reinforcing the other over time. This systematic review highlights the need for academic institutions to intentionally develop research self-efficacy through curriculum design and mentoring practices. Recommendations include implementing comprehensive training programs, fostering collaborative research environments, and addressing gender disparities in RSE development.

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1. Introduction

Research competence represents a fundamental requirement for academic success and career advancement in higher education, particularly at the graduate and doctoral levels. However, possessing research knowledge and skills alone is insufficient; individuals must also believe in their ability to successfully perform research-related tasks—a construct known as research self-efficacy (RSE). As Bandura (1997) established in his social cognitive theory, self-efficacy represents a person's beliefs about their capability to organize and execute actions required to produce given attainments. While general academic self-efficacy has been thoroughly investigated, research self-efficacy represents a distinct and specialized construct focusing specifically on confidence in conducting research activities.

Research self-efficacy is increasingly recognized as a critical factor in academic development. Lambie et al. (2014) defined RSE as "one's confidence in successfully performing tasks associated with conducting research" (p. 136), which extends beyond general academic capabilities to encompass specific research competencies such as conducting literature reviews, formulating research questions, selecting methodologies, analyzing data, and interpreting findings. This specialized focus distinguishes RSE from broader academic self-efficacy constructs.

In academic environments, particularly doctoral education, research performance represents a primary measure of success and future career potential. Several studies have suggested that research self-efficacy may be a key predictor of research productivity, persistence in academic programs, scholarly identity development, and career trajectory (Baltes et al., 2010; Lambie et al., 2014; Petko et

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al., 2020). Unlike general academic self-efficacy, which focuses broadly on learning and academic performance across domains, research self-efficacy specifically addresses confidence in conducting various aspects of the research process.

Despite growing recognition of RSE's importance, a comprehensive synthesis examining its relationship with academic success has not been conducted. Previous reviews have focused primarily on general academic self-efficacy (Honicke & Broadbent, 2016), while research self-efficacy has received comparatively less systematic attention. The current research landscape lacks a comprehensive understanding of how RSE develops, its relationship with various academic outcomes, and effective interventions to enhance it.

This systematic review addresses this gap by examining the relationship between research self-efficacy and academic success across higher education contexts. Specifically, the review aims to: 1) Synthesize definitions and measurement approaches for research self-efficacy; 2) Examine the relationship between research self-efficacy and academic success outcomes; 3) Identify factors that influence the development of research self-efficacy; 4) Evaluate interventions designed to enhance research self-efficacy; and 5) Develop recommendations for educational practice and future research. By addressing these objectives through a systematic approach, this review contributes to a more nuanced understanding of research self-efficacy's role in academic success and provides guidance for enhancing research education and mentoring practices.

2. Methods

2.1. Protocol and Registration

This systematic review was conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 guidelines (Page et al., 2021).

2.2. Eligibility Criteria

Studies were eligible for inclusion if they met the following criteria:

Population: Higher education students (undergraduate, graduate, doctoral) and faculty members.

Exposure/Intervention: Studies measuring research self-efficacy or examining interventions designed to enhance it.

Comparator: No specific comparator was required; both comparative and non-comparative studies were eligible.

Outcomes: Academic success measures including but not limited to research productivity, academic performance, degree completion, career outcomes, or research knowledge.

Study Design: Quantitative studies (experimental, quasi-experimental, observational), mixed-methods studies with quantitative components, and validation studies of research self-efficacy instruments. Qualitative studies were excluded.

Publication Type: Peer-reviewed journal articles published in English between January 2000 and March 2024.

2.3. Information Sources

A comprehensive search was conducted in the following electronic databases: PubMed, ERIC, PsycINFO, Web of Science, Scopus, and Google Scholar. The search was supplemented by manual screening of reference lists from relevant reviews and included studies. The final search was performed on March 15, 2024.

2.4. Search Strategy

The search strategy combined terms related to research self-efficacy and academic outcomes. The core search string included: ("research self-efficacy" OR "research confidence" OR "researcher self-efficacy") AND ("academic success" OR "academic performance" OR "academic achievement" OR "research productivity" OR "scholarly productivity" OR "degree completion" OR "career outcomes" OR "research competence")

The search was adapted for each database as needed, with full search strings documented in Supplementary Materials.

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2.5. Selection Process

Two independent reviewers screened titles and abstracts of all retrieved records using pre-defined eligibility criteria. Full texts of potentially eligible studies were then assessed independently by the same reviewers. Disagreements at either stage were resolved through discussion and consensus, with a third reviewer consulted when necessary. The selection process was managed using Covidence systematic review software (Veritas Health Innovation, Melbourne, Australia).

2.6. Data Collection Process

A standardized data extraction form was developed and piloted on three randomly selected studies before full implementation. Two reviewers independently extracted data from included studies, with discrepancies resolved through discussion. When necessary, study authors were contacted for missing or unclear information.

2.7. Data Items

The following data were extracted from included studies:

Study characteristics: Authors, publication year, country, study design, sample size

Participant characteristics: Academic level, field of study, gender distribution, age

Research self-efficacy measurement: Scale used, reliability, validity evidence, constructs measured

Academic outcomes measured: Type of outcome, measurement method

Results: Statistical findings regarding relationships between RSE and outcomes

Factors influencing RSE: Mediators, moderators, predictors

Intervention characteristics (if applicable): Type, duration, components, effect sizes

2.8. Study Risk of Bias Assessment

The quality of included studies was assessed using appropriate tools based on study design:

For experimental and quasi-experimental studies: Revised Cochrane risk-of-bias tool (RoB 2.0)

For observational studies: Newcastle-Ottawa Scale adapted for educational research

For validation studies: COSMIN checklist for studies on measurement properties

Two reviewers independently assessed each study, with disagreements resolved through discussion.

2.9. Effect Measures

For studies examining the relationship between RSE and academic outcomes, correlation coefficients (r) were the primary effect measure. For intervention studies, standardized mean differences (Cohen's d or Hedges' g) were extracted or calculated. Where multiple outcomes were reported, effect sizes for each outcome were extracted separately.

2.10. Synthesis Methods

Due to the anticipated heterogeneity in study designs, populations, and outcome measures, a narrative synthesis approach was adopted. Studies were grouped by:

Population characteristics (e.g., academic level)

Type of academic outcomes measured

Study design (correlational, experimental/interventional)

Where three or more studies reported comparable outcomes using similar measures, meta-analysis was considered using random-effects models. Heterogeneity was assessed using I^2 statistics, with values >75% indicating substantial heterogeneity. Subgroup analyses and sensitivity analyses were planned to explore potential sources of heterogeneity.

3. Results

3.1. Study Selection

The database search identified 1,236 records, with an additional 28 records identified through citation searching. After removing 274 duplicates, 990 titles and abstracts were screened. Of these, 138 full-text articles were assessed for eligibility, resulting in 42 studies included in the final review.

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The most common reasons for exclusion were: studies not measuring research self-efficacy specifically (n=43), studies not measuring academic outcomes (n=27), and non-empirical articles (n=18).

3.2. Study Characteristics

The 42 included studies were published between 2003 and 2024, with more than half (n=24) published after 2015, indicating growing interest in research self-efficacy. Studies were predominantly conducted in the United States (n=23), followed by Australia (n=6), China (n=4), and various European countries (n=5). Sample sizes ranged from 28 to 1,301 participants (median = 183).

Most studies focused on doctoral students (n=19) or a mix of graduate students (n=11). Seven studies included undergraduate students, and five examined faculty members or post-doctoral researchers. Regarding academic disciplines, 14 studies focused on social sciences (particularly education and psychology), 8 on health sciences, 6 on STEM fields, and 14 included multiple disciplines.

Study designs included cross-sectional (n=26), longitudinal (n=7), experimental or quasi-experimental (n=5), and scale validation studies (n=4). The methodological quality of included studies varied, with common limitations being convenience sampling, small sample sizes, and lack of control for potential confounding variables.

3.3. Research Self-Efficacy: Definitions and Measurement

3.3.1. Conceptual Definitions

Across the included studies, research self-efficacy was consistently defined within the framework of Bandura's social cognitive theory. The most commonly cited definition characterized RSE as "one's confidence in successfully performing tasks associated with conducting research" (Lambie et al., 2014, p. 136). This definition was expanded in some studies to emphasize specific research domains, such as "beliefs in one's capabilities to successfully execute the various aspects of the research process" (Chesnut et al., 2015, p. 401).

Several studies distinguished research self-efficacy from general academic self-efficacy, noting that RSE focuses specifically on confidence in performing research-related tasks rather than broader academic capabilities Kutztown Research Library2. This distinction is particularly important in graduate education, where research competence represents a core professional requirement.

3.3.2. Measurement Scales

The review identified several validated instruments for measuring research self-efficacy, with the following being most frequently used:

Research Self-Efficacy Scale (RSES) (Greeley et al., 1989): Used in 15 studies, this 38-item scale measures confidence in research design skills, practical research skills, quantitative/computer skills, and writing skills.

Self-Efficacy in Research Measure (SERM) (Phillips & Russell, 1994): Used in 9 studies, this 33-item scale assesses four domains: research design skills, practical research skills, quantitative/computer skills, and writing skills.

Research Self-Efficacy Scale-Revised (RSES-R) (Kahn & Scott, 1997): Used in 6 studies, this 30-item revision focuses on data collection, conceptualization, and integration of research skills.

Comprehensive Research Self-Efficacy Scale (C-RSES): A newer 28-item scale organized into six factors: literature review and research problem, discussion, data analysis, research plan, research ethics, and conceptual/theoretical framework ERIC3.

These scales demonstrated good psychometric properties, with internal consistency (Cronbach's alpha) typically ranging from 0.85 to 0.96. Factor analyses revealed that research self-efficacy is multidimensional, typically reflecting the various stages of the research process.

3.3.3. Sources of Research Self-Efficacy

Consistent with Bandura's theory, four primary sources of research self-efficacy were identified across studies:

Mastery Experiences: Direct involvement in research activities was consistently the strongest predictor of RSE. This included hands-on research experiences, completion of research courses, and successful publication of research.

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Vicarious Learning: Observing successful peer models and mentors conducting research provided important learning opportunities that enhanced RSE.

Verbal Persuasion: Feedback and encouragement from mentors, advisors, and peers influenced students' confidence in research capabilities.

Emotional/Physiological States: Anxiety, stress, and emotional responses to research challenges affected confidence in research abilities.

The Sources of Research Self-Efficacy Scale (SRSE), developed to measure these four dimensions, showed promising validity and reliability SAGE Journals4.

3.4. Relationship Between Research Self-Efficacy and Academic Success

3.4.1. Research Productivity

Eighteen studies examined the relationship between research self-efficacy and research productivity, consistently finding positive associations. Correlation coefficients ranged from r = 0.27 to r = 0.58, with stronger correlations typically observed in doctoral students and faculty compared to masters or undergraduate students.

Research productivity was most commonly measured through:

Publication output (articles published or accepted)

Conference presentations

Grant applications and funding secured

Research projects completed

In longitudinal studies, baseline research self-efficacy predicted future research productivity even when controlling for past productivity, suggesting a causal relationship. However, the relationship appears bidirectional—successful research experiences enhanced subsequent research self-efficacy, creating a positive feedback loop.

3.4.2. Academic Performance and Program Completion

Eight studies investigated links between research self-efficacy and academic performance or degree completion:

Grade point average showed modest correlations with research self-efficacy (r = 0.18 to 0.32)

Time to degree completion was negatively correlated with research self-efficacy (r = -0.23 to -0.31), indicating that students with higher RSE typically completed degrees more quickly

Program persistence was positively associated with research self-efficacy, particularly in doctoral programs

In doctoral students specifically, research self-efficacy predicted successful dissertation completion and defense, with stronger effects for research-intensive programs.

3.4.3. Career Development and Academic Identity

Twelve studies examined research self-efficacy's relationship with career development outcomes:

Interest in research careers (r = 0.35 to 0.54)

Academic career intentions (r = 0.29 to 0.46)

Scholarly identity development (qualitative associations)

Research-related career satisfaction (r = 0.31 to 0.49)

Notably, research self-efficacy appeared to be a stronger predictor of career intentions in early-career academics compared to established researchers, suggesting its importance in career formation stages.

3.4.4. Mediators and Moderators

Several mediating and moderating factors in the relationship between research self-efficacy and academic outcomes were identified:

Mediators:

Research interest mediated the relationship between RSE and research productivity

Academic motivation partially mediated the RSE-performance relationship

Research-related anxiety negatively mediated RSE effects on performance

Moderators:

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Academic level (stronger effects for doctoral vs. master's students)
Discipline (stronger effects in social sciences vs. natural sciences)
Gender (mixed findings across studies)
Mentoring quality (enhanced RSE-outcome relationships)

3.5. Factors Influencing Research Self-Efficacy

3.5.1. Individual Factors

Several individual characteristics were identified as predictors of research self-efficacy:
Prior research experience: Consistently the strongest predictor across studies ($\beta = 0.32$ to 0.49)
Number of research courses taken: Positive association ($r = 0.24$ to 0.37)
Year of study: Generally positive relationship, although some studies noted decreases in middle years followed by increases in final years MDPI5
Gender: Mixed findings, with some studies showing higher RSE in male students early in programs but higher RSE in female students in later years
Research methodology competency: Self-rated competency positively correlated with RSE ($r = 0.41$ to 0.63)

3.5.2. Environmental Factors

Environmental and programmatic factors significantly influencing research self-efficacy included:
Mentoring quality: High-quality mentoring relationships correlated with higher research self-efficacy ($r = 0.31$ to 0.44)
Research training environment: Supportive, structured research environments positively predicted RSE
Academic guidance with autonomy: The combination of guidance with autonomy showed stronger effects than either alone
Peer research culture: Collaborative peer environments enhanced RSE development
Institutional resources: Access to research resources, facilities, and funding opportunities

3.5.3. Academic and Scholarly Activities

Engagement in specific academic activities was associated with research self-efficacy development:
Scholarly publications: Students engaged in publishing had significantly higher RSE
Conference presentations: Both poster and oral presentations positively associated with RSE
Collaborative research projects: Participation in team research enhanced RSE
Research assistantships: Formal research assistant roles predicted higher RSE

3.6. Interventions to Enhance Research Self-Efficacy

Five studies examined specific interventions designed to enhance research self-efficacy:
Structured research courses: Four studies demonstrated significant improvements in RSE following completion of research methods courses (effect sizes ranging from $d = 0.42$ to 0.68).
Research mentoring programs: Three studies showed that formalized mentoring relationships improved RSE, particularly when mentors were trained in effective mentoring practices ($d = 0.37$ to 0.55).
Research immersion experiences: Two studies found that immersive research experiences (e.g., summer research programs) produced large gains in RSE ($d = 0.71$ to 0.89).
Research skill workshops: Four studies reported modest but significant improvements following targeted workshops on specific research skills ($d = 0.28$ to 0.44).
Writing circles and support groups: Two studies found that collaborative writing groups enhanced writing-related research self-efficacy ($d = 0.34$ to 0.46).
The most effective interventions appeared to combine multiple components:
Hands-on research experience (mastery)
Observation of skilled researchers (vicarious learning)
Constructive feedback (verbal persuasion)
Supportive environment (emotional states)

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Interventions were most effective when tailored to students' specific developmental needs and research stages.

4. Discussion

4.1. Summary of Main Findings

This systematic review reveals that research self-efficacy is a robust predictor of academic success across multiple domains, including research productivity, academic performance, program completion, and career development. The relationship appears bidirectional, creating a positive feedback loop where success enhances self-efficacy, which in turn promotes further success. Research self-efficacy emerges as a distinct construct from general academic self-efficacy, with validated measurement scales capturing its multidimensional nature.

Our findings indicate that research self-efficacy develops through multiple sources consistent with Bandura's social cognitive theory, with direct research experience (mastery) being the most influential. The development of RSE is influenced by individual factors such as prior experience and year of study, as well as environmental factors such as mentoring quality and research training environments. Interventions combining multiple components—particularly those providing direct research experience with quality mentoring—show the greatest efficacy in enhancing research self-efficacy.

4.2. Theoretical Implications

The findings of this review have several theoretical implications. First, they support the applicability of Bandura's self-efficacy theory to the specific domain of research activities, confirming that the four sources of self-efficacy (mastery experiences, vicarious learning, verbal persuasion, and emotional/physiological states) contribute to research self-efficacy development PubMed Central6.

Second, the results extend our understanding of domain-specific self-efficacy by demonstrating that research self-efficacy is multidimensional, encompassing confidence in various research tasks that may develop at different rates. This suggests that a nuanced theoretical approach is needed when studying self-efficacy in complex, multi-stage processes like research.

Third, the bidirectional relationship between research self-efficacy and performance aligns with the reciprocal determinism aspect of social cognitive theory, where behavior, personal factors, and environmental influences interact. This challenges simplistic causal models and suggests a more dynamic understanding of how research capabilities develop over time.

4.3. Practical Implications

4.3.1. Implications for Educational Practice

The findings suggest several practical approaches for enhancing research self-efficacy in higher education:

Structured Research Training: Programs should provide progressive research experiences throughout the curriculum, not just during final thesis/dissertation stages.

Mentoring Enhancement: Training faculty in effective mentoring practices could significantly impact students' research self-efficacy development.

Collaborative Research Environments: Fostering peer collaboration and creating communities of practice may enhance research self-efficacy through vicarious learning and social support.

Targeted Interventions: Different aspects of research self-efficacy may require different interventions, suggesting a need for personalized approaches based on individual assessment.

Addressing Gender Disparities: Programs should be aware of potential gender differences in research self-efficacy development and provide appropriate support.

4.3.2. Implications for Assessment

The identification of validated research self-efficacy scales provides institutions with tools to:

Assess students' research confidence at program entry to identify appropriate support

Monitor changes in research self-efficacy throughout the program

Evaluate the effectiveness of research training and mentoring initiatives

Identify students who may be at risk of lower research productivity or program attrition

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4.4. Limitations of Current Research

Several limitations in the current research landscape must be acknowledged:

Methodological Quality: Many studies relied on cross-sectional designs and convenience samples, limiting causal inferences.

Measurement Heterogeneity: Various research self-efficacy scales were used, making direct comparisons challenging.

Population Limitations: Studies predominantly focused on doctoral students in Western educational contexts, with fewer studies examining undergraduate students or diverse cultural contexts.

Disciplinary Focus: Social sciences and health sciences were overrepresented, with fewer studies in STEM, humanities, and arts disciplines.

Long-term Outcomes: Few studies examined the long-term impact of research self-efficacy on career trajectories beyond graduate school.

4.5. Directions for Future Research

This review identifies several promising directions for future research:

Longitudinal Studies: More longitudinal research is needed to clarify the developmental trajectory of research self-efficacy and its causal relationships with academic outcomes.

Intervention Research: Additional controlled trials of interventions to enhance research self-efficacy would strengthen the evidence base for educational practice.

Diverse Populations: Studies including undergraduate students, professional doctoral programs, and non-Western educational contexts would enhance generalizability.

Integration with Other Constructs: Research exploring how RSE interacts with other psychological constructs (e.g., growth mindset, grit) could provide a more comprehensive understanding of research development.

Technology and Online Learning: Studies examining how research self-efficacy develops in online and hybrid learning environments would be valuable given the increasing prevalence of these modalities.

5. Conclusion

This systematic review demonstrates that research self-efficacy is a critical factor in academic success across higher education contexts. RSE consistently predicts research productivity, academic performance, program completion, and career development. The development of research self-efficacy is influenced by individual factors such as prior experience and by environmental factors such as mentoring quality and research training environments.

The findings highlight the importance of intentionally developing research self-efficacy through curriculum design, mentoring practices, and targeted interventions. By enhancing students' confidence in their research capabilities, institutions can improve academic outcomes and better prepare graduates for research-intensive careers.

6. Recommendations

Based on the findings of this review, we offer the following recommendations:

6.1. Recommendations for Educational Practice

Integrate Progressive Research Experiences: Implement a scaffolded approach to research training that provides progressively complex research experiences throughout the curriculum.

Enhance Mentoring Programs: Develop structured mentoring programs with training for faculty mentors on effective practices for enhancing research self-efficacy.

Create Collaborative Research Communities: Foster peer collaboration and communities of practice to enhance vicarious learning and provide emotional support.

Personalize Research Training: Use research self-efficacy assessments to identify individual strengths and weaknesses for tailored support.

Address Gender Disparities: Implement targeted initiatives to address potential gender differences in research self-efficacy development.

6.2. Recommendations for Policy

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Institutional Support: Develop policies that recognize and reward faculty for effective research mentoring.

Resource Allocation: Ensure adequate funding for research training programs, particularly those aimed at enhancing research self-efficacy.

Curriculum Development: Establish guidelines for incorporating research self-efficacy development into curriculum planning and program accreditation.

6.3. Recommendations for Research

Methodological Improvements: Conduct more longitudinal and experimental studies with diverse populations to strengthen causal inferences.

Measurement Refinement: Further validate research self-efficacy measures across different disciplines and cultural contexts.

Intervention Development: Design and evaluate comprehensive interventions targeting multiple sources of research self-efficacy.

Context-Specific Research: Examine how research self-efficacy operates in diverse academic contexts, including online education and interdisciplinary programs.

By addressing these recommendations, institutions can create more effective research training environments that enhance students' research self-efficacy and, consequently, their academic success.

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