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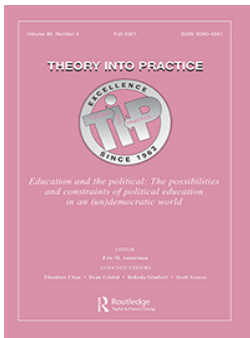
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## Supporting Self-Efficacy Development From Primary School to the Professions: A Guide for Educators

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**Supporting Self-Efficacy Development From Primary School to the Professions:  
A Guide for Educators**

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### **Abstract**

Over the past 2 decades, scholars in various educational contexts have examined Bandura's (1997) theorizing about how self-efficacy develops. Bandura proposed 4 primary informational sources of self-efficacy—enactive experiences, vicarious experiences, social persuasions, and physiological and affective states—each of which can be supported in different ways. This article first defines and situates self-efficacy and these sources within a broader social cognitive theoretical frame.

Subsequent sections highlight specific ways that educators can apply insights from Bandura's theorizing and from the empirical literature that has examined self-efficacy development at different stages of learning and in diverse contexts. We address how educators can create instructional tasks that show progress, establish supportive social structures, and work with students' emotions in ways that foster self-efficacy. Special attention is given to the sociocultural factors that affect how learners evaluate efficacy-relevant information. Several directions for further applying Bandura's theory are offered.

**Supporting Self-Efficacy Development From Primary School to the Professions:  
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As learners face the variety of academic tasks before them, they often ask, “Can I do this?” Their answer reflects some level of certainty or doubt about their personal capabilities, or their *self-efficacy*. Such judgments are made during formal learning (Can I divide fractions?) and informal learning (Can I play this Taylor Swift song on the guitar?). Learners make broad judgments about what they can achieve (Can I be an excellent surgeon?) and specific judgments about their capability to manage their learning (Can I motivate myself to study for Friday’s exam instead of spending time on social media?).

Albert Bandura dedicated at least one-third of his life to writing about the ways in which people’s beliefs about their personal capabilities are strong predictors of what they accomplish and the paths their lives take. His social cognitive theory situates the learner as an agent of their own development, endowed with the capacity to reflect, self-regulate, and yes, even self-sabotage. Self-efficacy, from Bandura’s view, is a key source of motivation because, “unless people believe that they can produce desired effects by their actions, they have little incentive to act” (Bandura, 1997, pp. 2-3). In fact, Bandura devoted an entire book to the topic in which he provided compelling arguments about the ways in which self-efficacy guides cognition, affect, motivation, and behavior in all spheres of life from school to health to the workplace. Few psychological constructs have been as consistent at predicting educational outcomes as self-efficacy. We therefore hope the reader agrees with his basic premise that self-efficacy is among the worthwhile targets of education.

Fortunately, Bandura (1997) provided a rich description of how self-efficacy develops through four primary sources of influence, which researchers have since investigated in a variety of settings. The results provide an evidence-based framework for educators who wish to support not only learners’ skill development, but also the beliefs needed to put acquired skills to effective use.

Drawing from his theorizing and the empirical literature that has examined it, we provide practical tips for educators about how to support learners' self-efficacy. Before educators influence self-efficacy, though, they must first understand how to evaluate it.

### **Evaluating Learners' Self-Efficacy**

Bandura (1997) defined self-efficacy as a judgment of one's personal capability to perform designated tasks successfully. Gauging learners' self-efficacy levels can help educators tailor their instructional activities in ways that support learners' developing skills and confidence. How can self-efficacy be gauged? Educators must ask learners how capable they feel to perform the tasks required for success. Of course, "success" in any discipline requires a constellation of underlying proficiencies such as content mastery, self-regulation, communication, reasoning, and social skills, each of which involves numerous subtasks. A learner might feel more capable in one area than another, so educators should assess learners' self-efficacy in specific areas.

Learners also have different levels of self-efficacy for performing the same task under different conditions (e.g., high vs. low stakes, individual vs. group work, situational constraints). Self-efficacy can also change across time; thus, assessing self-efficacy at different time points can offer useful information. Learners at different developmental stages may also vary in their ability to assess their capabilities, particularly when the skills needed for success are unfamiliar or complex.

In general, to create an assessment of learners' self-efficacy, it is helpful to begin with the target learning outcome (What do I want learners to be able to do? What are the subskills involved?) and then to craft questions or statements in response to which learners rate their self-efficacy.

Figure 1 provides some examples of self-efficacy items used in different contexts. Inferring learners' self-efficacy from their behaviors, on the other hand, can be unreliable. The supplemental resources at the end of this article provide further guidance.

## **Bandura's Theory of Self-Efficacy Development**

Where does self-efficacy come from? What do learners rely on when making judgments about what they can and cannot do? Bandura (1997) proposed that individuals construct their sense of personal efficacy by interpreting information from 4 primary informational sources—enactive experiences, vicarious experiences, social persuasions, and physiological and affective states. We summarize his theorizing on these 4 informational sources next.

### **Enactive Experiences**

When learners begin to assess their capabilities for success, they tend to ask themselves, *Have I succeeded (or struggled) at this before?* If they can draw on previous successes (i.e., mastery experiences), they are more likely to believe that they can be successful. Conversely, if they have little direct experience from which to draw or are reminded of previous failures, they are likely to doubt their capabilities. Although this relationship may seem simple on the surface, the mechanisms through which learners perceive and interpret their direct experiences are complex. For instance, of two learners who answer 85% of the test questions correctly, one may feel masterful while another may consider it a poor performance. Factors such as task difficulty, perceived effort required, whether the task was self-selected or externally imposed, the stakes at hand, and peers' performances can affect how learners appraise their experiences. Experiences perceived as successful have a strong, positive effect on self-efficacy.

### **Vicarious Experiences**

In many cases, learners must judge their capabilities for performing tasks that they have never or rarely tried. Under such conditions, watching how others perform helps them make inferences about their own capabilities. Indeed, one hallmark of social cognitive theory is that much learning happens vicariously. During the early phases of learning, seeing others perform a task successfully can be especially convincing (e.g., "If they can do it, I can too."). As learners gain

more direct experience in a domain, they may shift their attention to how their own performance compares to others' (e.g., "I must be a capable reader because I am always the first among my peers to finish reading assignments.").

### **Social Persuasions**

Evaluative or persuasive messages can also influence learners' self-beliefs. These messages may come through formal feedback (e.g., "What a creative, well-crafted essay") or less formal remarks (e.g., "It took you a while to complete the task today"). Social messages can be especially "sticky" during the early phases of skill development or when learners are facing difficulties. Learners' expectations, fears, and past experiences can affect how they interpret social messages. Social status can matter too. For example, messages from educators in positions of power (e.g., field supervisors, mentors) can have a profound impact on learners' self-efficacy. As with direct experiences, messages that are confidence-building to some may be crushing to others.

### **Physiological and Affective States**

Learners partly judge their capabilities from their bodily reactions and feelings as they perform tasks. Physiological and emotional states (e.g., feeling calm in class, a racing heart rate during an exam) may be taken as signs of impending success or failure. Strong, unpleasant physical manifestations (sweating, trembling) may be difficult to ignore, making some learners feel incapable of exercising control over their actions. Still, learners differ in the extent to which they interpret their physiological and affective states as signs of higher or lower capability.

### **Combinatory Effects**

The informational sources described above rarely affect self-efficacy independently. People give more or less weight to certain sources of information depending on personal and environmental circumstances (Usher & Pajares, 2008). Educators can play an instrumental role in this process by supporting learners skill development, optimizing the social environment of learning, and attending



to learners' interior lives. We next offer recommendations related to each of these areas of potential influence.

### **Educator Behaviors That Support Learners' Growth**

- 1. Reflect on successes and emphasize progress.** Success and progress help learners feel capable. Designating time for reflection on growth helps learners recognize their progress (Aro et al., 2018). Likewise, becoming aware of how learners reflect on their past performances can help educators redirect attributions that may lower motivation and engagement (e.g., "I was successful because I got lucky"; "I missed those problems because I just can't do math"). This is especially important when learners make slower progress than their peers or have difficulty noticing improvement. Acknowledging learners' effort and growth can draw their attention to personal progress and away from normative goals.
- 2. Help people learn from challenges and failures.** Failures and setbacks are an inevitable part of learning. Educators can help learners frame mistakes as opportunities to learn and improve (Marks & Chase, 2019; Simpson et al., 2020). They can remind learners that challenges during skill acquisition is normal. Experiencing and overcoming moderate difficulties can offer an enduring boost to self-efficacy. Shielding learners from the possibility of failure or shaming them for their missteps can undermine this process. Self-efficacy sustained only by success is poorly equipped for adversity.
- 3. Design attainable learning tasks but provide "stretch" opportunities.** Self-efficacy is supported when learners see evidence of progress and mastery. Unattainable goals can undermine self-efficacy (Fong & Krause, 2014). If a student with reading difficulties is asked to read a long book, they might experience frustration and doubt. On the other hand, work that is too easy or that has little apparent value ("busy work") rarely makes students feel more capable. Designing learning tasks that are achievable with effort and that highlight the learner's progress

can support a sense of mastery and encourage ongoing effort. Mixing in challenging tasks can stretch learners' skills and goals. Success reveals their readiness for new stages of growth and boost self-efficacy. Difficulty signals the need for additional instruction and practice.

4. **Support self-regulation skills.** Success in most if not all academic endeavors requires that learners self-regulate: they must plan and monitor their academic work, manage time effectively, and reflect on what strategies they need to implement. Weaknesses in self-regulatory skills can undermine self-efficacy and lead to learning deficits (Panadero et al., 2017). Educators can support learners' self-regulatory skill development by structuring lessons clearly, providing regular feedback on student work, and scheduling opportunities for learners to plan, self-assess, and reflect. Supporting self-regulation can help learners take control over their own learning, which can bolster their self-efficacy in other academic areas.
5. **Provide scaffolded support when the learning curve is steep.** The quality and timing of applied learning experiences can also affect self-efficacy. For example, learners who are pushed into a professional internship without adequate preparation could experience early failures that have detrimental effects on self-efficacy and career longevity. Well-scaffolded experiences with opportunities for feedback and reflection are more likely to provide evidence of personal growth. Preservice teachers build self-efficacy by practicing new teaching skills with peers before entering real classrooms (Gurvitch & Metzler, 2009). Medical students refine clinical skills by practicing in low-stakes settings, such as learning in simulated environments (Dalwood et al., 2020). When they are new to a field, learners may look to mentors and other proficient models to evaluate their competence and gain the knowledge and skills necessary to improve (Young et al., 2012). The transition from knowledge acquisition to effective practice-based implementation can be guided by those who have already made the journey.

6. **Encourage learners who struggle.** Students who have learning disabilities or who struggle to succeed may doubt their capabilities in part because they have fewer positive academic experiences. Teachers can cultivate opportunities for mastery by differentiating their instruction and supporting skill development (García & de Caso, 2006). Portfolio approaches and feedback opportunities that emphasize personal improvement can help focus learners' attention on their own growth rather than how they compare with others (Peura et al., 2021).

### **Social Environments That Support Self-Efficacy**

1. **Provide diverse models of success.** Social models can help learners expand their notion of what is possible. Seeing the accomplishments of others (e.g., parents, peers, educators, media figures) exposes learners to a variety of academic and career pathways and can enhance observers' beliefs in their own capabilities. As a young girl on a popular ad for an afterschool mentorship program says, "If I can see it, I can be it." As theorized, models perceived as similar wield more influence on observers' self-efficacy (Shin et al., 2016). Therefore, educators should look for ways that learners can "see" themselves through others by incorporating models of diverse identities and backgrounds into instructional experiences (Gladstone & Cimpian, 2021). Opportunities for learners to expand their network of social models through professional interactions (e.g., internships, conferences, career fairs, invited speakers) can offer additional efficacy-building information (Chen et al., 2023).
2. **Show models who struggle but succeed.** Watching someone succeed at a difficult task on the first try and with minimal effort provides little inspiration. Seeing exemplars who have achieved success through coping and perseverance can help learners more readily to envision themselves doing the same (J. N. Ahn et al., 2019; Schunk & Hanson, 1989). Learners who struggle may especially benefit from exposure to models who have faced similar obstacles but overcame them (Schunk & Pajares, 2002).

3. **Minimize competitive learning structures.** Competitive climates with a heightened focus on social comparison may increase stress and anxiety (Posselt & Lipson, 2016). Conversely, communal learning environments in which students learn with and from one another to accomplish shared goals can minimize comparisons that breed insecurity and self-doubt (Dasgupta et al., 2022). Educators who create a supportive learning environment centered on personal and collective growth help learners focus on their own progress.
4. **Send messages that are specific and sincere.** Messages intended to support self-efficacy are most powerful when they are sincere, specific, and not overly critical of performance (Morris et al., 2017; van de Ridder et al., 2015). It is more effective to focus on the tools one needs to improve than to emphasize deficits. Educators must be tactful when critiquing student work, keeping the needs and developmental level of the learner in mind. On the other hand, “sugar-coating” or downplaying concerns to protect a student’s ego may come across as inauthentic and increase self-doubt. The social position of the messenger and recipient can sometimes mean that feedback is perceived as more critical than it was intended. Inviting the learner to be involved in planning their response to feedback can help both parties communicate clearly and establish shared goals (Griffiths et al., 2023). In trusting supervisory or mentoring relationships, educators can explore with learners the style of feedback that is most effective for their motivation and learning (Mills et al., 2023).
5. **Be sensitive to learners’ interpretations.** When judging what they can do academically, learners attend to information in the social environment in different ways. Some evidence shows that learners who have been historically minoritized in an area (e.g., women in engineering) may be more attuned to information conveyed via social models or messages from others, particularly others whom they perceive as similar (Chen et al., 2023; Hurtado et al., 2009). However, educators should not assume that all individuals from a particular group will respond

to social cues in the same way (see Butz & Usher, 2015). Educators should remain aware of the different ways in which learners respond to input from the social environment.

6. **Consider power and privilege.** Most educational institutions replicate the dominant structures of power and privilege in society. Educators are in positions of authority and power over students. However, social class, race, ethnicity, gender, and religion also play a role in the power dynamics of learning. Social positionality and the sociocultural environment can influence the impact of interpersonal exchanges (H. S. Ahn et al., 2016). Establishing trust and belonging among members of the learning environment can go a long way in fostering communications that support self-efficacy.

### **The Interior Landscape of the Learner**

1. **Pay attention to learners' emotions.** Reading learners' emotional "landscape" can provide clues about their self-efficacy. Positive emotions might indicate that students believe they can do well, whereas strong negative emotions such as anxiety and stress likely point to self-doubt. The ultimate effect of physiological and emotional states on self-efficacy depends on how learners interpret them. Educators can help learners use stress-reduction techniques such as reframing negative emotional responses as a common part of learning rather than something to eliminate or avoid (Samuel & Warner, 2019).
2. **Encourage constructive self-talk.** Learners who hold pessimistic beliefs about their capabilities may fear trying and avoid challenging tasks altogether. Ruminating on strong negative thoughts and fears can lower self-efficacy and lead to poor performance. Educators can help students quell their inner critics by engaging in constructive self-talk that refocuses attention on skill development and attainable goals. Guiding learners toward self-compassion can reduce negative emotions and support self-efficacy (Liao et al., 2021). Educators can help

students reduce negative self-talk and adopt a view of their ability as malleable (Haimovitz & Dweck, 2017).

3. **Use care when learners' self-efficacy might be too high or too low.** Educators often wonder how to manage underconfidence and overconfidence when they arise, as either can impair learning and motivation. Chronic self-doubt may lead learners to withdraw their effort, even when they are capable. Overconfidence can be harmful if it deters the learner from taking the necessary steps to improve (Destan & Roebbers, 2015). Misalignment between actual ability and perceived capability can signify a self-protective mechanism that helps people avoid unpleasant emotions related to actual or feared incompetence. By specifying what learners are doing well and helping them discover areas in which they need to improve, educators can assist learners in calibrating their self-efficacy and skill (Gutierrez & Schraw, 2015).
4. **Normalize the struggle.** Learning can at times feel overwhelming and isolating. Hearing stories of others' experiences and difficulties helps bring adverse arousal into perspective, normalizing it and lessening its blow (Lin-Siegler et al., 2016). Sending the message that "you're not alone" can prevent catastrophic thinking and keep negative emotions in check. Knowing that many others have found certain aspects of learning uncomfortable can make difficulties seem manageable and less threatening to one's sense of efficacy.
5. **Talk through impostor feelings.** When students enter uncharted learning territory, they sometimes suffer from a sense that everyone else is smarter (i.e., "impostor phenomenon," Clance & O'Toole, 1987). Feelings of fraudulence can arise for any learner and are particularly common among those entering selective environments or spaces where people like them have been historically underrepresented. Learners who view themselves as "impostors" struggle to accept that they belong among those they perceive as bright and competent. They fear being discovered as incompetent. Reminding learners that many successful people have felt similarly

and emphasizing that their capabilities and qualifications have rightfully landed them in their learning environment can help their impostor feelings subside.

**6. Support self-efficacy under stereotype threat.** The fear of confirming a stereotype about a group to which one belongs (i.e., stereotype threat; Aronson, 2002), especially one involving competence, can invoke debilitating stress that undermines self-efficacy and learning. Educators should not only examine their own implicit biases that may reinforce harmful stereotypes but also remain aware of social identity-threatening interactions happening in the learning environment. Highlighting students' achievements and expressing belief in their abilities can help create a sense of psychological safety and mitigate threats when they arise. A robust sense of efficacy can provide a buffer against the negative effects of stereotypic cues in the learning environment (Deemer et al., 2014).

#### **Best Practices for Supporting Learners' Self-Efficacy: Putting It All Together**

The tips above, though a good place to start, are not intended to be prescriptive. There is no "one-size-fits-all" approach to building self-efficacy. Learners differ in the ways they respond to any teaching practice, and those at different developmental levels interpret information differently. Skilled educators must first develop an understanding of who their students are and what they bring to the learning environment. If their efforts to support self-efficacy do not have the intended effect, the approach must be tailored to the learner's individual needs. Strategies to support self-efficacy should also be catered to how learning occurs in a particular setting; learning happens in classrooms, labs, libraries, field settings, homes, communities, internships, and more.

Educators can ensure that the environment enables learners to encounter a variety of efficacy-building opportunities. Indeed, intervention studies highlight the usefulness of targeting all four sources of self-efficacy (Huang et al., 2020; Unrau et al., 2018). Such findings lend support to Bandura's (1997) theorizing that receiving supportive information about one's efficacy from

multiple sources may provide a stronger indication of one's capabilities than any single source of information alone (Aro et al., 2018). By contrast, interventions focused only on learning gains sometimes fail to change learners' self-efficacy even though they produce the desired change in skills. In fact, the effectiveness of skill-building interventions on learning depends in part on learners' self-efficacy (Koponen et al., 2021). This reinforces the central assumption we began with: Both competence and confidence are essential to long-term success.

### **Further Exploring Bandura's Theory**

Bandura's (1997) social cognitive theory and the research inspired by it have shown that "people guide their lives by their beliefs of personal efficacy" (p. 3). Nevertheless, self-efficacy development in diverse educational and social contexts can be better understood. We briefly highlight 3 areas that could offer new insights for educational practice.

First, humans must feel capable of developing social and technological systems that can sustain health and life on a planet with finite resources. Yet studies of self-efficacy and its sources have largely focused on core academic subject areas. Although this is necessary and worthwhile, we hope to see more research focused on how to change people's beliefs in their capabilities to improve their lives and the lives of others through social and environmental change.

Second, Bandura frequently described the need for collective action to achieve shared goals. Learning has become increasingly specialized, and no one holds absolute authority. Successful endeavors will require collaborative effort and a belief in the efficacy of individuals and groups. How might groups of learners develop a shared sense of what they can do collectively (i.e., a sense of collective efficacy)? In addition to investigating the development of individuals' self-efficacy, researchers can begin to address the sources of collective efficacy in team-based endeavors.

Third, to choose one's life path and succeed in it while participating in an increasingly technology-mediated world filled with information and possibility requires a powerful ability to



self-regulate. Given mounting demands on their attention and time, how do learners develop competence and confidence in their self-regulatory skills? Research can help elucidate the role of educators in supporting learners' beliefs in their capabilities to cope with life's demands, manage their time, and put their skills to effective use.

### **Conclusion**

Learners construct their sense of efficacy by interpreting what happens to them. Bandura offered a framework for how this sociocognitive interpretation process takes place. With a sympathetic understanding of how learner characteristics (e.g., developmental level, prior knowledge), the sociocultural context, and the learning climate play a role in self-efficacy development, educators will be well positioned to support learners. We hope that the tips outlined here serve as a helpful starting point. Translating these tips to actual practice depends on nothing less than the educator's artistry.

We are indebted to Albert Bandura for helping us improve our own self-efficacy in our personal and collective pursuits. We are eager to continue investigating his theorizing for years to come and to read the work of others who do so too. As we carry on in this work, as Al might say, "May the efficacy force be with us."

### References

- Ahn, H. S., Usher, E. L., Butz, A. R., & Bong, M. (2016). Cultural differences in the understanding of modelling and feedback as sources of self-efficacy information. *British Journal of Educational Psychology*, 86(1), 112-136. <https://doi.org/10.1111/bjep.12093>
- Ahn, J. N., Hu, D., & Vega, M. (2019). "Do as I do, not as I say": Using social learning theory to unpack the impact of role models on students' outcomes in education. *Social and Personality Study Compass*, 14, 1-12. <https://doi.org/10.1111/spc3.12517>
- Aro, T., Viholainen, H., Koponen, T., Peura, P., Räikkönen, E., Salmi, P., Sorvo, R., & Aro, M. (2018). Can reading fluency and self-efficacy of reading fluency be enhanced with an intervention targeting the sources of self-efficacy? *Learning and Individual Differences*, 67, 53–66. <https://doi.org/10.1016/j.lindif.2018.06.009>
- Aronson, J. (2002). Stereotype threat: Contending and coping with unnerving expectations. In J. Aronson (Ed.), *Improving academic achievement* (pp. 279-301). Academic Press. <https://doi.org/10.1016/B978-012064455-1/50017-8>
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. Freeman.
- Butz, A. R., & Usher, E. L. (2015). Salient sources of self-efficacy in reading and mathematics. *Contemporary Educational Psychology*, 42, 49-61. <https://doi.org/10.1016/j.cedpsych.2015.04.001>
- Chen, X.-Y., Usher, E. L., Roeder, M. L., Johnson, A. A., Kennedy, M. S., & Mamaril, N. A. (2023). Mastery, models, messengers, and mixed emotions: Examining the development of engineering self-efficacy by gender. *Journal of Engineering Education*, 112, 64-89. <https://doi.org/10.1002/jee.20494>

- Clance, P. R., & O'Toole, M. A. (1987). The imposter phenomenon: An internal barrier to empowerment and achievement. *Women & Therapy, 6*, 51-64.  
[https://doi.org/10.1300/J015V06N03\\_05](https://doi.org/10.1300/J015V06N03_05)
- Dalwood, N., Bowles, K. A., Williams, C., Morgan, P., Pritchard, S., & Blackstock, F. (2020). Students as patients: A systematic review of peer simulation in health care professional education. *Medical Education in Review, 54*, 387-399. <https://doi.org/10.1111/medu.14058>
- Dasgupta, N., Thiem, K. C., Coyne, A. E., Laws, H., Barbieri, M., & Wells, R. S. (2022). The impact of communal learning contexts on adolescent self-concept and achievement: Similarities and differences across race and gender. *Journal of Personality and Social Psychology, 123*(3), 537–558. <https://doi.org/10.1037/pspi0000377>
- Deemer, E. D., Lin, C., & Soto, C. (2016). Stereotype threat and women's science motivation: Examining the disidentification effect. *Journal of Career Assessment, 24*, 637–650.  
<https://doi.org/10.1177/1069072715616064>
- Destan, N., & Roebbers, C. M. (2015). What are the metacognitive costs of young children's overconfidence? *Metacognition and Learning, 10*(3), 347–374.  
<https://doi.org/10.1007/s11409-014-9133-z>
- Fong, C. J., & Krause, J. M. (2014). Lost confidence and potential: A mixed methods study of underachieving college students' sources of self-efficacy. *Social Psychology of Education, 17*, 249–268. <https://doi.org/10.1007/s11218-013-9239-1>
- García, J. N., & de Caso, A. M. (2006). Changes in writing self-efficacy and writing products and processes through specific training in the self-efficacy beliefs of students with learning disabilities. *Learning Disabilities: A Contemporary Journal, 4*, 1–27.
- Gladstone, R. J., & Cimpian, A. (2021). Which role models are effective for which students? A systematic review and four recommendations for maximizing the effectiveness of role

- models in STEM. *International Journal of STEM Education*, 8, 1-20.  
<https://doi.org/10.1186/s40594-021-00315-x>
- Griffiths, C. M., Murdock-Perriera, L., & Eberhardt, J. L. (2023). “Can you tell me more about this?”: Agentic written feedback, teacher expectations, and student learning. *Contemporary Educational Psychology*, 73, 102145. <https://doi.org/10.1016/j.cedpsych.2022.102145>
- Gurvitch, R., & Metzler, M. W. (2009). The effects of laboratory-based and field-based practicum experience on pre-service teachers’ self-efficacy. *Teaching and Teacher Education*, 25, 437–443. <https://doi.org/10.1016/j.tate.2008.08.006>
- Gutierrez, A. P., & Schraw, G. (2015). Effects of strategy training and incentive on students’ performance, confidence, and calibration. *Journal of Experimental Education*, 83(3), 386-404. <https://doi.org/10.1080/00220973.2014.907230>
- Haimovitz, K. & Dweck, C. S. (2017). The origins of children’s growth and fixed mindsets: New research and a proposal. *Child Development*, 88(6), 1849–1859.  
<https://doi.org/10.1111/cdev.12955>
- Huang, X., Mayer, R. E., & Usher, E. L. (2020). Better together: Effects of four self-efficacy-building strategies on online statistical learning. *Contemporary Educational Psychology*, 63, 101924. <https://doi.org/10.1016/j.cedpsych.2020.101924>
- Hurtado, S., Cabrera, N. L., Lin, M. H., Arellano, L., & Espinosa, L. L. (2009). Diversifying science: Underrepresented student experiences in structured research programs. *Research in Higher Education*, 50, 189–214. <https://doi.org/10.1007/s11162-008-9114-7>
- Koponen, T., Aro, T., Peura, P., Leskinen, M., Viholainen, H., & Aro, M. (2021). Benefits of integrating an explicit self-efficacy intervention with calculation strategy training for low-performing elementary students. *Frontiers in Psychology*, 12, 714379.  
<https://doi.org/10.3389/fpsyg.2021.714379>

- Liao, K. Y.-H., Stead, G. B., & Liao, C.-Y. (2021). A meta-analysis of the relation between self-compassion and self-efficacy. *Mindfulness, 12*, 1878–1891. <https://doi.org/10.1007/s12671-021-01626-4>
- Lin-Siegler, X., Ahn, J. N., Chen, J., Fang, F. F. A., & Luna-Lucero, M. (2016). Even Einstein struggled: Effects of learning about great scientists' struggles on high school students' motivation to learn science. *Journal of Educational Psychology, 108*, 314–328. <https://doi.org/10.1037/edu0000092>
- Marks, J., & Chase, C. C. (2019). Impact of a prototyping intervention on middle school students' iterative practices and reactions to failure. *Journal of Engineering Education, 108*, 547–573. <https://doi.org/10.1002/jee.20294>
- Mills, L. M., O'Sullivan, P. S., ten Cate, O., & Boscardin, C. (2023). Investigating feedback orientation in medical learners. *Medical Teacher, 45*(5), 492–498. <https://doi.org/10.1080/0142159X.2022.2138741>
- Morris, D. B., Usher, E. L., & Chen, J. A. (2017). Reconceptualizing the sources of teaching self-efficacy: A critical review of emerging literature. *Educational Psychology Review, 29*, 795–833. <https://doi.org/10.1007/s10648-016-9378-y>
- Panadero, E., Jonsson, A., & Botella, J. (2017). Effects of self-assessment on self-regulated learning and self-efficacy: Four meta-analyses. *Educational Research Review, 22*, 74–98. <http://dx.doi.org/10.1016/j.edurev.2017.08.004>
- Peura, P., Aro, T., Räikkönen, E., Viholainen, H., Koponen, T., Usher, E. L., & Aro, M. (2021). Trajectories of change in reading self-efficacy: A longitudinal analysis of self-efficacy and its sources. *Contemporary Educational Psychology, 64*, 101947. <https://doi.org/10.1016/j.cedpsych.2021.101947>

- Posselt, J. R., & Lipson, S. K. (2016). Competition, anxiety, and depression in college. *Journal of College Student Development, 57*, 973-989. <https://doi.org/10.1353/csd.2016.0094>
- Samuel, T. S., & Warner, J. (2019). "I can math!": Reducing math anxiety and increasing math self-efficacy using a mindfulness and growth mindset-based intervention in first-year students. *Community College Journal of Research and Practice, 45*(3), 205-222. <https://doi.org/10.1080/10668926.2019.1666063>
- Schunk, D. H., & Hanson, A. R. (1989). Influence of peer-model attributes on children's beliefs and learning. *Journal of Educational Psychology, 81*, 431-434.
- Schunk, D. H., & Pajares, F. (2002). The development of academic self-efficacy. In A. Wigfield & J. S. Eccles (Eds.), *Development of achievement motivation* (pp. 15-31). Elsevier Science & Technology.
- Shin, J. E. L., Levy, S. R., & London, B. (2016). Effects of role model exposure on STEM and non-STEM student engagement. *Journal of Applied Social Psychology, 46*(7), 410-427. <https://doi.org/10.1111/jasp.12371>
- Simpson, A., Maltese, A., Anderson, A., & Sung, E. (2020). Failures, errors and mistakes: A systematic review of the literature. In C. H. Mayer & E. Vanderheiden (Eds.), *Mistakes, errors and failures across cultures*. Springer International.
- Unrau, N. J., Rueda, R., Son, E., Polanin, J. R., Lundeen, R. J., & Muraszewski, A. K. (2018). Can reading self-efficacy be modified? A meta-analysis of the impact of interventions on reading self-efficacy. *Review of Educational Research, 88*, 167-204. <https://doi.org/10.3102/0034654317743199>
- Usher, E. L., & Pajares, F. (2008). Sources of self-efficacy in school: Critical review of the literature and future directions. *Review of Educational Research, 78*, 751-796. <https://doi.org/10.3102/0034654308321456>

van de Ridder, J. M. M, Peters, C. M. M., Stokking, K. M., de Ru, J. A., & ten Cate, O. Th. J.

(2015). Framing of feedback impacts students' satisfaction, self-efficacy and performance.

*Advances in Health Science Education*, 20, 803-816. [https://doi.org/10.1007/s10459-014-](https://doi.org/10.1007/s10459-014-9567-8)

[9567-8](https://doi.org/10.1007/s10459-014-9567-8)

Young, H. N., Schumacher, J. B., Moreno, M. A., Brown, R. L., Sigrest, T. D., McIntosh, G. K.,

Schumacher, D. J., Kelly, M. M., & Cox, E. D. (2012). Medical student self-efficacy with

family-centered care during bedside rounds. *Academic Medicine*, 87, 767-755.

<https://doi.org/10.1097/ACM.0b013e318253dcd8>

ACCEPTED MANUSCRIPT

### Additional Resources for Classroom Use

1. **Pajares, F., & Urdan, T. (Eds.). (2006). *Adolescence and education, Vol. 5: Self-efficacy beliefs of adolescents*. Information Age.**

This edited volume features chapters written by leading self-efficacy scholars. Highlights include Bong's recommendations on self-efficacy assessment (Ch. 13), Bandura's Guide for Constructing Self-Efficacy Scales (Ch. 14) and a compilation of strategies that parents and teachers can use to support self-efficacy during childhood and adolescence (by Frank Pajares, Ch. 15).

2. **Usher, E. L., & Weidner, B. L. (2018). Sociocultural influences on self-efficacy development. In G. A. D. Liem & D. M. McInerney (Eds.), *Big theories revisited 2* (pp. 141-164). Information Age.**

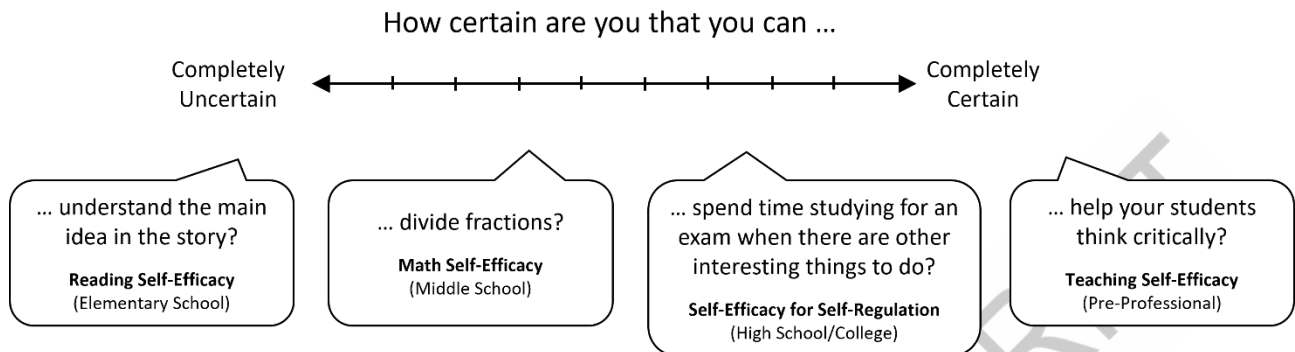
This chapter examines how the sociocultural context of learning affects self-efficacy development. Using a hypothetical learner case, the authors consider the role that culture plays in directing what students think, how they behave, and how they interpret situational cues within different circumstances. They then explore how these sociocultural processes affect learners' self-efficacy.

3. **Warner, L. M., & French, D. P. (2020). Self-efficacy interventions. In M. S. Hagger, L. D. Cameron, K. Hamilton, N. Hankonen, & T. Lintunen (Eds.), *Handbook of behavior change* (pp. 461–478). Cambridge University Press.**

<https://doi.org/10.1017/9781108677318.032>

This chapter begins with a summary of research findings on the ways in which self-efficacy motivates behavior change. The authors present several lists of behavioral techniques and environmental inputs that can be useful for supporting self-efficacy in different educational and healthcare settings. After reviewing relevant research, the authors provide a step-by-step guide to self-efficacy interventions.



**Figure 1***Sample Self-Efficacy Assessment for Learners in Different Contexts*

*Note.* Rating scale anchors are not depicted here but are recommended to help learners express their level of self-efficacy more precisely.