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Building a Compendium of Teaching Strategy Resources that
Foster Growth Mindset and Belonging

A dissertation submitted in partial satisfaction of the
Requirements for the degree Doctor of Education

by

Jacque Marie Beaubien

2018

ABSTRACT OF THE DISSERTATION

Building A Compendium of Teaching Strategy Resources That Foster Growth Mindset and Belonging

by

Jacque Marie Beaubien

Doctor of Education

University of California, Los Angeles, 2018

Professor Kathryn Anderson-Levitt, Co-Chair

Professor Gerardo Ramirez, Co-Chair

This study used document analysis and basic qualitative research methods to compile an evidence-based¹ compendium of links to online, open-access resources that can help educators learn strategies for fostering belonging and a growth mindset in their classrooms—two social psychological factors known to improve academic equity, engagement, and achievement. The literature provides guidance for five general teaching principles that can foster belonging and a growth mindset; however, previously there was no consolidated set of evidence-based resources to guide educators on how to implement these principles in different grade levels and content areas. A wide range of relevant online resources exist, but many have limitations such as being difficult to find, mislabeled, or not linked to research evidence. The original goal of collecting 30

¹ The term *evidence-based* is defined as any concept or strategy that is derived from or informed by objective evidence—most commonly, educational research or metrics of school, teacher, and student performance.

resources was exceeded; in total, 83 videos, text materials, podcasts, blogs, and vlogs (blogs with embedded videos) of teachers modeling strategies or concisely describing how they enact a strategy were collected. These are modeled across a wide range of grade levels, content areas, school types, and ethnically diverse contexts. Despite this success, important gaps were identified such as resources for: *Growth Mindset Language* in high school and college contexts; *Effective Feedback* in college contexts; any resources for science content areas; and key *Teacher Caring* strategies that may be especially important for improving teacher-student trust in contexts where stereotype threat may be activated (e.g. between white teachers and students of color, or between male science or math teachers and female students). Because resources for college contexts were the most limited, community college faculty (n=9) were interviewed to learn about their perceptions of opportunities and challenges when modifying a strategy that is modeled in a different grade level, subject area, or school context. All participants expressed excitement about the compendium and provided valuable insights on conceptual and logistical considerations for translating the strategy in the reviewed resources for use in their own contexts.

The dissertation of Jacquie Marie Beaubien is approved.

Thomas M. Philip

Louis M. Gomez

Kathryn Anderson-Levitt, Committee Co-Chair

Gerardo Ramirez, Committee Co-Chair

University of California, Los Angeles

2018

DEDICATION

I would like to dedicate this dissertation to my brother Paul who has schizophrenia, my now deceased friend Lawrence Ostrander who committed suicide in 1993 shortly after being diagnosed with bi-polar disorder, and to all those like them who are brilliant beyond belief and care deeply about being of service, but who have mental health challenges that make it harder to fulfill this longing. I lived much of my life held back by mental health issue and know the pain of this frustration well. Were it not for the support of exceptional mental health practitioners, I could be experiencing it still.

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The Mindset Scholars Network (MSN) serves a critical role in unifying the voice and vision for the nation's leading social scientists dedicated to advancing an interdisciplinary understanding of students' psychological experience of school and its impact on learning outcomes and equity. They also work with education stakeholders to translate the implications of this research for practice and policy. It has been a great honor to have the friendship and thought partnership of Lisa Quay, the MSN Executive Director. Lisa, your support, both personally and professionally have been nothing short of transformative. You helped me feel confident about changing directions with my research, provided invaluable feedback to refine the framework that guided the collecting and coding of resources, were always available to bounce ideas off of, and you kept me up to date on the latest emerging findings relevant to my topic. Thank you!

I first learned about the research on growth mindset and belonging during my final semester as an undergraduate at Stanford University when I took a class called Wise

Interventions taught by Professor Greg Walton. I can honestly say this class changed my life. I immediately saw its potential to meaningfully impact real-world problems and knew I would devote myself from that point forward to ensuring the bridge between research and practice was structurally sound, built for scale, and built for the bi-directional flow of ideas. Thank you, Greg, for sparking this inspiration, for introducing me the work of Carol Dweck, David Yeager and many other brilliant researchers, and for introducing me to PERTS – the Project for Education Research That Scales.

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In particular, this dissertation study grew out of my work over the last several years at PERTS developing resources for educator teams for the Mindset Kit (mindsetkit.org) and having the opportunity to work directly with three amazing teams of teachers at Le Conte, Berendo, and Young Oak Kim Middle Schools in the Los Angeles Unified School district with the support of the Gear UP4LA team, Lois Bramwell, Mickie Vazquez-Hahn, and Rocio Piña. This collaboration helped our team at PERTS gain a deeper understand what educators need to

effectively integrate learning mindset research into their practice. It also helped me appreciate the vast practical wisdom of educators on how to motivate learning and create inclusive classroom environments. There are too many of you to list, but thank you all who welcomed me into your classrooms and who shared your wisdom and feedback so candidly!

To all of my family in Canada and my adopted family in Southern California, I am so grateful for all the ways each one of you has pushed me to become a better person. The love, commitment, and courage each of you have shown is what fuels my fierce determination to never let anything stand in the way of my own growth, or creating a purpose-driven, community-oriented life.

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VITA

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Chapter 1

Problem Statement

According to the National Center for Children in Poverty, 44% of children in the United States (31.4 million) are living in low-income or poverty conditions, a 5% increase since 2008 (Jiang, Ekono, & Skinner, 2016). The negative academic and life outcomes associated with growing up in poverty are well documented (Brown, 2013; Holzer, Schanzenbach, Duncan, & Ludwig, 2008; Leventhal & Brooks-Gunn, 2000; Mani, Mullainathan, Shafir, & Zhao, 2013; Putnam, 2016; Reardon, Robinson, & Weathers, Forthcoming), and are disproportionately likely to impact minority children (Logan, Minca, & Adar, 2012; Putnam, 2016). African American and Latino children are twice as likely to grow up in poverty (Jiang et al., 2016); these students receive poorer grades, graduate from high school at lower rates, and are less college-ready when they do graduate (Condrón, 2009a; Rogers & Freelon, 2012; Venezia & Kirst, 2005). While there are a host of complex structural factors driving these achievement gaps between African American and Latino students and their White and Asian peers, one important factor that has recently emerged is the role of students' psychological experiences—whether they, and their teachers believe they have what it takes to succeed intellectually and whether they feel like they belong and are seen as competent in academic settings. Social psychological factors such as these that influence student motivation are sometimes referred to as learning mindsets, two of which are:

- *Growth mindset* – the belief that you can grow your intellectual abilities
- *Belonging* – the belief that you belong and are seen as competent in academic settings

Numerous well-controlled studies have shown these social psychological factors are malleable,

and are powerfully shaped by context cues that students detect from the adults they interact with and from their environment (Gunderson et al., 2013; Newman & Schwager, 1993; Sun, 2015; Tenenbaum & Ruck, 2007). The literature provides guidance for five general teaching principles that can ensure that students receive signals that they belong and can growth their abilities (growth mindset) (Mueller & Dweck, 1998; Yeager & Walton, 2011), however, currently there is no consolidated set of resources of specific strategies that can guide teachers on how to implement these principles in different grade levels and content areas. There are many open-access resources available online, however, they are not well organized, good examples are often mixed in with inaccurate examples (e.g. a resource labeled as growth mindset that is actually about grit), or good examples that are buried within unrelated resources due to poor search and filter functions on some websites. In this study, I first collected existing open-access resources such as videos of teachers modeling specific principles, as well as supporting professional development training materials to help improve the usefulness of these resources. Because pilot data suggested more online professional development resources are targeted towards elementary grades, this study focused on collecting resources from middle school, high school, and higher education contexts and those that were modeled in different content areas. Second, because gaps in the collected resources emerged for those modeled in higher education contexts and for two growth mindset teaching principles, I conducted two interviews and two focus groups with a total of nine college faculty to obtain their feedback on several growth mindset resources modeled in lower grades. These interviews and focus groups helped identify the opportunities and challenges of modifying a strategy that is modeled in a different grade level, and provided recommendations for areas where more knowledge of how to apply growth mindset constructs is needed. Participants also directed me to a new source for video resources for college instructors

which were then added to the compendium. One interview subject shared two teaching strategies that were relevant to this study, therefore, with his consent, I created YouTube videos of him describing his strategies which were also added to the compendium.

The final compendium is, for now, an open-access Google spreadsheet which can be accessed by clicking this link: [Belonging & Growth Mindset Teaching Strategy Resources - Published v1 \(http://tiny.cc/belonging_GM_Compendium\)](http://tiny.cc/belonging_GM_Compendium). The first tab provides the framework used to categorize resources and on the second each resource is tagged to indicate which teaching principle and teaching strategy within that teaching principle it supports. Since many resources model more than one strategy, many have multiple tags. The resulting compendium of resources will be shared through open-access sites geared towards helping educators foster positive psychological classroom environments such as the PERTS Mindset Kit, Mindset Scholars Network, and Sevenzo. Making a resource such as this broadly available free of charge could help large numbers of educators improve their students' motivation and engagement.

Background

Students from low income backgrounds and minority students face enormous external barriers to academic success. They are more likely to attend under-resourced schools with less experienced teachers (Condrón, 2009a); have access to fewer academic opportunities at their schools (Venezia & Kirst, 2005); are more likely to be disciplined more harshly and become involved in the juvenile justice system (Balfanz, Spiridakis, Neild, & Legters, 2003; Okonofua & Eberhardt, 2015); and to have less family and community social capital (Putnam, 2016; Venezia & Kirst, 2005). Unsurprisingly, they are also significantly more likely to drop out before completing high school (U.S. Department of Education, 2015).

Students of color are also significantly more likely to face bias within the classroom.

Tenenbaum and Ruck (2007) conducted four meta-analysis and found that teachers use more positive speech and hold higher expectations for White and Asian students than for African American and Latino students. Minority students are also subjected to more severe discipline practices and are suspended from school at significantly higher rates² than their White peers—a disparity that exists in varying degrees in every state in the country (Losen & Martinez, 2013; Office of Civil Rights, 2012). An extensive analysis of merged data from three national surveys found that the disparity in out of school suspension rates between Black and Latino students could not be accounted for by differences in frequency of misbehavior or severity of the offenses committed (Finn & Servoss, 2015) suggesting that racial bias plays a role.

Historical and present day institutional racism, the propagation of negative stereotypes, differential access to resources, and differential treatment due to implicit bias can all send students of color and other students for whom negative stereotypes exist powerful negative messages about the expectations their teachers, schools, and society have for their academic success. The combined effect can leave these students vulnerable to internalizing negative perceptions about their abilities and to disengaging from school. Fortunately, there is evidence that teachers can actively cultivate a positive psychological climate for their students (Blackwell, Trzesniewski, & Dweck, 2007; Boaler, 1998; Kraft & Grace, in press; Sun, 2015; Walton & Cohen, 2007).

The Importance of Learning Mindsets

An extensive body of literature has shown that believing that abilities are malleable and having a sense of belonging in academic contexts can improve academic outcomes—especially for low-performing students—and can buffer against the negative effects of both poverty and

² For example, Black students are expelled at more than three times the rate of their White peers.

being part of a group for which negative stereotypes about academic ability exist (Claro, Paunesku, & Dweck, 2016; Walton, 2014). Numerous well-controlled studies have shown these beliefs and perceptions are malleable, and are powerfully shaped by context cues that students detect from the adults they interact with and from their environment (Gunderson et al., 2013; Newman & Schwager, 1993; Sun, 2015; Tenenbaum & Ruck, 2007). An emerging body of literature emphasizes the role teachers can play in shaping students' mindsets including insights on what changes in practice could be beneficial (Blazar & Kraft, 2017; Brummelman, Thomaes, Overbeek, et al., 2014; Park, Gunderson, Tsukayama, Levine, & Beilock, 2016; Sun, 2015). The literature also provides guidance for which teaching principles—the foundational constructs—are most effective for foster students' sense of belonging and a growth mindset.

Translating Research into Practice

In recent years, research on the social psychology of learning and motivation, particularly growth mindset, has gained widespread attention in mainstream media. This attention has triggered an explosion of articles and books on these topics (e.g., a Google search of news articles on growth and fixed mindset returns over 2,000,000 results). Education policy makers have also taken notice. For example, the new Every Student Succeeds Act (ESSA) encourages schools and districts to address student engagement and endorses the use of federal funds to implement growth mindset and belonging programs. Schools, and districts around the country, hungry to bring this research into their classrooms, are implementing large-scale initiatives, and individual teachers too are rushing to implement these ideas. However, evidence-based resources to guide these efforts are sparse. In a recent survey of registered users of Education Week, over 600 K-12 teachers from across the nation reported that not only were they familiar with growth mindset, 98% said they believed building growth mindset into their classrooms would improve

student learning. Yet only 20% felt confident they were good at fostering a growth mindset in their students (Education Week Research Center, 2016). Indeed, there is evidence to suggest that teachers simply believing in the malleability of intelligence does not predict their students' mindsets (Park et al., 2016; Sun, 2015). Many teachers who actively attempt to instill a growth mindset in their students attempt to do so by focus on changing students' beliefs about the nature of abilities rather than on changing their teaching practices to create the conditions that foster a growth mindset (Dweck, 2015). This is problematic for several reasons. First, it locates the source of students' motivation issues solely within the student creating fertile ground for "blaming students" for their lack of success—a concern raised by some critics of growth mindset research (Kohn, 2015). This, in turn, creates the potential for replicating structural inequalities as has been the case with labeling a disproportionate number of students of color as learning disabled (Artiles, Kozleski, Trent, Osher, & Ortiz, 2010).

The second issue with focusing on changing students' belief alone is that teachers practices are predictive of students beliefs (Park et al., 2016; Sun, 2015). If teachers attempts to convince students to adopt a growth mindset, or adopt superficial aspects of growth mindset like focusing on effort praise, but their teaching practices are inadvertently contradicting these messages (Sun, 2015), then not only might their efforts to teach a growth mindset fail, they may actually cause a backfire effect of reinforcing a fixed mindset in students (Amemiya & Wang, 2018; Brummelman, Thomaes, Overbeek, et al., 2014).

It is not surprising, however, that many educators struggle with how to effectively cultivate a growth mindset and sense of belonging in their students. As is often the case, educators and administrators are mostly left to translate research into practice themselves—something they may not have time or expertise to do well. Schneider states the problem as, “a

fundamental separation of the capacities and influences needed to move research into practice” (Schneider, 2014, p. 4). This lack of clear guidance for educators on how to bring relevant research insights into their classrooms is a gap this study hopes to at least partially address.

Teaching Principles that Cultivate Positive Learning Mindsets

There is an abundance of recommendations that could be drawn from the literature to guide teachers in positively influence their students’ sense of belonging and belief in the malleability of ability. For example, subtle changes in the framing of praise and encouragement can influence students’ reactions to failure, their willingness to persist, and their level of enjoyment of their work (Dweck, 2000; Mueller & Dweck, 1998). And when teachers convey high standards for performance along with assurances that all students can achieve these standards, they are more engaged and responsive to critical feedback (Benner & Mistry, 2007; Yeager et al., 2014). Similarly, the structure of learning tasks and the goals teachers emphasize also influence students’ beliefs about the nature of abilities (as either fixed or malleable) and their motivation (Boaler, 1998; Park et al., 2016; A. M. Ryan, Gheen, & Midgley, 1998; Sun, 2015; Urdan, Midgley, & Anderman, 1998).

Teaching principles that have been shown to increase students’ sense of belonging include but are not limited to: teachers conveying they care about each student (e.g. by making eye contact, and by getting to know about their interests outside of school) (Gehlbach et al., 2016; Immordino-Yang, 2011; Murdock & Miller, 2003; Sakiz, Pape, & Hoy, 2012; Wentzel, 1997, 2002); creating a classroom norm of respectful, inclusive discourse between students and between teacher and student, especially when students misbehave (Okonofua, Paunesku, & Walton, 2016); and by helping students understand that it is normal to feel belonging uncertainty when entering a new academic setting (Goyer et al., in press; Walton & Cohen, 2007a).

For this study, I will focus on identifying resources that address five key principles related to fostering a growth mindset and belonging. The term *Teaching principle* is used to define the foundational construct. Within each teaching principle, there are distinct *teaching strategies* that educators use to enact the teaching principle. These principles and strategies form the framework that guided the document analysis process of collecting and labeling teaching resources. For a full description of each teaching strategies, see Appendix A. It is worth acknowledging that many teachers have been implementing strategies related to these principles long before they were defined as growth mindset or belonging promoting.

Table 1. Growth Mindset and Belonging Teaching Principles and Teaching Strategies

Mindset	Teaching Principle	Principle Description	Teaching Strategies
Growth Mindset	High Standards for All	Practices that signal an expectation that all students can achieve at a high level.	Mixed Ability Grouping/All Students Participate (Boaler, William, & Brown, 2000; Sun, 2015)
			Open (Open-ended) Task Structures/ Encouraging Critical Thinking (Boaler, 1998; Ramirez, Hooper, Kersting, Ferguson, & Yeager, 2018; Sun, 2015)
Mindset	Teaching Principle	Principle Description	Teaching Strategies
Growth Mindset	Growth Mindset Language	Using language that focuses students on learning as a process and builds a classroom culture of embracing challenge, learning from mistakes, and focusing on effective strategies for growth.	Use Process Praise, Minimize Person Praise (Brummelman et al., 2014; Mueller & Dweck, 1998)
	Effective Feedback	Practices that cultivate students’ capacity for self-regulated learning and that helps students to: know what the learning goals are; accurately assess their current	Support Risk-Taking and Resilience to Mistakes & Failure (Haimovitz & Dweck, 2016; Moser, Schroder, Heeter, Moran, & Lee, 2011; Mueller & Dweck, 1998; Sun, 2015)
			Clear Goals and Formative Feedback Opportunities (Butler, 1988; Goodman et al., 2004; Nicol & Macfarlane-Dick, 2006)

		progress towards those goals; and know what next steps they can take to reach their learning goal.	Develop Self-Regulated Learning Skills (Deci et al., 1999; Nicol & Macfarlane-Dick, 2006)
Belonging	Teacher Caring and Respect	Practices teachers use to get to know students and let them know they care about them, believe in them, and respect them.	Convey Belief in Students' Competence/Reduce Ambiguity (Yeager et al., 2014).
			Form Connections with All Students (Furrer & Skinner, 2003; Kohli & Solórzano, 2012; Wirth, Sacco, Hugenberg, & Williams, 2010)
			Empathic Discipline/Prioritize Trust (Okonofua, Paunesku, & Walton, 2016)
			Normalize Belonging Uncertainty in New Settings (Walton & Cohen, 2011; Yeager et al., 2014)
	Peer-to-Peer Belonging	Practices that help students get to know each other and that establish a classroom norm of students supporting each other's learning.	Cooperative Learning Tasks (Johnson and Johnson, 1999, 2009)
			Peer-to-Peer Feedback and Support (Furrer, Skinner, & Pitzer, 2014; Wentzel & Caldwell, 1997)
			Increase Peer-to-Peer Connection (Gehlbach et al., 2016; Walton, Cohen, Cwir, & Spencer, 2012)

Limitations with Currently Available Resources

A vast body of teaching practice resources and video models exist on the internet—many of which are free, and contain excellent examples of these principles in action. However, they are not well organized. For example, The Teaching Channel, which has 1172 high-quality videos available for free, has 200 videos under the category of ‘engagement.’ Many of these videos show teachers enacting strategies supportive of belonging and growth mindset but they are not categorized or tagged as such. Consequently, teachers who learn about the importance of growth mindset and belonging, and who go looking for examples of how to enact them, cannot easily

find guidance to do so. Of those that are tagged as growth mindset, most focus on how to teach students to change their beliefs about intelligence which can be helpful, but counterproductive if the teachers' strategies are contradicting this message (Sun, 2015). Research has shown that teachers' practices are critical (Kraft & Grace, in press; Sun, 2015), yet very few resources can be found that provide guidance on what changes in their practices can help build growth mindset and belonging norms into their classroom culture. The few that do exist are typically modeled in elementary grades.

Another problem with existing resources is that many are inaccurately labeled due to the conflating of different motivational terms and concepts. This means that a search for growth mindset or belonging strategies may turn up some good strategies that are mixed in with unrelated strategies. For example, Edutopia, has a section devoted to growth mindset, however, many of the resources listed are related to social-emotional learning or other motivation constructs such as grit. This tendency to conflate or overgeneralize constructs may be contributing to the tendency of some educators to label any student who appears to lack motivation as having a fixed mindset, an issue I have observed among teachers in my pilot work. For example, one teacher identified a student saying they didn't feel like they belonged as evidence of a fixed mindset (Beaubien, Stahl, Herter, & Paunesku, 2017).

Finally, good resources do not cite the research evidence for why the practice is of value. They also often lack supplementary materials that would make them useful for training teachers new to learning mindsets how to implement the practice.

Rationale

Creating a compendium of newly discovered and existing teaching strategy resources that are linked to each of the five teaching principles and 13 teaching strategies identified in Table 1

is an important gap to address for two reasons. First, these principles and strategies hold promise for helping to improve the outcomes of struggling students' and to reduce achievement gaps (Dweck, 2000; Walton & Cohen, 2011; Yeager & Walton, 2011). Second, there has been a significant increase in the number of districts across the country implementing growth mindset and belonging initiatives despite a paucity of evidence-based recommendations to guide the development of these initiatives (Beaubien, Stahl, Herter, & Paunesku, 2016; Beaubien et al., 2017; Education Week Research Center, 2016; Sparks, 2013). Third, as described above, the students who are likely to benefit the most from their teachers enacting growth mindset and belonging strategies are the students attending under-resourced schools in poor communities. Thus, creating a compendium of open-access resource that can help individual teachers in these communities apply these strategies could minimize equity gaps that often form as a result of more resources schools being able to pay for expensive programs to train educator on new pedagogy (Schneider, 2014).

The rationale for focusing on the five principles and strategies listed in Table 1 is that a growing body of evidence suggests that fostering a sense of belonging and growth mindset early in the year may help stem the development of negative cycles of distrust and discouragement, particularly among students with a history of academic struggle (Beaubien et al., 2016; Blackwell et al., 2007; Claro et al., 2016; Paunesku et al., 2015; Walton & Wilson, Under review) or those who may be susceptible to identity threat—concerns that they may not be treated fairly due to structural racism, stereotypes, prejudice, and bias (Emerson & Murphy, 2014; Okonofua, Paunesku, et al., 2016; Okonofua, Walton, & Eberhardt, 2016; Walton & Cohen, 2007). Therefore, providing a set of guidelines on how to implement these five high-leverage principles is the best starting point for creating such a compendium.

Study Design

The goal of this study was to answer the two research questions below in order to create a compendium of resources to help guide educators on how to implement the five teaching principles outlined in Appendix A.

Research questions.

1. What open-access internet resources and video models currently exist for demonstrating how teachers can enact belonging and growth mindset strategies, but which may not be highlighted as supporting these mindsets, or which may not relate the strategy to the evidence-base for its effectiveness?
 - a. What supplemental materials could help improve on these existing resources?
2. What do teachers say are the opportunities and challenges of modifying a strategy that is modeled in a different context such as a different grade level, subject area, or school context (e.g. well-resourced school)?
 - a. What, if any, supplemental materials could help improve on their ability to apply the strategy to their context?

Overview of study design.

Data collection for this study involved conducting a search of the internet for documentation of teaching strategies related to each of the five mindset teaching principles. I specifically looked for how these strategies are enacted in a variety of grade-level settings such as middle schools, high schools, and colleges and across content areas, whenever possible. Forms of documentation that were collected included online popular culture documents such as videos, text materials, podcasts, blogs, and vlogs (blogs with embedded videos) of teachers modeling strategies or concisely describing how they enact a strategy. I also collected

supplemental professional development materials that provided additional background or instructional information to improve the effectiveness of the primary resources collected.

The data collection proceeded in stages. First, I conducted a document analysis of content available online to identify existing resources posted by individual teachers and educational organizations which included The Teaching Channel (1173 videos, categorized), Edutopia (430 videos) and EL Learning (277 videos). The goal was to identify at least two documents (i.e., video models, interviews, curriculum, or syllabi) from three different grade levels for each teaching principles (see Table 2 below). Stage one revealed where gaps in the collected resources existed and guide stage two of the study which involved interviewing teachers.

After this initial phase of document analysis, it became clear that the most significant gap in resources was for those modeled in a college context. Therefore, I conducted two one-on-one interviews and two focus groups with seven college faculty (nine college faculty total) to learn about their perceptions of the opportunities and challenges of modifying a strategy that is modeled in a different context such as a different grade level, subject area, or school context. The interview participants also provided recommendations for additional sources of instructional videos modeled in college contexts.

The initial goal was to collect thirty resources total that provided examples modeled in middle school, high school, and college settings for each of the five principles (see Table 2 below). All resources were selected to maximize ethnic diversity and to represent a diversity of contexts such as, rural, suburban, and urban; public, charter, and private schools; and student population diversity related to ethnicity and socioeconomic status.

Table 2. Planned Goals for Teaching Practice Collection

		Middle School	High School	College	Total
Growth Mindset	High Standards for All	2	2	2	6
	Growth Mindset Language	2	2	2	6
	Effective Feedback	2	2	2	6
Belonging	Teacher Caring and Respect	2	2	2	6
	Peer-to-Peer Belonging	2	2	2	6
	TOTAL	10	10	10	30

Participant and site selection.

Two interviews and two focus groups were conducted with a total of nine community college faculty at two colleges. College faculty were selected because the biggest gap that emerged early on was in resources for college settings. Five resources total were reviewed by these instructors. See Table 3 below for which instructors reviewed which resources. In most interviews, there was only time for participants to review one resource. Although not an explicit goal of this study, two new video resources were created from teaching strategies shared during one interview. All interviews and focus groups were conducted onsite at the college.

Table 3. Summary Characteristics of Interview Subjects and Resources Used in Interviews

Type	Name	Subject Area	# Yrs	M/F	Ethnicity	Practice Reviewed	Teaching Principle	Teaching Strategy Resource Reviewed
Intvw	Miguel	English	17	M	White	Praising the Process: See it in Action	Growth Mindset Language	Use Process Praise, Minimize Use of Person Praise
Intvw	Pam	Faculty Professional Development	20	F	White	1) Austin's Butterfly 2) Getting Better through	Growth Mindset Language	Support Risk-taking and Resilience to Mistakes & Failure

						Authentic Feedback		
FG 1	Mariana	Sociology	15	F	Af Am/ Surinamese Am	Highlighting Mistakes: A Grading Strategy	Effective Feedback	Clear Goals and Formative Feedback Opportunities
	Barry	Criminal Justice	17	M	Hispanic			
	James	Philosophy	10	M	White			
FG2	Isabel	Counseling	25	F	Hispanic	First Five Minutes Last Five Minutes	Effective Feedback	Develop Self- Regulated Learning Skills
	Nicole	Psychology	11	F	Hispanic			
	Sarah	Education	25	F	White Jewish			
	Jillian	Geography	10	F	White			

Convenience sampling was used to identify and recruit participants for interviews. This method was used primarily due to time limitations for recruitment and interviewing. All selected interview participants had prior knowledge of growth mindset research, and some were aware of the belonging research. Participants with some knowledge of this area of research were intentionally chosen so that they could provide feedback on how useful they believed a resource was for helping new teachers implement the strategy based on either having experience training other educators on these principles, or based on their own experience learning to integrate growth mindset and/or belonging promoting strategies into their teaching. All participants taught at colleges serving significant numbers of low-income and first-generation students.

One interview subject, Miguel Powers, an English professor from a community college, in southern California, was previously known to me as having extensive experience applying growth mindset and belonging to his own practice, and leading professional development workshops with educators. The student demographics in his college are 46% Latino; 3% Black or African American, 45% White or Asian.

The eight other instructors were all recruited from a college in Florida that had asked me to lead a half-day workshop. The coordinator of my visit assisted with recruiting participants by emailing an invitation to a select group of faculty who she knew to have prior knowledge of growth mindset research and who she believed would be most open to being interviewed. The student demographics at this college are 29% Black or African American, 32% Latino, 30% White or Asian. Five of the interviewed instructors at this college were White, and the remaining four were Hispanic or Black/African American. All have been teaching 10 or more years and the average number of years of teaching experience was 16.7 years.

The original goal was to recruit STEM and ELA subject teachers because these subject areas are the most critical determinants of students' academic success, particularly in K12. However, due to the interviewees being college instructors and the reliance on convenience sampling, I was only able to recruit one ELA and one STEM instructor participated. Though I initially worried this would be a shortcoming, the content area expertise of the recruited participants ended up providing important and diverse viewpoints. For example, one interview subject, Pam, had 18 years of experience providing faculty development to a wide range of college instructors and thus had deep insight on what instructors in different domains need to be convinced of the usefulness of new pedagogical practices. Two other participants worked with students training to become K12 teachers and thus brought a depth of pedagogy knowledge to the review of the resources as well as an understanding of what new teachers need in order to implement unfamiliar strategies.

The rationale for only interviewing nine educators was that interviewing more would be impractical due to time constraints for this study. Less than nine would be too few to make a

significant contribution to understanding how useful resources are when modeled in a different content area or grade level.

Data collection and analysis.

Document analysis. I conducted a review of the literature and consulted with a learning mindset expert to define the teaching principles and teaching strategies used to guide the selection of resources (see Appendix A for a summary of principles and strategies and Appendix E for the Document Analysis Data Collection Instrument). Using this framework, I searched available open-access online resources to compile a list of teaching strategy resources for each teaching principle. For each teaching principle, I discontinued actively seeking new resources once I identified two resources for each of the three grade levels (middle school, high school, and college). However, in many instances, new resources emerged as I searched for examples related to other strategies. In these cases, I added the resource despite having already having met the goal.

Interviews. I used a semi-structured interview protocol in interviews with educators to gain an understanding of how useful a resource was for them if the recommended strategy was modeled in a different grade level or content area. Each interview was recorded and transcribed. Interviewees were also invited to share about strategies they use in their own practice, when relevant. The strategies they described were analyzed using the same criteria developed for the documents and artifacts analysis. Interviews were between 45–60 minutes each.

Significance and Conclusion

This study provides an important contribution by establishing a framework for growth mindset and belonging teaching principles and strategies as well as a consolidated set of existing, open-access, evidence-based resources from a variety of contexts which educators can use to

foster belonging and growth mindset in their classroom. These two learning mindsets are important because they are known to contribute to improved motivation and academic achievement, especially for those from economically disadvantaged and marginalized groups. The resulting compendium of resources will be shared through open-access sites geared towards helping educators foster adaptive learning mindsets such as the PERTS Mindset Kit and the Mindset Scholars Network. Making a resource such as this broadly available free of charge could help large numbers of educators improve their students' motivation and engagement by thwarting negative cycles of distrust and hopelessness.

Chapter 2

Introduction

While there are a host of complex structural factors driving achievement gaps between African American and Latino students and their White and Asian peers, one important factor that has recently emerged is the role of students' internal, psychological experiences—whether they believe they have what it takes to succeed intellectually and whether they feel like they belong and are seen as competent in academic settings. Social psychological factors such as these can have a powerful influence on students' motivation and persistence. The two aspects of this research that are the focus of this study are:

- *Growth mindset* – the belief that you can grow your intellectual abilities
- *Belonging* – the belief that you belong and are seen as competent in academic settings

Numerous well-controlled studies have shown these beliefs are malleable, and are powerfully shaped by context cues that students detect from the adults they interact with and from their environment (Blackwell et al., 2007; Blazar & Kraft, 2017; Brummelman, Thomaes, Overbeek, et al., 2014; Gunderson et al., 2013; Newman & Schwager, 1993; Park et al., 2016; Sun, 2015; Tenenbaum & Ruck, 2007; Walton & Cohen, 2011). Specifically, the literature provides guidance for which *teaching principles*—teaching practice foundational constructs—can be most beneficial for fostering belonging and growth mindset. In order for educators to know how to translate these principles into concrete classroom strategies that make sense in their grade level and content area, they must have access to recommendations that are guided by the literature. There are many open-access resources available online, however, there are significant limitations to these resources.

To emphasize the importance and urgency for developing a compendium of teaching resources for educators on how to foster a growth mindset and belonging in their classrooms, I begin by discussing the interacting roles of poverty and race in perpetuating racial achievement gaps and how these forces can systematically create a negative psychological climate for students of color and students from other marginalized groups (e.g. women in STEM fields). These forces lay the foundation for the next section on how and why stereotype threat can play such a significant role in driving stereotyped students' underachievement. However, by leveraging the insights from social psychological research on motivation, teachers can help create psychologically safe learning environments that can improve their students' motivation and achievement. In the third and fourth section, research on growth mindset and belonging is reviewed for evidence of the impact these factors have on academic achievement and for guidance on the specific teaching principles and strategies related to each that guided the data collection process.

Race, Class, and the Achievement Gap

Overall, compared to their White and Asian peers, Black and Latino students receive poorer grades, graduate from high school at lower rates, and are less college-ready when they graduate (Condron, 2009b; Rogers & Freelon, 2012; Venezia & Kirst, 2005). A complex interplay between class and race play a significant role in driving this achievement gap. For example, African American and Latino children are twice as likely to grow up in poverty (Jiang et al., 2016) which has been shown to negatively impact children's ability to succeed academically (Brown, 2013; Mani et al., 2013; Putnam, 2016). For many minority communities, especially African American communities, racist real estate practices in the 1930's and the accompanying practice of predatory lending sunk many families into an inescapable cycle of

poverty (Coates, 2014). Additionally, a growing trend over the past 50 years is that neighborhoods and schools are increasingly segregated along class lines (Putnam, 2016). The result is that minority students are more likely to attend schools with high concentrations of poor which has an additive, negative affect on student performance (Logan et al., 2012). Unfair state funding practices in many states also leave schools in high-poverty communities inadequately supported (Putnam, 2016). For example, the schools they attend typically have fewer resources and weaker college-going cultures (Perna et al., 2008; Venezia & Kirst, 2005), less experienced teachers (Brown, 2013; Putnam, 2016), fewer advanced placement (AP) courses (Putnam, 2016; Rogers & Freelon, 2012) and fewer extracurricular activities (Putnam, 2016).

Students of color are also significantly more likely to face bias within the classroom. Tenenbaum and Ruck (2007) conducted four meta-analysis and found that teachers use more positive speech and hold higher expectations for White and Asian students than for African American and Latino students. Minority students are also subjected to more severe discipline practices and are suspended from school at significantly higher rates³ than their White peers – a disparity that exists in varying degrees in every state in the country (Losen & Martinez, 2013; Office of Civil Rights, 2012). An extensive analysis of merged data from three national surveys found that the disparity in out of school suspension rates between Black and Latino students could not be accounted for by differences in frequency of misbehavior or severity of the offenses committed (Finn & Servoss, 2015) suggesting that racial bias is playing a role.

Strong confirmation of these findings comes from Okonofua & Eberhardt (2015), who tested experimentally to determine if implicit bias might be a contributing factor by presenting the academic records and scenarios describing students behaviors. Teachers were asked to indicate what disciplinary action they would take for a first, second, and third infraction. The

same scenarios were presented to two groups of teachers, the only difference being that the students' race was manipulated through the use of either stereotypically White or Black sounding names. They found that there was no difference by race for the first incident, but for the second incident, Black student's behavior was more likely to be perceived as a pattern (troublemaker) and teachers were more likely to imagine themselves suspending the student in the future. These results are consistent with an analysis of 2012 data from the Office for Civil Rights showing that second and third infractions are where the change in intensity of discipline occurs—an effect Okonofua and Eberhardt (2015), who conducted the analysis termed the “Black-escalation effect.” It is important to note that there is typically no association between a person's explicit attitudes towards African Americans, and their implicit bias (Eberhardt, Goff, Purdie, & Davies, 2004). In other words, teachers can hold non-racist views while still implicitly acting on stereotypes that exist within the larger society.

Given that teachers regularly face situations in which they must make disciplinary decision, this research underscores the important role teachers can play in unconsciously propagating the negative stereotypes that create a negative psychological climate for students of color. It is, therefore, especially important for teachers to focus on creating a strong sense of belonging for all students, but particularly for students of color, in their classrooms. This can help students feel reassured, and can help teachers overcome their own implicit bias.

The impact on achievement for out of school suspensions is not simply due to reduced time in class, but to the negative impact on students' trust of their teachers and in school as a supportive environment. Researchers Hemphill and colleagues (2006) conducted a cross-national (United States and Australia) longitudinal study on the long-term consequences of being

³ For example, Black students are expelled at more than three times the rate of their White peers.

suspended and found that even when controlling for a variety of potentially linked factors, being suspended lead to an increase in antisocial behavior one year later.

Historical and present day institutional racism, the propagation of negative stereotypes, differential access to resources, and differential treatment due to implicit bias can all send students of color powerful negative messages about the expectations their teachers, schools, and society have for their academic success. The combined effect can leave these students vulnerable to the negative effects of stereotype threat.

Stereotype Threat

As discussed in the previous section, there are many factors influencing the persistence of the achievement gap. However, a consistent finding has been that, even controlling for external barriers and prior achievement, students of color underperform over time compared to their White peers (Coleman & Department of Health USA, 1966; Ramist, Lewis, & McCamley-Jenkins, 1994). In other words, when a cohort of students with the same prior level of academic achievement⁴ begin in a new academic setting, White students will receive higher grades over time compared to their African American and Latino/a peers. In the early 1990's, Claude Steele and his colleagues began exploring whether anxiety about being part of a stereotyped group was playing a role in depressing the performance of stereotyped groups. They reasoned that for students to do well academically, they need to development a strong identification with school; they must believe they are capable of succeeding and that an important part of their positive self-evaluation is connected to performing well in school. But forming a strong academic identity may be more challenging for stigmatized groups given the history described above of both explicit and implicit bias. They may question their own ability to succeed, or they may worry

⁴ Measures of prior achievement typically include prior grade point average or standardized test scores such as the Scholastic Achievement Test (SAT).

that their teachers or peers question their abilities and whether they belong in academic environments. This anxiety could impair their cognitive functioning, especially in situations that are pushing them to the outer limits of their current ability level. They named this effect “stereotype threat,” and described it as the conscious or unconscious anxiety that one’s performance will be used to confirm a negative stereotype about one’s group (Steele, 1997a; Steele & Aronson, 1995).

Building on early work by Katz, Roberts, and Robinson (1965) who showed that Blacks underperformed when they were told a test was diagnostic of intelligence versus when they were not, Steele and Aronson (1995) conducted a series of experiments in which they gave African American and White undergraduate students difficult General Records Examination (GRE) questions. Students were randomly assigned to either a group that was told the test was diagnostic of ability (stereotype threat condition) or one in which no such explanation was given. In the stereotype threat condition, African American students performed significantly worse than White students, but in the no-threat condition, they performed as well as their White peers. Subsequent studies have shown this same effect for other groups for whom there is a widely held stereotype such as women in math (Spencer, Steele, & Quinn, 1999), White men and athletic performance compared to Black men (Stone, Lynch, Sjomeling, & Darley, 1999), and low socioeconomic status (SES) students compared to high SES students (Croizet & Claire, 1998).

The theory predicts that three moderators will influence the degree to which a person is impacted by stereotype threat. First, the effect is only activated when the stereotype is relevant (e.g., in a situation where a negative stereotype about the ability of one’s group exists). Second, for an individual to experience stereotype threat, an important part of their identity must be attached to performing well in that domain (domain identification). Third, the impact of

stereotype threat will be greatest when the individual under threat is performing at the upper bounds of their ability such as during a high-stakes exam (Steele, 1997a). Two meta-analysis have confirmed the role of these moderators (Nguyen & Ryan, 2008; Walton & Cohen, 2003). Nguyen and Ryan, (2008) in their meta-analysis of 116 studies found, for example, that in studies of women's math performance, stereotype threat effects were larger for women who were only moderately math-identified (those who stated that doing well in math was important to them) compared to those where were either strongly math-identified or weakly math-identified. This suggests that for weakly math-identified women, the stereotype was irrelevant because their identity was not contingent upon doing well in the domain of math. For those who were strongly math-identified, the threat was also less relevant, perhaps due to higher levels of confidence and having a more stable math identity.

The negative impact that stereotype threat has on performance appears to arise from increased stress responses that impair processing in the prefrontal cortex (Blascovich, Spencer, Quinn, & Steele, 2001; Schmader & Johns, 2003; Schmader, Johns, & Forbes, 2008), and the tendency in high-arousal states to focus more attention on negative information. Mangels and colleagues (2012) studied the cognitive processes of students both under threat and not under threat and identified that in threatened states, students who focus longer on negative information about their performance were less likely to take advantage of tutorial support, and were less efficient at learning from their mistakes. Thus, the tendency to perseverate on negative feedback when under stereotype threat can impair students' ability to make use of critical feedback to improve their future performance. Using critical feedback to improve rather than to fuel self-doubt is critical to remaining resilient in the face of inevitable academic challenges.

These findings suggest that not only are stigmatized students susceptible to the negative impact stereotype threat can have on their academic performance and learning, but that over time, the cumulative impact may erode their identification with school altogether as they seek to protect their identity. Therefore, it is critical that educators understand how to support all students, but especially those at risk of stereotype threat in remaining resilient and identified with school. Thus far, two effective strategies for doing so are helping students internalize a growth mindset and a strong sense of belonging in their classrooms and in school. This is because the very existence of a stereotype implies that abilities are fixed traits and that some people are innately less competent and therefore don't belong in certain environments. Next, I review the evidence for how each of these social psychological factors can build academic motivation and resilience and what is known about the teaching principles that can support students in developing a growth mindset and a sense of belonging.

The Role Growth Mindset and Belonging Play in Motivation and Persistence

Our beliefs and perceptions act as the lens through which we interpret the meaning of events. The meaning we make of events, particularly in educational contexts, forms the basis for what goals we think are important, and what actions we take to fulfill those goals (Dweck, 2006; Yeager & Walton, 2011). Importantly, our beliefs can be powerfully shaped by our experiences and by cues we receive through our interactions with others and from our environment (Walton & Wilson, Under review). In this section, I examine two key psychological factors that have been shown to powerfully influence students' academic engagement and achievement:

belonging—whether students feel they belong in academic settings and that their teachers and peers respect them; and *growth mindset*—whether one believe their intelligence and other abilities can be developed. I also discuss the evidence describing how each influences students'

academic engagement and what is known about the teaching principles educators can use to create learning environments that foster growth mindset and belonging, and thus create more positive, motivating classroom experiences for their students.

Belonging

Humans are a social species whose survival and longevity are significantly enhanced by forming strong social attachments (Silk, Alberts, & Altmann, 2003; Uchino, 2006). In fact, some have argued that the evolution of our larger brains was driven not by our growing intellect, but by our increasingly complex social structures that depend so heavily on social trust and bonding (Byrne & Whiten, 1989; Dunbar, 2009). Decades of research on emotional well-being have shown that a sense of belong is a core psychological need (Baumeister & Leary, 1995; Dweck, 2017; Ryan & Deci, 2000) with real implications for our physical well-being. Low belonging can impair immune functioning and increased mortality rates (Berkman & Syme, 1979; S. Cohen, Janicki-Deverts, & Miller, 2007). And the pain of social rejection is more than a metaphor; it has been shown to activate the same neural networks as actual physical pain (Eisenberger & Lieberman, 2004). Aspects of these effects have been studied using several related terms such as *relatedness* (Connell & Wellborn, 1991), *student/teacher relations* (Midgley, Feldlaufer, & Eccles, 1989), and *belongingness* (Baumeister & Leary, 1995).

Given the impact our need for belonging has on both our physical and emotional health, it is not surprising that a great deal of evidence also exists for the role that belonging plays in students' academic engagement and achievement (Furrer & Skinner, 2003; Goodenow, 1993; Walton & Cohen, 2007). Additionally, experimentally inducing insecurity about one's belonging can impair performance on intellectual tests (Baumeister, Twenge, & Nuss, 2002) and can even lead to more aggressive behavior (Twenge, Baumeister, Tice, & Stucke, 2001). Belonging

uncertainty can be especially acute during key transitions because this is a time when people are scanning for cues that let them know they are noticed and accepted, that the environment is one that they want to be part of, and that it is a place where they trust they will be viewed as more than a stereotype (Walton & Brady, 2017). Addressing these concerns early on in the academic year can prevent the beginning of negative recursive processes and create the conditions for more positive relationships between students and teacher and between peers (Walton & Brady, 2017; Yeager et al., 2016).

While there are several school-level strategies that can foster belonging, this study will focus on two that are within teachers’ power to influence relatively easily: *Teacher Caring and Respect* and *Peer-to-Peer Belonging*. Teaching strategies this literature review will explore are listed in the table below. See Appendix A for full description of all teaching principles and strategies.

Table 4. Summary of Belonging Teaching Principles and Teaching Strategies

Mindset	Teaching Principle	Principle Description	Teaching Strategies
Belonging	Teacher Caring and Respect	Practices teachers use to get to know students and let them know they care about them, believe in them, and respect them.	<ul style="list-style-type: none"> - Reduce Ambiguity and Convey Belief in Students’ Competence - Form Connections with All Students - Empathic Discipline/Prioritize Trust - Normalize Belonging Uncertainty in New Settings
	Peer-to- Peer Belonging	Practices that help students get to know each other and that establish a classroom norm of students supporting each other’s learning.	<ul style="list-style-type: none"> - Cooperative Learning Tasks - Peer-to-Peer Feedback and Support - Increase Peer-to-Peer Connection

Teacher Caring and Respect

Studies have shown that children’s perceptions of teacher support predicts their

(students') expectations for success, valuing of the subject, level of effort, and performance (Furrer & Skinner, 2003; Goodenow, 1993). Wentzel (1997) studied middle school students and found that their perceptions of how much their teachers cared about them predicted changes in their academic motivation over two years, even when controlling for previous academic performance. These findings are not surprising when you consider that learning is an inherently vulnerable process; to learn effectively we need to feel safe taking risks, making mistakes, and receiving critical feedback. This means that trust between teacher and student is an essential precondition for optimal learning (Yeager et al., 2014). However, since many social signals are ambiguous, members of historically stereotyped groups may be especially prone to question whether their teacher views them as competent and may be more likely to take ambiguous signals as confirmation that their teachers and/or peers don't hold positive views of them (Steele, 1997; Walton & Cohen, 2007b).

Convey belief in students' competence and reduce ambiguity.

Intervention studies have shown that explicitly reducing this ambiguity can have a powerful impact on the academic performance of students of color, especially when their teachers are White. For example, Yeager et al. (2014) hypothesized that if teachers explicitly alleviated belonging uncertainty it would help students of color be more receptive to critical feedback. They conducted a double-blind randomized field experiment to test a "high standards and reassurance" interventions. Graded essays from 7th grade students were randomly assigned to have a post-it attached that, for the treatment group students, said, "I'm giving you these comments because I have high standards and I know you can meet them." The control group post-its simply said, "I'm giving you these comments so you have feedback on your essay." Seventy two percent of African American students in the treatment group resubmitted their

essays compared to only 17% in the control group, and their resubmitted papers received higher quality ratings from third party reviewers who were blind to condition. African American treatment group students also reported higher levels of trust in their teachers. A follow up study with 9th grade students showed that directly training students to reattribute critical feedback from teachers as intended to help them had a significant positive impact on African American students' end of year grades (Yeager et al., 2014).

Form connections with all students.

It is important to acknowledge that teachers have belonging needs too, and as such, it is natural that they will gravitate towards students who reciprocate in social interactions. There is evidence that in the absence of active monitoring, teachers tend to interact more with students who are already engaged which has been shown to amplify increased engagement in engaged students while simultaneously amplifying decreased engagement among quieter or less engaged students (Skinner & Belmont, 1993; Wentzel, 1997). This negative recursive process can be avoided when teachers take conscious steps to ensure all students receive signals of teacher caring. For example, students feel more cared for when teachers make eye contact with them (Wirth, Sacco, Hugenberg, & Williams, 2010), address them by name and check to make sure they are pronouncing their names correctly (Brummelman et al., Manuscript under review; Kohli & Solórzano, 2012), and when teachers take the time to get to know about their interests outside of school (Furrer & Skinner, 2003), and highlighting interests they share with their students (Gehlbach et al., 2016).

Empathic discipline.

While research on how to effectively address implicit bias is still in its infancy, encouraging teachers to take an empathetic approach to discipline has shown impressive results

at reducing suspension rates. In a recent intervention study (N = 1682), Okonofua, Paunesku, and Walton (2016) succeeded in halving the year-long suspension rates for students with a prior history of suspension in the classes of the 31 participating teachers at five different middle schools. The intervention encouraged teachers to adopt an empathetic approach to disciplining their students by encouraging teachers to think about and value gaining an understanding of their student's perspective. They were encouraged to think about the negative feelings students might be experiencing that give rise to misbehavior, and to consider the important role they, as a teacher, can play in maintaining students' trust. Participants also engaged in reflective writing activities that help them internalize the messages. For example, they were asked to respond to the prompt, "What are some of the ways that you try to build positive relationships with your students, or things that you would like to try in the future to improve your relationships with your students?" (Okonofua, Paunesku, et al., 2016, pp. 1, supplemental). Teacher went through two sessions, one 45-minute session in the fall, and one 25-minute session in the spring. This illustrates that relatively brief activities can have a significant positive impact on teacher's relationships with their students.

Normalize belonging uncertainty.

Transitioning into a new social situation—whether it is starting a new job, entering a new school, or beginning a class with a new group of peers—can be a time of heightened anxiety for many people. While adjusting to this new environment, interpreting the meaning of ambiguous social cues can become particularly salient, especially if there are underlying concerns about being viewed through the lens of a negative stereotype. Interpreting ambiguous cues negatively during this window of transition can trigger a downward spiral where negative interpretations lead to negative reactions, which can then elicit more negative social interactions. This makes

transition a key time to intervene and prevent such negative cycles from beginning (Walton & Wilson, In press; Yeager et al., 2014).

In a brief intervention study with incoming college freshmen, students were told that belonging uncertainty is normal at first, but passes with time. This led African American students in the treatment group to perform better than those in the control group over the next three years. African American treatment group students also had better health outcomes and reported higher levels of well-being than those in the control group. The intervention did not significantly impact non-minority students (Walton & Cohen, 2011). In a follow up study that tracked participants from this study over seven to nine years, the African American students in the treatment group showed greater life and career satisfaction as much as nine years later (Brady, Walton, Cohen, & Jarvis, in prep B).

Peer-to-Peer Belonging

There is extensive evidence that positive peer relationships predict increased academic engagement and academic outcomes whereas negative peer relations increase the likelihood of school disengagement, lower academic outcomes, and increased risk of depression and anxiety (Becker & Luthar, 2002; E. Diener & Seligman, 2002; Flook, Repetti, & Ullman, 2005; Fredricks, Blumenfeld, & Paris, 2004; Roseth, Johnson, & Johnson, 2008; Wentzel & Asher, 1995; Wentzel & Caldwell, 1997). Wentzel & Caldwell (1997), for example, found that group membership and peer acceptance were significantly correlated with students' grade point average in a cohort of students tracked from sixth through eighth grade. Correlational and interventions studies highlight several pedagogical practices that can support the development of positive peer relationships.

Cooperative learning tasks.

Education and academic engagement researchers, Johnson and Johnson (2009), cite cooperative learning as one of social and education research's great successes. Over 1,200 studies on cooperative, competitive, and individualistic learning structures have demonstrated, in both experimental and correlation studies, that cooperative learning tasks and goal structures lead to increases in academic achievement, depth of processing, capacity to apply learning to new situations, and creativity in generating new ideas and solutions. This body of literature also shows that cooperative learning predict more positive peer relationships (Johnson & Johnson, 2009; Roseth et al., 2008). In a study with undergraduate students, when communal classroom goals were highlighted, undergraduate students, especially female students, show greater interest in STEM careers (Diekman, Clark, Johnston, Brown, & Steinberg, 2011). Cooperative academic tasks structure learning in ways that encourage students to share knowledge and resources, encourage each other's efforts, and create situations that allow students to proactively facilitate each other's learning. For example, with jigsaw assignments, students work in groups to master one aspect of a topic and then are responsible for teaching this content to the other groups so that the success of the whole class is linked to each student and each small group doing well. This has been shown not only to increase achievement, but to improve relationships between ethnic groups (Aronson & Bridgeman, 1979).

Building on the foundational research of Lewin (1947) and Deutsch (1949), Johnson and Johnson (1999, 2009) spent several decades identifying five mediating processes that predict successful cooperative learning outcomes: *positive interdependence*, students see their collective learning as dependent on each other's success which can involve having shared goals, sharing joint rewards, dividing resources, and having complementary roles; *individual accountability*,

students are held accountable to the group for their performance and engagement; *face-to-face promotive interactions*, students understand how to support each other's learning and value helping each other succeed; social skills, students understand have opportunities to develop leadership, decision-making, conflict-management skills; *group processing*, students are provided sufficient opportunities to reflect on and discuss what worked during a group process and what they could do better next time. The degree to which each of these factors is present is related to the degree of positive benefits of collaborative learning.

Peer-to-peer feedback and support.

When students feel socially connected to each other they are more likely to become a source of academic support by helping each other understand instructions, and helping each other work through confusion (Wentzel & Caldwell, 1997). Many educators incorporate peer review processes into their teaching. However, several studies have shown that most students, in the absence of specific training, give vague feedback that lacks depth and rigor (Mendonça & Johnson, 1994; Tsui & Ng, 2000). However, when students are provided training on how to give concrete actionable feedback, it can significantly improve academic outcomes (Furrer, Skinner, & Pitzer, 2014; Li, Liu, & Steckelberg, 2010; Min, 2005). Min (2005) found that training students to address four specific characteristics in their feedback—clarifying writers' intentions, identifying problems, providing concrete feedback about the problem, and making specific suggestions—improved the quality peer feedback. In *Leaders of Their Own Learning*, author Ron Berger, the Chief Academic Officer for EL Education, emphasizes the importance of systematically training students on how to give constructive feedback that is *kind, specific, and helpful* (Berger, Rugen, Woodfin, & Education, 2014). The extraordinary outcomes this process yields in EL classrooms are demonstrated in the short video called Austin's Butterfly

(<https://vimeo.com/38247060>).

Increasing peer-to-peer connections.

Robust evidence exists showing that actual and perceived similarities increase liking, even when they are seemingly insignificant (Montoya, Horton, & Kirchner, 2008). Dubbed the *similarities effect*, it has been shown to predict important, real-world outcomes. For example, knowing that they shared a birthday with math majors increased the length of time undergraduate students worked on math puzzles and their interest in math overall (Walton, Cohen, Cwir, & Spencer, 2012). In a study with 25 9th grade teachers and 315 of their students, teachers received information about values they shared with their randomly selected students. Providing teachers with this information led them to feel more socially connected to these students. Notably, African American and Hispanic students in the intervention group had improvement in their grades which reduced the achievement gap by 60% (Gehlbach et al., 2016). This evidence suggests using strategies to help students identify interests and values they share with their classroom peers could help foster an increase in sense of social connectedness and belonging between peers.

Growth Mindset

Early in her career, researcher Carol Dweck became fascinated by children's reactions to failure. Some, she observed, remained resilient and excited about being challenged, while others became discouraged soon after encountering challenges and withdrew their effort (Diener & Dweck, 1980; Dweck & Dickon, 1973). Research over the past several decades has shown that one explanation for these different response patterns lays in students' beliefs about intelligence (Dweck & Leggett, 1988). Dweck & Leggett's (1988) seminal study found that students who see intelligence as a stable trait that changes little over one's lifetime - those with a *fixed mindset* -

are less resilient and perform more poorly in the face of challenges and setbacks. By contrast, students who view intelligence as malleable - those with a *growth mindset* - show greater resilience, are more excited about learning, and perform significantly better than their fixed mindset peers after a setback. Students' beliefs about intelligence—the degree to which they agree or disagree with statements such as, “You have a certain amount of intelligence, and you really can't do much to change it” (Dweck, 2000)— can cause students to interpret the day-to-day experiences in the classroom as either threatening or exciting. For students who believe that intelligence is a fixed trait that they have no control over, the possibility of being exposed as ‘dumb’ is a constant threat, which leads them to have the goal in school of proving that they are ‘smart.’ This can be especially true if a student is at risk for stereotype threat (Steele & Aronson, 1995). Consequently, they tend to focus on performance goals such as getting the best grade, and comparing themselves to other students (Burnette, O'Boyle, VanEpps, Pollack, & Finkel, 2013; Dweck & Leggett, 1988). By contrast, for students who believe they can grow their intelligence, learning is exciting and fun. Their goal in school is to learn and thus they are more likely to agree with statements such as, “I like school work best when it makes me think hard” (Midgley et al., 1989).

These beliefs also influence the attributions students make about effort. Students with a fixed mindset tend to view effort as an indictment of low ability (Dweck & Leggett, 1988). In other words, they believe that if they have to try hard at something, they must not be very good at it. This interpretation causes them respond to failure with a *helpless response* and to withdraw future effort (Dweck & Leggett, 1988). For students with a growth mindset, however, effort is seen as a way to grow one's intelligence. They are more resilience in the face of setbacks and are more open to learning from their mistakes (Dweck & Leggett, 1988; Mangels, Butterfield, Lamb,

Good, & Dweck, 2006). Early research by Dweck and Leggett (1988) found that in a series of academic tasks where participants experienced initial success followed by a challenge or failure, students with a growth mindset demonstrated greater persistence and used more adaptive strategies. Students with a fixed mindset, on the other hand, showed the opposite pattern of behavior. They withdrew effort, chose poorer strategies in subsequent tasks, and lost interest in the activity.

Intelligence beliefs have been shown to affect long-term achievement outcomes and to be especially important during challenging academic transition such as from elementary into middle school (Blackwell et al., 2007; Burnette et al., 2013). In a longitudinal study, Blackwell and colleagues (2007) examined the academic performance of students over two years from the beginning of 7th grade to the end of 8th grade. By the end of their 8th year, students with a growth mindset showed a significant upward trajectory in math performance compared to their fixed mindset peers, controlling for prior math performance. This provides evidence for the importance of fostering a growth mindset early in the year, especially in transition years such as entering middle school, high school, or college.

Numerous studies have linked mindsets to achievement outcomes, but the sample sizes were moderate and not nationally representative (Aronson, Fried, & Good, 2002; Blackwell et al., 2007; Good, Aronson, & Inzlicht, 2003). In a recent survey of the mindsets of all 10th grade students in Chile (n=168,000), students' mindsets showed a striking correlation to achievement. Students with a growth mindset were three times more likely to score in the top fifth of the national math and language arts exam while those with a fixed mindset were four times more likely to score in the bottom fifth (Claro et al., 2016).

Given the known link between poverty and poorer academic outcomes (Sirin, 2005),

another important unanswered question in the field of mindset research is the degree to which mindsets interact with socioeconomic status. A compelling finding in the above-mentioned study is that students in the bottom decile of family income with a growth mindset performed at the level of students with a fixed mindset in the 80% of family income for math. For language arts, students with a growth mindset performed at the same level as those near the 95% of family income (Claro et al., 2016). In other words, having a growth mindset seems to buffer low SES students against the negative impact of poverty on their academic achievement.

Malleability of Beliefs about Intelligence

Helping students adopt more adaptive beliefs about intelligence has been an area of intense interest for social psychology researchers over the past several decades. Of particular interest have been interventions targeting groups who have been traditionally stereotyped as lacking innate ability in a particular domain (women in math, and African American and Latino students in all academic settings). These groups are often susceptible to the performance hindering impact of “stereotype threat” (Steele & Aronson, 1995) discussed in the previous section. Stereotype threat, and the negative impact it has on performance, may fuel uncertainty for minority students about their intellectual abilities and reinforce ‘fixed mindset’ beliefs. In a study conducted by Blackwell et al. (2007), researchers explored the impact of teaching students about the malleability of intelligence during the transition to middle school, a time when school becomes more challenging and many students’ academic performance suffers. Low SES students in both the treatment and the control group learned about the anatomical structures of the brain and various study skills. In the treatment group, students also read a scientific article about the malleability of intelligence. The article explained that the brain is like a muscle that can get stronger with effort and practice, and that intelligence can be increased as a result. These

students became more likely to endorse a growth mindset after the intervention. They also showed an improvement in math performance compared to students in the control group who continued to show the decline in grades typical of students entering middle school.

Subsequent studies using randomized control trial (RCT) design—the gold standard to rigorously test for causality— in which thousands of students were randomized to the treatment condition have shown that it is possible to teach students to view intelligence as malleable through a highly scalable, brief online program, and that doing so has a significant positive impact on achievement, particularly for at-risk⁵ students (Paunesku et al., 2015; Yeager, Romero, et al., 2016). This program is now available free of charge to high schools and colleges across the United States (see www.perts.net/programs).

Addressing Recent Criticism of Growth Mindset Interventions

Two recent meta-analyses conducted by a team of researchers from Case Western Reserve University and Michigan State University examined first how strong the relationship between mindset and achievement is, and second, the effectiveness of mindset interventions (Sisk, Burgoyne, Sun, Butler, & Macnamara, 2018). It stands to reason that if an intervention to impart a growth mindset shows a positive impact on achievement when tested in a randomized controlled trial, then it is safe to conclude that having a growth is beneficial. For this reason, I will focus my review on the second meta-analysis of intervention effects only. This meta-analysis found an effect size of .19 for students at risk for low achievement, .34 for students from low SES backgrounds, and an overall effect size of .08, which includes students from more advantaged backgrounds and those already doing well academically. Yet, the authors claim that

⁵ At-risk students is defined as those with less than 2.0 grade point average in the prior semester or who had failed a core class (Allensworth, 2007).

these effect sizes are too small to be practically significant. There are several problems with this conclusion.

First, they base their expectations for meaningful effect size on a meta-analysis by Hattie and his colleagues (1996) which they say, “found that the meta-analytic average effect size for a typical educational intervention on academic performance is 0.57.” However, according to education meta-analysis expert, Robert Slavin, Hattie’s meta-analysis for this study and his meta-meta-analyses that form the basis for his Visible Learning framework are deeply flawed (Slavin, 2018). As Slavin states in his blog post simply titled “John Hattie is Wrong,”

If you are familiar with the What Works Clearinghouse (2007), or our own Best-Evidence Syntheses (www.bestevidence.org) or Evidence for ESSA (www.evidenceforessa.org), you will know that individual studies, except for studies of one-to-one tutoring, almost never have effect sizes as large as +0.40, Hattie’s “hinge point.” This is because WWC, BEE, and Evidence for ESSA all very carefully screen individual studies. We require control groups, controls for pretests, minimum sample sizes and durations, and measures independent of the treatments. Hattie applies no such standards, and in fact proclaims that they are not necessary.

Additionally, many of the studies included in Hattie’s meta-analysis (Hattie et al., 1996) were not conducted in authentic contexts and did not look at long-term, real-world outcomes such as students’ grades or test scores. Most of the included studies were conducted with very small samples, used short time intervals between training and testing, and tested students on exactly what was trained using experimenter-made measures—all of which are known to inflate effect sizes (Cheung & Slavin, 2016).

In her response to the meta-analysis by Sisk et al. (2018) Dweck highlights that very few interventions that meet the rigorous standards set by the What Works Clearinghouse for recommended education interventions can show an impact on achievement at all, and those that do have small effect sizes (e.g., .06 for one highly regarded program) but are typically costly to implement. Therefore, contrary to the conclusion of these researcher's conclusions, highly scalable interventions such as the PERTS intervention referenced in this meta-analysis which require less than one hour to implement, can be implemented with high fidelity, are available free of charge, and which have an effect size of .19 for the students we should care most about helping should be seen as nothing short of remarkable. And as she points out, these interventions, which first began being tested in large-scale randomized controlled trials in 2010, are continuously tested using rigorous methods (e.g. RCT with pre-registered analysis plan and third party data collection) as well as larger, more representative samples to better understand who they are working most and least well for, and how they can be improved (Dweck, 2018).

To be clear, however, as Dweck (2017b, 2018) herself has stated, research on growth mindset is still in its infancy and there is much we still have to learn about how best to foster it in students. Given how many other growth mindset-relevant messages students receive from their schools, their teachers, their peers, their parents, and from the larger society, it is unrealistic to expect a single growth mindset intervention alone would produce enormous shifts in student beliefs or academic achievement. There are many researcher-practitioner partnerships underway that are actively working to develop and evaluate effective curriculum and training for teachers. This work, some of which I am involved in, builds upon an existing body of literature, discussed in the next section, on what we currently know about teaching principles and strategies that support students in becoming engaged learners.

The Role of Teachers in Fostering a Growth Mindset

There is an emerging body of literature which emphasizes teachers' roles in shaping students' beliefs about the malleability of intelligence, including insights as to what changes in practice could be beneficial (Blazar & Kraft, 2017; Brummelman, Thomaes, Overbeek, et al., 2014; Park et al., 2016; Sun, 2015). In an extensive mixed-methods study, Sun (2015) examined the relationship between teachers' classroom practices and students' beliefs about math ability. A total of 40 middle school math teachers from six schools and 3400 of their students were surveyed. Survey data revealed that teachers' self-reported mindset was not related to students' mindsets. To understand how mindset messages were being conveyed in the classroom and how teaching practices varied across teachers, Sun (2015) collected extensive qualitative data over one year. Classroom observations, interviews, and artifacts were gathered from seven teachers who held a mix of fixed and growth mindset beliefs and their 3400 students at 4 schools. Each teacher was observed between 11-13 times over the course of one year and a selection of both fixed and growth mindset students from each class were interviewed. The analysis revealed variations in teaching practices with respect to how students were sorted, what classroom norm were set, what types of math tasks were given, and the types of assessment and feedback students were provided.

This study will focus on three teaching principles that are within teachers' power to influence relatively easily: *High Standards for All*, *Growth Mindset Language*, and *Effective Feedback*. The related teaching strategies that were used in this framework are listed in the table below. See Appendix A for full description of each teaching strategy.

Table 5. Summary of Growth Mindset Principles and Strategies

Mindset	Teaching Principle	Principle Description	Teaching Strategies
Growth Mindset	High Standards for All	Practices that signal an expectation that all students can achieve at a high level.	<ul style="list-style-type: none"> - Mixed Ability Grouping/All Students Participate - Open (Open-ended) Task Structures/ Encouraging Critical Thinking
Growth Mindset	Growth Mindset Language	Using language that focuses students on learning as a process and builds a classroom culture of embracing challenge, learning from mistakes, and focusing on effective strategies for growth.	<ul style="list-style-type: none"> - Use Process Praise, Minimize Person Praise - Support Risk-Taking and Resilience to Mistakes & Failure
	Effective Feedback	Practices that cultivate students' capacity for self-regulated learning and that helps students to: know what the learning goals are; accurately assess their current progress towards those goals; and know what next steps they can take to reach their learning goal.	<ul style="list-style-type: none"> - Clear Goals and Formative Feedback Opportunities - Develop Self-Regulated Learning Skills

High Standards for All

Mixed ability grouping.

Ability grouping within classes and academic tracking by classroom assignment (high performers and low performers assigned to different classes) has been a common practice for many decades despite meta-analysis evidence that it has little if any positive impact on academic achievement (Slavin, 1990). There is, however, evidence that it can produce negative academic outcomes for lower performing students, and can amplify equity gaps due to low income and minority students being disproportionately likely to end up in lower track classes (Boaler, Wiliam, & Brown, 2000; Hanushek & Wößmann, 2006; Slavin, 1990; Venezia & Kirst, 2005). In contrast to these findings, mixed ability grouping has been found to improve learning and engagement across ability groups (Boaler et al., 2000). In a meta-analysis examining the effects of tracking, Hattie (2002) concluded that, while there was a very modest positive effect of

tracking students based on prior achievement for high-ability students, “the effects of many teaching related, instructional innovations substantially overwhelm the effects of tracking” and that, “the quality of teaching and the nature of the student interactions are key issues, rather than the compositional structure of the classes.” (p. 463). Given the concerns raised about Hattie’s methodologies in the section above, it would be wise to consider these results with caution. However, other research has found similar results.

Consistent with Hattie’s (2002) findings and evidence in other studies (e.g. Boaler et al., 2000), Sun (2015) found that the positive impact of mixed ability grouping appeared to be mediated by specific strategies such as teachers’ expectations of students ability to succeed and structuring learning in ways that validate multiple approaches to master of learning tasks.

Open (open-ended) task structures.

Open or open-ended tasks are those that have more than one right answer, or more than one way to arrive at the right answer (Boaler, 1998). Sun’s (2015) research revealed that teachers who endorsed a multidimensional rather than unidimensional view of math had a greater influence on shaping their students’ mindsets by the end of the semester. In other words, students were more likely to have a growth mindset about math ability if their teachers disagreed with statements such as, “Mathematics involves mostly facts and procedures that have to be learned,” or “There is usually only one way to solve a math problem” (p. 51). Indeed, the qualitative data revealed that while a number of teachers with unidimensional views of math paid homage to the rhetoric of growth mindset - for example, using the term “growth mindset” or encouraging persistence - their teaching practices often convey more fixed mindset messages.

A core principle identified by Sun (2015) was that teachers who held a multidimensional view of math created a classroom norm that all students could succeed at high levels and made

explicit attempts to group students not based on current ability level, but based on how each student might contribute to the group's collective mastery of mathematics concepts. In these teacher's classrooms, the norm was that the contribution of all students was valuable and expected. The math tasks given in these classrooms often encouraged students to think conceptually rather than to use rote memorization of formulas to solve problems. Multiple methods of solving the same problem were also encouraged (i.e., find 12 percentages of the same number using different methods). This legitimized different approaches to solving problems thus it wasn't always the same students being publicly acknowledged for their work.

By contrast, teachers who held more unidimensional views of math were more likely to group students together based on past achievement (e.g. high performers grouped together, and low performers grouped together) and to conveyed high expectations for past high achievers, and low expectations for past low achieving students. One way low expectations were conveyed was that low achieving students were rarely given opportunities to demonstrate mastery by offer help to others, even at their own ability level. Instead, the teacher offered them help quickly whenever they encountered difficulty. This tended to produce a helpless response from these students whenever they encountered content they didn't understand. While teachers may not have control over school-level tracking, this evidence suggests that mixed ability grouping within classes is advised.

It is worth noting that many of the strategies that Sun (2015) identified as growth mindset promoting are also strategies that support students' trust that their teacher views them as competent and that their contributions can be of value to their classmates—both of which support a students' sense of belonging. The interconnectedness of growth mindset and belonging has only recently been probed, but the relationship is clearly important.

Growth Mindset Language

Process praise.

Typically, teachers give praise with the intention of bolster confidence and self-esteem, with the belief that, in turn, this will lead to improved academic performance and resilience (Baumeister, Campbell, Krueger, & Vohs, 2003). For several decades now, showering kids with praise has been a core tenant of the self-esteem movement with hundreds of books, posters, and other training materials developed to advance the cause (Singal, 2017). We now know, however, that subtle differences in the types of praise used can have important implications for learners resilience to failure and willingness to take on challenges (Baumeister et al., 2003; Brummelman, Thomaes, Overbeek, et al., 2014; Cimpian, Arce, Markman, & Dweck, 2007; Gunderson et al., 2013; Kamins & Dweck, 1999; Mueller & Dweck, 1998; Pomerantz & Kempner, 2013).

In a highly cited study, researchers Mueller and Dweck (1998) explored whether praise that made explicit attributions for the cause of good performance—as either being due to smartness or effort—might differentially impact students resilience after a setback. To test this, they gave 128 5th grade students 3 sets of problems from the Standard Progressive Matrices (Raven, 1976). Students were randomly divided to receive one of three different forms of praise. After completing the first set of problems that were moderately difficult, all students were told that their score and that they had done very well. One group of students were given additional fixed ability praise, also referred to as *person praise*, “You must be smart at these problems.” Another group were praised for their effort, which the authors refer to as *process praise*, “You must have worked hard at these problems.” The control group received no additional praise. All students were then given a set of much more difficult problems after which they all received the same negative feedback: “That’s a lot worse.” This was followed by the third set of problems

which were the same level of difficulty as the first set. Students' performance on the third set was then compared to their performance on the first set. Students in the control condition performed about the same. Strikingly though, students given person praise performed significantly worse while students given praise for their effort performed significantly better (Mueller & Dweck, 1998).

Students given process praise also were more likely to endorse learning goals over performance goals, reported enjoying the problems more, were more likely to attribute their performance to their effort, and were less likely to lie about their score. Those given person (or fixed ability) praise indicated performance goals, enjoyed the problems less, attributed their poor performance to lack of ability, and were more likely to lie about their score. At the end of the study, students were also given a choice of looking at interesting new strategies for solving the problems, or seeing the scores of other participants. Those given process praise were more likely to choose to look at new strategies while those given ability praise were more interested in seeing the scores of others (Mueller & Dweck, 1998). A follow-up study by Kamins & Dweck (1999), confirmed the detrimental effects of both person-focused praise and person-focused criticism in that it led children to have a more "helpless" response after a setback.

Studies in naturalistic settings have confirmed the link between person and process praise to children's subsequent beliefs about the malleability of intelligence. In a longitudinal study tracking parents' use of praise in naturalistic observations, the young children (age 14-38 months) of parents' who used proportionally more process praise (rather than person praise) were more likely to hold a growth mindset belief about intelligence 4-6 years later (Gunderson et al., 2013). A similar study tracking 123 mother's use of person and process praise found person praise to be predictive of their children (all between 8-12 year old) holding fixed mindset

beliefs (Pomerantz & Kempner, 2013). The teachers in Sun's (2015) study discussed above, who's students held more fixed mindset beliefs at the end of the year were more likely to praise successful performance using person praise. They also were more likely to praise high-performing students publicly for their success in accuracy and speed signally that these were the primary goals rather than emphasizing the goal of learning or productive struggle.

Another reason to avoid person praise is because it can lead to the internalization of contingent self-worth—the belief that one's worth is contingent on one's performance or behaviors. At the same time, person praise also suggesting that abilities are fixed traits that a person has little control over changing (Burhans & Dweck, 1995; Mueller & Dweck, 1998). It is, therefore, unsurprising that such praise can lead recipients to have more helpless responses to failure and challenge. Process praise, by contrast, helps learners see learning as a process; one that they have control over through increasing effort, learning new strategies, and seeking out help from others (Dweck, 2006). Research has also demonstrated that it is common for adults to use inflated praise, particularly when praising low performing students who they see as needing extra encouragement (Brummelman, Thomaes, Overbeek, et al., 2014). This can, however, backfire, not because students perceive it as inauthentic, but because it can set what can feel like an unattainably high standard for all future performance (Brummelman, Thomaes, Orobio de Castro, Overbeek, & Bushman, 2014). Evidence also exists for the over-use of praise as a strategy for motivating students suggesting teachers interested in cultivating their students' growth mindset would be wise to consider increasing the use of more effective forms of feedback (Brummelman, Thomaes, Overbeek, et al., 2014).

Resilience to mistakes and failure.

When a student in a fixed mindset classrooms in Sun's (2015) study were asked what happened when someone made a mistake, they responded with statements such as, "the teachers will tell us why it's wrong, how we can fix it, and how it should be done" (p. 123). Thus, students were not encouraged to explain their thinking or to try work through confusion or mistakes on their own. The implicit message is that mistakes are not helpful and should be avoided. By contrast, in growth mindset oriented classrooms a norm was explicitly set that mistakes were a normal, and even helpful part of learning—that the brain is like a muscle that grows by being challenged and by thinking hard to understand and correct errors. Notably, this depiction of mistakes as valuable is consistent with cognitive neuroscience research showing that the mistakes help to focusing attention on learning from errors (Mangels et al., 2006a; Moser, Schroder, Heeter, Moran, & Lee, 2011). Thus, students were encouraged to embrace struggle, take risk, learn from mistakes, and persevering through confusion or frustration. They were expected to be able explain their rationale for answers whether it was right or wrong.

Further confirmation for the influence of reactions to mistakes and failure comes from research showing that parents failure-mindsets—their view of mistakes and failure as helpful or harmful to learning—is causally linked to their children's beliefs about intelligence as either malleable or fixed. In a series of studies, the children of parents who viewed failure as debilitating were significantly more likely to have a fixed mindset, regardless of whether their parents believed intelligence was malleable. Parents who held a negative belief about failure were more likely to report worrying about their child's ability after an academic failure and to offer comfort by assuring their child that it's okay if they aren't the most talented at the subject (Haimovitz & Dweck, 2016).

Effective Feedback

Actively seeking opportunities to expand our sense of competence by being optimally challenged—neither under-challenged to the point of boredom, nor over-challenges to such a degree that our sense of competence is threatened—has been identified as a core psychological need. When we are optimally challenged, learning is an intrinsically motivating experience (Dweck, 2017; Vygotsky, 1978). An important element for helping students to be optimal challenged is providing feedback that can help to, “...reduce discrepancies between current understanding and performance and a goal” (Hattie & Timperley, 2007, p. 86). Extensive research has taken place over the last several decades in a quest to identify what kinds of feedback promote the most growth in student achievement (Butler, 1988; Cohen, Steele, & Ross, 1999; Nicol & Macfarlane-Dick, 2006; Yeager et al., 2014). This rich literature provides guidance on two feedback strategies educators can focus on to optimize learning gains.

Clear goals and formative feedback opportunities.

In our highly evaluation-focused education landscape, providing grades on assignments can be construed as a form of reward, thus it is not surprising that providing formative feedback—feedback on progress towards learning goals—in the absence of a grade has been shown to be especially effective at promoting engagement and learning (Butler, 1988; Nicol & Macfarlane-Dick, 2006). Training students on how to provide effective feedback can help alleviate the burden on teachers to provide formative feedback themselves. Peer-to-peer feedback has the added benefit of helping students develop self-regulated learning skills (Nicol & Macfarlane-Dick, 2006).

The effectiveness of formative feedback is, of course, contingent upon it being timely (e.g. students have time to act on the feedback such as opportunities to resubmit assignments),

and linked to clear, pre-defined goals and evaluation criteria for determining if and when the goal has been achieved. Clear learning goals can be achieved by providing written criteria and exemplars, use discussion and reflection to ensure students understand learning goals, and by involve students in creating the assessment criteria. When possible it can be helpful to review formative feedback with students one-on-one, particularly as students are developing self-regulated learning skills (Nicol & Macfarlane-Dick, 2006).

Providing varied levels of feedback also improves its effectiveness. For example, Goodman et al. (2004) found that feedback that includes a mixture of highly specific and more general or conceptual feedback was significantly more effective than feedback that was predominantly low-level and task-specific. Task-specific feedback can be helpful in the early stages of learning but once a learner has begun to master foundational knowledge, more process feedback focused on conceptual understanding, and feedback that develops self-regulation skills are most effective. When students develop deeper conceptual knowledge and learn self-regulation skills they are better able to generalize knowledge to novel situations, are more persistent, resourceful and confident, and achieve at higher levels (Nicol & Macfarlane-Dick, 2006; Zimmerman, 2008).

Develop self-regulated learning skills.

Classroom strategies that cultivating self-regulated learning skills—the capacity to self-evaluate progress and self-identify strategies to progress independently towards learning goals—can also create a growth mindset norm in which learning is understood to be a continuous process. Nicol & Macfarlane-Dick (2006) synthesized findings from an extensive body of literature to provide several guiding principles for cultivating self-regulated learning skills which include the following: provide self-assessment opportunities that include planning for next steps;

have students indicate the kinds of feedback they would like, when appropriate; use self-reflective grading practices such as portfolio compilation; help students understand which is the most and least important feedback; encourages teacher and peer dialogue around learning processes and strategies; and evaluate students learning on a regular basis so that students can provide information to teachers that can shape their teaching. For example, one-minute essay after lesson to assess learning and ask students to identify where they still have questions or having students work in groups to identify where there is still confusion to help clarify what needs to be mastered before the class can move to next lesson are both effective strategies for ongoing assessment.

A commonly used motivational strategy that can interfere with the development of self-regulated motivation to learn is the use of extrinsic rewards. Notably, a meta-analysis by Deci, Koestner & Ryan (1999) on the effectiveness of extrinsic rewards showed that they are ineffective, in part because they fail to provide students information on how to improve. Extrinsic rewards also reduce intrinsic motivation and subject interest, both of which are necessary in order for students to willingly choose to apply the effort needed to master difficult content (Deci et al., 1999). During the data collection process, the use of extrinsic rewards was an exclusion criteria.

These criteria guided the evaluation of feedback related teaching strategies that can foster a growth mindset.

The Need for Actionable Recommendation

As discussed in chapter one, growth mindset research has received the most widespread media attention which has triggered an explosion of articles and books on the topic (Sparks, 2013; Tough, 2006, 2016) and school districts around the country are rushing to implement growth

mindset initiatives. Yet Dweck (2015) herself has spoken out about the oft-observed conceptual misunderstandings and misapplications of growth mindset such as the over emphasis on effort, the tendency for some educators to blame students' academic failures on their "fixed mindset," or, conversely, to believe that having a growth mindset means believing anyone can become an expert at anything. There is also concern that administrators leap too quickly to adopting wide-scale implementation before adequate research has been done to confirm how best to implement research insights more broadly (Dweck, 2015).

PERTS, the research center at Stanford University where I work until December 2017, developed the Mindset Kit (mindsetkit.org) to share evidence-based resources and professional development materials to help educators learn about and integrate insights from growth mindset into their teaching practice. Over the course of two and a half years, I worked closely with three teams of teachers who were using these materials to learn about and integrate growth mindset and later belonging into their teaching practice. We sought to understand how effective the Mindset Kit resources were and to identify what gaps still exist in teachers' understanding. Insights from this work are summarized in two reports, which highlight that teachers want more concrete, actionable guidance on how to enact growth mindset and belonging promoting strategies in their classrooms (Beaubien et al., 2016, 2017). Thus, addressing teachers' need for more accessible, specific strategies they can easily implement to foster belonging and growth mindset in their classrooms is the primary goal of this study.

It is important to note that the five belonging and growth mindset principles are a subset of principles that could be included in this study. For example, another principle important for fostering belonging is implementing culturally relevant pedagogy to ensure all races, genders, and sexual orientations feel welcome and represented in the school and in the curriculum content

(Cokley, 2002; Dee & Penner, 2016; Faircloth, 2009). I have chosen to focus this study on these five principles due to time and resource constraints and because the strategies that flow from them are the most high-impact strategies that an individual teacher can easily implement without requiring support from their school leadership (e.g. changing school tracking or discipline practices), or a significant investment of time or financial resources (e.g. designing culturally responsive curriculum or purchasing new textbooks that are more culturally and gender balanced).

Other *Wise* Interventions

Growth mindset and belonging—and interventions to address them described in the sections above—are what Walton (2014) describes as *wise interventions* because “they are psychologically precise, often brief, and often aim to alter self-reinforcing processes that unfold over time and, thus, they [aim] to improve people’s outcomes in diverse circumstances and long into the future” (p. 74). That is, many issues related to engagement have their roots in students’ social psychological experiences: the psychological lenses students use to make meaning of the events in their daily lives, and the kinds of messages they receive through the structure of learning experiences, and their environment. The learning mindset teaching principles and related teaching strategies used in this study will provide educators guidance for how they can positively influence students’ subjective experiences by tapping into self-reinforcing psychological processes.

However, the breadth of *wise intervention* research extends far beyond just growth mindset and belonging. For example, social norms interventions have shown that it is possible to alter people’s behavior by suggesting a new social norm such as simply removing signs of social disorder by cleaning up trash in vacant lots and improving street lighting which led to a

significant decrease in crime (Braga & Bond, 2008). A sense of control intervention with nursing home residents which trained nursing staff to provide opportunities for residents to have more responsibilities and choices led to treatment group residence having increased well-being and lower mortality rates 18 months later (Rodin & Langer, 1977). And an intervention that provided GRE preparatory test-takers with an alternative explanation of anxiety—that it is helpful because it is the body’s way of preparing you to respond to a challenge—led treatment participants to perform better on the practice GRE immediately following the intervention and the real GRE exam three months later (Jamieson, Mendes, Blackstock, & Schmader, 2010; Jamieson, Mendes, & Nock, 2013). Many of these and other wise interventions have potential implications for educators. However, currently there is less evidence for their successful implementation in applied educational settings.

Conclusion

If we hope to successfully address equity issues so that demographic characteristics such as race, class, and gender no longer predict students’ educational attainment, it is critical that educators understand how to create classroom experiences that support all students in remaining engaged in learning and identified with school. An emerging source of hope for addressing equity issues is to create classroom norms and cultures that help students feel a strong sense of belonging and believe that their academic abilities can grow with the right support, strategy development, and effort. There are many open-access resources available online that can help educators understand how to implement growth mindset and belonging principles and strategies, however, these resources have significant limitations such as being mislabeled, not linked to research, or difficult to know how to implement. The compendium of resources on how to

implement growth mindset and belonging teaching strategies that resulted from this study could help large numbers of educators improve their students' motivation and engagement.

Chapter 3

Introduction

The purpose of this study was to create an evidence-based compendium of resources that can guide educators on how to implement belonging and growth mindset promoting teaching strategies in their classrooms—two learning mindsets known to contribute to improved motivation and academic achievement. I focused on three growth mindset principles (*High Standards for All*, *Growth Mindset Language*, and *Effective Feedback*) and two belonging principles (*Peer-to-Peer Belonging*).

This qualitative study involved two parts: (1) I first used document analysis to discover existing open-access resources such as video or other instructional resources as well as supplemental materials such as curriculum templates or supplemental text materials; (2) I then conducted two one-on-one interviews and two focus groups with seven college faculty (nine college faculty total) to learn about their perceptions of the opportunities and challenges of modifying a strategy that is modeled in a different context such as a different grade level, subject area, or school context. The interview participants also provided recommendations for additional sources of instructional videos modeled in college contexts.

Research Questions

The goal of this study was to build a compendium of evidence-based, open-access resources on implementing teaching strategies that can foster belonging and a growth mindset by answering two research questions:

1. What open-access internet resources and video models currently exist that demonstrate how teachers can enact belonging and growth mindset strategies, but which may not be

highlighted as supporting these mindsets, or which may not relate the strategy to the evidence-base for its effectiveness?

- a. What supplemental materials could help improve on these existing resources?
2. What do teachers say are the opportunities and challenges of modifying a strategy that is modeled in a different context such as a different grade level, subject area, or school context (e.g. well-resourced school)?
 - a. What, if any, supplemental materials could help improve on their ability to apply the strategy to their context?

Research Design and Rationale

This study used a qualitative research design that included a combination of document analysis and participate interviews. The combination of these two methods was the most appropriate because the goal of this study was to collect a broad range of documentation of teacher’s growth mindset and belonging strategies and how these strategies are enacted in a variety of grade level and content area contexts. Document analysis allowed for the collection of existing resources that were not always tagged as supporting the growth mindset or belonging teaching strategies identified in the study framework, were often not well linked to the research evidence, or were not presented in a format that could effectively guide a teacher new to the strategy on how to implement it effectively. The forms of documentation that were collected included online popular culture documents such as text materials, blogs, podcasts, and vlogs (blogs with embedded videos) of teachers modeling strategies or concisely describing how they enact a practice. I also identified supplemental materials that augmented the main resources by providing curriculum templates, additional background information, or which provided supplemental instructional materials that could improve teachers’ ability to effectively enact the

strategy. This process yielded a rich compendium of teaching strategy resources and exposed areas where existing resources were limited.

It was understood that gaps in resources might emerge during the document analysis data collection and, therefore, that interviews would be conducted with educators in the context for which a gap existed to gain an understanding of how useful a resource was for educators in a different context (grade level or content area). Early on it became clear that the biggest gap was for resources modeling Growth Mindset Language and Effective Feedback strategies. Therefore, interviews and focus groups with nine college instructors were conducted using already-collected resources from these categories. Based on the document analysis and teacher interviews I created a compendium of resources, which includes links to videos, text-based resources, podcasts, and materials such as curriculum or syllabi (Merriam, 2016).

A goal was set to collect approximately thirty resources total selected to represent examples from middle school, high school, and college settings for each of the five principles (see Table 2). All resources and interview participants were selected to maximize ethnic diversity and to represent a diversity of contexts such as, rural, suburban, and urban; public, charter, and private schools; and student population diversity related to ethnicity and socioeconomic status. Identifying resources in elementary grades was not initially a goal for this study because pilot data from my own online searches and interviews with educators suggested that resources for elementary grades are more common.

The document analysis alone provided many useful resources but it was clear that a significant gap existed for resources modeling strategies in higher education context. Therefore, interviews and focus groups with college faculty were necessary in order to illuminate how useful resources modeled in younger grades might be for educators in higher education context.

These interviews and focus groups also helped me learn about new sources for higher education resources. A quantitative study design could not be able to achieve the intended goals of this study or answer the research questions being posed.

Site Selection and Access

Document analysis site selection.

For the document analysis, I reviewed content available online to identify existing resources posted primarily by educational organizations but also some individual teachers. Several sites were those I had discovered through working in the area of learning mindsets and education over the past eight years and sites that have been shared with me by learning mindset experts who were familiar with my research topic. The main source websites I searched included, Teaching Channel (1173 videos, categorized), EL Learning (277 videos), ACUE (56 videos) Edutopia (430 videos), PERTS Mindset Kit (57 videos), and, Cult of Pedagogy (75 podcasts, 16+ videos), Neuendorf (2016) differentiates between sites that are *user-selected content* (USC)—content others have created that the website has selected to host for sharing on their site, or *user-created content* (UCC)—content created by the website host. All resources gathered for this study came from sites that were primarily UCC sites. However, some sites were a combination of UCC and USC. In most cases, I discovered resources directly from UCC sites, however there were cases where resources were discovered through a site that was a combination UCC and USC. For example, ACUE create many of their own videos, however they also share links to resources created by other organizations. In cases such as this where I included resources discovered through another site, I linked directly to the original creator of the resource (the UCC) rather than the USC so that the UCC was properly credited.

In addition to searching the sites I was familiar with, I also used Google, Bing, Yahoo, and Duckduckgo search engines to search for topics related to each teaching principle. When a phrase or keyword yielded productive results in one search engine, the same keywords or phrase was used in the other two search engines. Some keyword search examples include: “training students to give peer feedback,” “teacher student relationships,” “positive teacher student relationship,” “process praise,” and “praising the process.” Google generally returned the widest array of results, and in most cases, the results from the other search engines were the same. However, occasionally the other sites would return unique results. How resources were found are listed in column V of the compendium (see Appendix E).

The goal was to identify at least two documents (i.e., video models, text instructions, podcasts interviews, curriculum, or syllabi) from two different grade levels and content areas for each teaching principles. In cases where there were multiple resources available for a principle or strategy, resources were prioritize based on completeness (e.g. provides enough information that no new materials would need to supplement the resource) as well as how generalizable the resources were likely to be for different contexts (e.g. to different grade levels or content area).

The stage one document analysis revealed where additional teaching resources were needed which guided stage two of the study. For stage two, I conducted two one-on-one interviews and two focus groups with seven college faculty (nine college faculty total) to learn about their perceptions of the opportunities and challenges of modifying a strategy that is modeled in a different context such as a different grade level, subject area, or school context. The interview participants also provided recommendations for additional sources of instructional videos modeled in college contexts.

Focus groups and interviews site selection.

Convenience sampling was used to identify and recruit two community colleges to participate. This method was used primarily due to time limitations for recruitment and interviewing. One interview subject, Miguel Powers⁶, an English professor from a community college, in southern California, was previously known to me as having extensive experience applying growth mindset and belonging to his own practice, and leading professional development workshops with educators. The college Miguel works at serves approximately 24,000 students per year and the student demographics are 46% Latino; 3% Black or African American, 45% White or Asian. In this case, the site was secondary to the participant selection.

The eight other participants were all recruited from a college in Florida that had invited me to lead a half-day workshop. The coordinator of my visit assisted with recruiting participants by emailing an invitation to a select group of faculty who she knew to have prior knowledge of growth mindset research and who she believed would be most open to being interviewed. The college serves over 60,000 students and the demographics are 29% Black or African American, 32% Latino, 30% White or Asian. A notable characteristic of this college is that they have successfully eliminated race-based achievement gaps and were a recipient of the prestigious Aspen Institute's College Excellence Program award of one million dollars in 2017.

Participant selection and recruitment.

All interview participants were selected because they had prior knowledge of growth mindset research, and some were also aware of the belonging research. Participants with some knowledge of this area of research were intentionally chosen so that they could provide feedback on how useful they believed a resource was for helping new teachers implement the strategy

⁶ I have included his real name with his consent because I created two open-access videos from our interview to include in the compendium.

based on either having experience training other educators on these principles, or based on their own experience learning to integrate growth mindset and/or belonging promoting strategies into their teaching. There were nine participants total, 67% were female, 56% were Caucasian, 44% Hispanic or African American. All have been teaching 10 or more years and the average number of years of teaching experience was 16.7 years.

Table 6. Summary Characteristics of Interview Subjects

Type	Name	Site Location	Subject Area	# Years Teaching	M/F	Ethnicity
Interview	Miguel	Southern California	English	17	M	White
Interview	Pam	Florida	Faculty Professional Development	20	F	White
Focus Group 1	Mariana	Florida	Sociology	15	F	Af Am/ Surinamese Am
	Barry	Florida	Criminal Justice	17	M	Hispanic
	James	Florida	Philosophy	10	M	White
Focus Group 2	Isabel	Florida	Counseling	25	F	Hispanic
	Nicole	Florida	Psychology	11	F	Hispanic
	Sarah	Florida	Education	25	F	White Jewish
	Jillian	Florida	Geography	10	F	White

The original goal was to recruit STEM and ELA subject teachers because these subject areas are the most critical determinants of students' academic success, particularly in K12. However, due to the interviewees being college instructors and the reliance on convenience sampling, I was only able to recruit one ELA and one STEM instructor to participate. Though I initially worried this would be a shortcoming, the content area expertise of the recruited participants ended up providing valuable and diverse viewpoints. For example, one interview subject, Pam, had 18 years of experience providing faculty development training to a wide range of college instructors and thus had deep insight on what instructors in different domains need to

be convinced of the usefulness of new pedagogical strategies. Two other participants worked with students training to become K12 teachers and thus brought a depth of pedagogy knowledge to the review of the resources as well as an understanding of what new teachers need in order to implement unfamiliar strategies.

The rationale for only interviewing nine educators was that interviewing more would have been impractical due to time constraints for this study. Less than nine would be too few to make a significant contribution to understanding how useful resources are when modeled in a different content area or grade level.

Data Collection

Data was collected in the following ways:

1. Document analysis of open-access (free) online resources and video models of teachers enacting or describing how to enact the two belonging and three growth mindset principles (RQ1).
2. Semi-structured interviews with educators to learn about their perceptions of the opportunities and challenges of modifying a strategy that is modeled in a different context such as a different grade level, subject area, or school context (RQ2).

The original goal was to target collecting thirty resources that represent examples from middle school, high school, and college settings for each of the five principles (see Table 2). Elementary grades were not prioritized because pilot data suggested more online professional development resources are targeted towards elementary grades. Therefore, this study primarily focused on collecting resources from middle school, high school, and higher education contexts.

All video resources and interview participants were selected to maximize ethnic diversity and to represent a diversity of contexts such as: rural, suburban, and urban; public, charter, and private schools; and student population diversity related to ethnicity and socioeconomic status.

Document analysis data collection methods.

To answer research question one, I first conducted a review of the literature and consulted with a learning mindset expert to define the teaching principles and teaching strategies used to guide the selection of resources (see Appendix A for a summary of principles and strategies and Appendix E for the Document Analysis Data Collection Instrument). Using this framework, I searched available open-access online resources to compile a list of teaching strategy resources for each teaching principle. Resources collected included videos, text materials, blogs, podcasts and vlogs (blogs with embedded videos).

I began by searching sites I had discovered myself through working in the area of learning mindsets and education over the past eight years as well as sites that were shared with me by learning mindset experts who were aware of my research topic. These sites included The Teaching Channel, EL Education, Edutopia, Cult of Pedagogy, Mindshift, and Research for Better Teaching. Once searching these sites was complete, I began conducting a general internet search using three different search engines—Google, Bing, and Duckduckgo. Since many resources that model the target strategies were highlighted or tagged as supporting these mindsets, I conducted searches using search terms related to each teaching principle. Some keyword search examples include: “training students to give peer feedback,” “teacher student relationships,” “positive teacher student relationship,” “process praise,” and “praising the process.” When a phrase or keyword yielded productive results in one search engine, the same keywords or phrase was used in the other two search engines. Google generally returned the widest array of results,

and in most cases, the results from the other search engines were the same. However, occasionally the other sites would return unique results.

Another search process used was akin to snow-ball sampling where new resources were discovered by clicking on links to additional resources posted within other resources that were identified through the above-mentioned steps. Midway through, as gaps were identified, I began conducting interviews with educators in the context for which the biggest gaps existed (college) and through those interviews I learned of additional online resources. How each resource was found is listed in column V of the compendium (see Appendix E).

As resources were identified, they were added to the spreadsheet in Appendix E, tagged to indicate which, grade level, subject area, and teaching principle(s) and strategy(ies) the resource was most aligned with. I then added notes to explain why it was selected (positive attributes) and any of its limitations. Relevant details about the context in which the resource was developed or modeled (e.g., subject area, grade level, school and student characteristics) were also added.

I attempted to identify a range of the teaching strategies within each of the five teaching principles. For example, for the principle *growth mindset language*, I attempted to identify some examples of the principle that demonstrate the strategy *process praise over person praise* and some that demonstrate strategies for building *resilience to mistakes and failure*. In cases where I identify more than six resources per principle, I select the resource that represent the greatest range across school type, socioeconomic status of the student population served by the educator.

For each teaching principle, I discontinued actively seeking new resources once I identified two resources for each of the three grade levels (middle school, high school, and college). However, in many instances, new resources emerged as I searched for resources related

to other strategies. In these cases, I added the resource despite having already having met the goal.

Participant interview data collection.

To answer research question two, I conducted two one-on-one interviews and two focus groups with a total of nine community college faculty. Five resources total were reviewed by these instructors. See Table 3 for which instructors reviewed which resources. In most interviews, there was only time for participants to review one resource. Although not an explicit goal of this study, two new video resources were created from teaching strategies shared during one interview.

At the beginning of the interview or focus group, I explained the purpose of the study and provided participants a copy of the Table of Principles and Strategies (See Appendix A) to help make the compendium framework clear. I then showed them the selected video(s) modeling a strategy in a lower grade context. After viewing the video, I used a semi-structured interview protocol (see Appendix B) that included a think aloud to explore the following themes: how useful the strategy modeled in the video seemed, how they might implement the strategy in their context, what modifications they might make, what aspects of the strategy they thought might not be effective with their students and why, and what additional resources they thought might improve the resource.

For one-on-one interviews, the think aloud process was done during the viewing of the video and I paused the video when appropriate. For the focus groups, I provided participants with a sheet of paper to make notes while watching the video and also paused when requested or when participants were making substantial notes. I then provided each focus group participant two minutes each to share their reflections. Similar rounds were done for each of the additional

protocol questions. Their written notes were collected at the end. Since many of the participants were involved in professional learning groups or were leading professional development trainings, I also asked how useful they thought the resource would be for other instructors new to these principles and strategies.

All participants provided written consent to be audio recorded and permission was also requested from one participant to video record the interviews. This participant, Miguel Powers, described two new strategies during the interview and therefore, I created two YouTube videos from this interview that were added to the compendium. Miguel, was provided an opportunity to review the videos and gave his consent for them to be shared publicly.

Data Analysis

Document analysis and resource coding.

Each resource collected for the document analysis and the new resources created from the interview were coded using the categories developed in the literature review to indicate which teaching principle and strategy(ies) the resource is aligned with (see Appendix A). In cases where the resource aligned with more than one principle or strategy, it was tagged to indicate the additional principle and strategy it supported. For each resource, I added a description about what specific elements I believe qualified it to fit within the category as well as any limitations to the resource. Priority was given to resources that provided sufficient detail to help a teacher new to the strategy implement it for the first time, and whether there were supplemental materials provided to assist in implementation. In cases where the resource was useful, but not necessarily sufficient for guiding a teacher on how to implement it successfully, it was tagged and included as a supplemental resource.

The goal of the study was to collect examples of strategies modeled in a variety of grade levels and content areas, and to represent diversity in the context where the resource originated. Therefore, each resource was tagged as fitting within one of four grade level categories (elementary school, middle school, high school, and college), and six content area categories (English language arts, *math*, *social studies*, *science*, *other*, or *any*). To describe the context the resource represented, resources were also coded to indicate the school type (e.g. public, charter, private, 2-year college, 4-year college etc.), poverty level of school, diversity of student population. Another goal of this study was to create a compendium that linked strategy recommendations to the evidence base for the recommendation. Therefore, resources were also tagged to indicate whether or not research evidence was cited for its effectiveness.

Interview and focus group coding.

All interviews and focus groups were audio recorded and one interview was both audio and video recorded. All were transcribed and the text was analyzed using Quirkos to identify themes related to how relevant and useful they found the presented resources to be. Themes that emerged were related to aspects of the strategy participants liked and were either already doing, or would do with modifications. Key themes that emerged were:

- Similarities and differences with strategies currently in use
- Liked the demonstrated strategy and describing how they would implement
- Liked the demonstrated strategy but anticipate logistical challenges, or resistance from students
- Liked the strategy but age of students makes the resource not useful for training college faculty
- Challenges engaging some faculty in pedagogy related professional development

Data Storage

Each digitally recorded interview and any artifacts collected is stored on a password-protected laptop computer and on a Web-based Password-protected storage site (Box.com). Each interview recording was transcribed, and the transcriptions is also stored on a password-protected laptop computer or Web-based Password-protected storage site (Box.com). All identifying information was removed during transcription except in the case where the interviewee agreed to having their identity disclosed. After the interviews were transcribed, the recordings were permanently erased.

Ethical Issues

All interview participants provided informed consent to participate and to be recorded. For the document analysis, all creators of practices and the sites where the practice was found have been credited. I reviewed websites for limitations on sharing content without consent and will seek consent where necessary. Interviewed educators have been credited unless they or their institution have requested anonymity. There was no power differential in any of the relationships I have with interview and focus group participants. During the development of the principle and strategy framework used in this study I consulted with one expert who did eventually hire me to provide consulting. This power differential was not an issue because her involvement was minimal for the overall study, there was no incentive for her to respond in a dishonest way, and our working relationship since has not influenced by the opinions she provided during this early developmental phase of the study.

Credibility/Trustworthiness

One possible threat to the credibility of my findings is that, for some practices, the effectiveness may be mediated by characteristics of the teacher, the students, or the school

context and these may not be described in the example or perhaps not even known. For example, cultural differences may exist that make students' experience of some practices more or less beneficial. Collecting multiple examples from a variety of context will help minimize this threat to validity by providing either examples of similar strategies enacted in different context or by providing several types of practices a new teacher could try. The data collected during the interviews and focus groups were intended to help address this credibility threat as much as possible by identifying details on challenges participants anticipate in implementing the strategy modeled in the resource they reviewed and to learn about modifications they think would be required to make the strategy applicable to their context.

Other threats to validity are my own personal bias and that I am not a classroom teacher. Though I did my best to be guided by the literature, I may still have preconceived notions of what good practices are, and because I may not understand the nuances involved in teaching, I may have neglect resources that some classroom teachers may find useful. One way I attempt to guard against this was by soliciting recommendations for resources from educators within my network and during the interviews and focus groups.

Researcher Role

The interview subject from the southern California college, Miguel Powers, and the coordinator at the Florida community college who facilitated the recruitment at this site both knew me through my role as Senior Program Manager at PERTS (the Project for Education Research That Scales) at Stanford University where I worked up until December of 2017. As such, they were familiar with my mission to help educators apply evidence-based strategies in order to advance educational excellence and equity on a large scale.

Miguel Powers and I had spoken on several occasions about our mutual interest in the application of learning mindset research. He was familiar with my research interests, and we had already developed the trust necessary for honesty during the interview process. Similarly, the coordinator at the Florida college had seen me speak at a conference, and we met in person once and spoke by phone several times to discuss me visiting their college to lead a workshop for their faculty, thus she and I had developed a level of trust that she was then able to leverage in her recruitment efforts on my behalf.

Conclusion

The research design and methods used in this study were intended to maximize the identification of existing resources in order to make these resources more accessible and bring new insights to educators on how they can integrate growth mindset and belonging into their teaching practice. The results from this study will hopefully make a significant contribution in that they will help improve educators' ability to implement evidence-based recommendations for fostering belonging and growth mindset in their classrooms.

Chapter 4

Introduction

The goal of this study was to answer the two research questions below in order to create a compendium of resources to help guide educators on how to implement the five teaching principles outlined in Appendix A.

Research Questions

1. What open-access internet resources and video models currently exist for demonstrating how teachers can enact belonging and growth mindset strategies, but which may not be highlighted as supporting these mindsets, or which may not relate the strategy to the evidence-base for its effectiveness?
 - a. What supplemental materials could help improve on these existing resources?
2. What do teachers say are the opportunities and challenges of modifying a strategy that is modeled in a different context such as a different grade level, subject area, or school context (e.g. well-resourced school)?
 - a. What, if any, supplemental materials could help improve on their ability to apply the strategy to their context?

This chapter begins by presenting the results of the document analysis used to answer research question one and is followed by a section describing the results of the qualitative interviews and focus groups used to answer question two. It concludes with a synthesis of the results from both sources of data, which will guide the discussion and conclusions to be elaborated on in Chapter 5.

Document Analysis

To answer research question one, I conducted a document analysis of existing online resources with the original goal of collecting a total of 30 resources that could help educators better understand how to implement three growth mindset teaching principles (High Standards for All, Growth Mindset Language, and Effective Feedback) and two belonging teaching principles (Peer-to-Peer Belonging) modeled across three grade level contexts (middle school, high school, and higher education) and content areas. See Appendix A for a full description of the five principles and 13 related teaching strategies.

This section begins with a description of the search methods used to collect resources, followed by findings based on summary characteristics of the collected resources. Next will be a discussion of findings for each teaching principle, closing with a synthesis of the findings that are elaborated upon in Chapter 5.

Summary of Collected Practices

One hundred twenty-three resources that initially held some promise were reviewed during the data collection process. A total of 83 resources were selected for inclusion in the final compendium, including 45 for the originally targeted grade level categories (middle school, high school, and college), as well as 14 for elementary grades and 24 additional supplemental resources. Resources included as primary resources included video modeling of a strategy in a classroom with students, or those that provided sufficient details or supplemental resources to support successful implementation. A resource was typically designated as supplemental if it was text only, if it did not demonstrate the strategy in a classroom (e.g., interviews of teachers or researchers talking about a strategy, but not modeling it), or if it only provided other curriculum or implementation support but no instructions for implementation. In most cases the resources

collected were user-generated content—content created by the organization hosting the content or by the author of the blog, vlog, or podcast. The website that yielded the most video content was the Teaching Channel from which 17 videos were selected for inclusion. Six resources from the PERTS MindsetKit and five resources from EL Education were included. Between one and two resources each came from other sites.

The aim of this study was to collect 30 resources—two resources for each of the five teaching principle and from each of the three level grade contexts. See Table 7 for a summary of the original goals and the total number of collected practices for each category. Overall, 45 resources were collected, 15 more than planned. There were three categories for which the goal was not met (highlighted subsequently) and nine categories for which the goal was exceeded. When I began this study, I had expected to discontinue adding resources after the category goal was met. However, since new exemplary resources continued to emerge as a result of the ongoing search, I decided to continue adding them since their inclusion could improve the quality of the final compendium.

Table 7. Summary of the Goals and Total Collected Practices

	Teaching Principle	Middle School		High School		College		Total	
		Goal	Collected	Goal	Collected	Goal	Collected	Goal	Collected
Growth Mindset	High Standards for All	2	4	2	4	2	2	6	10
	Growth Mindset Language	2	4	2	1	2	0	6	5
	Effective Feedback	2	3	2	5	2	1	6	9
Belonging	Teacher Caring and Respect	2	4	2	4	2	2	6	10
	Peer-to-peer Belonging	2	2	2	5	2	4	6	11
	TOTAL	10	17	10	19	10	9	30	45

Finding 1: There is a paucity of resources for higher education contexts.

Early on in the document analysis, it became clear that resources modeling teaching principles in college settings were less common overall. It also became clear that Growth Mindset Language resources were least available for high school and college settings, and models for the teaching practice sub-group of Process Praise were not available beyond elementary grade levels. This will be discussed in greater detail subsequently.

Summary of resources including elementary and supplemental resources.

Identifying resources in elementary grades was not a goal of this study because pilot data from my own online searches and interviews with educators suggested that resources, particularly video models, for elementary grades are more common. However, given the gaps noted previously, I decided to include strategies modeled in lower grades if the resource was exemplary, or if it was the only resource available, as was the case with Process Praise. Supplemental resources were also added in cases where these resources were deemed useful for supporting the implementation of the relevant teaching principle. See Table 8 for a summary of collected resources including elementary and supplemental resources. For the remainder of this chapter, all discussions of total collected resources will include both elementary level and supplemental resources. The full compendium is in the form of an online, open access Google spreadsheet. The link to the spreadsheet is provided in Appendix E. There are two relevant tabs in the spreadsheet: the tab labeled “Summary of Resources” provides a summary view of the collected practices by teaching principle, grade level, content area, and resource type, and the tab labeled “Included Resources” offers a complete list of resources with the detailed notes on each practice.

Table 8. Summary of All Collected Main Resources and Supplemental Resources

	Teaching Principle	Elementary	Middle School	High School	College	Supplemental Resources	Total Collected
Growth Mindset	High Standards for All	2	4	4	2	7	19
	Growth Mindset Language	5	4	1	0	5	15
	Effective Feedback	2	3	5	1	5	16
Belonging	Teacher Caring and Respect	2	4	4	2	7	19
	Peer-to-peer Belonging	3	2	5	4	0	14
	TOTAL	14	17	19	9	24	83

Examples in the form of video models, text, or audio were collected, with preference given to those that were modeled in diverse content areas, in ethnically diverse contexts, and in public schools serving students in low-income communities. These focus areas were chosen in order to increase the likelihood that educators using the resulting compendium who teach in these contexts would view the resources as relevant to their classroom context and their students. The following sections will discuss the descriptive statistics related to these characteristics for the resources collected.

Content area summary.

Table 9 summarizes the resources by content area. Resources were classified by the subject categories Math, English Language Arts (ELA), Science, Other, or Any. Resources were categorized as Other if they were specific to a non-core subject such as Art and Advisory. Resources were categorized as applying to any subject area if they were non-content area/subject specific and could be implemented in any subject area.

Table 9. Summary of Collected Resources by Subject Area

Content Area	Elementary	Middle School	High School	College	Supplemental	Total	% of Total
Math	3	4	2	1	4	14	17%
ELA	4	3	7	2	1	17	20%
Science	0	1	0	1	0	2	2%
Other	3	0	0	0	0	3	4%
Any	4	7	10	5	21	47	57%
TOTAL	14	15	19	9	26	83	

Finding 2: Few resources exist for science content areas.

It is unsurprising that the greatest number of resources found were modeled in Math (14) and ELA (17) given that standardized tests such as the National Assessment of Educational Progress (NAEP) focus on students' Math and Reading scores. However, the paucity of resources for the sciences (2) is noteworthy, especially given the known gender- and race-based gaps in these areas of study. These gaps and the prevalence of stereotypes about who is expected to do well in science-related fields suggests it may be especially beneficial to focus on training educators in these subject areas regarding teaching resources that could help counteract such negative stereotypes.

Resource type summary.

Table 10 summarizes the collected resources by resource type. There was an intentional effort to find videos of educators modeling the teaching principles and strategies and, as anticipated, these were more readily available in lower grades.

Table 10. Summary of Collected Resources by Resource Type

Resource Type	Elementary	Middle School	High School	College	Supplemental	Total	% of Total
Video	13	11	8	2	5	39	47%
Text	0	0	4	2	16	22	27%
Text & Video	1	3	7	5	2	18	22%
Audio	0	1	0	0	1	2	2%
Multiple	0	0	0	0	2	2	2%
TOTAL	14	15	19	9	26	83	

Finding 3: Higher quality resources include text and video.

A total of 69% of the resources contained video; however, the resources that combined text and video—only 22%—were often the highest quality because they provided supplemental resources to improve the clarity of how to implement the practice, such as implementation instructions, curriculum, or downloadable templates. They were also more likely to link the suggested practice to research evidence regarding its effectiveness.

Context characteristics.

Preliminary data suggested that existing resources might over-represent affluent schools and/or classroom contexts lacking in diversity. To verify whether this was a valid concern, when possible, resources were categorized to indicate the poverty level of the school community, the diversity of the student body, and the type of school from which the practice originated. This was done in order to select resources that would be seen as most relevant for educators teaching in contexts where schools may not have the resources to pay for expensive professional development for educators, and thus where access to a compendium of these teaching strategy resources might be of greatest benefit. Therefore, in cases where the teaching practice resources came from a single elementary, middle, or high school, the ethnic diversity, school poverty

levels, and school type were obtained either through a search of the statistics provided on the school’s website, or through a search of the Great Schools website (greatschools.org).

School poverty level.

For resources from elementary, middle school, and high school contexts, the school’s poverty level was determined by proxy using the percentage of students at the school who receive free or reduced-price (FRPL) lunch (U.S. Department of Education, National Center for Education Statistics, 2018). For colleges and universities, school resource level was not assigned. However, Table 11 provides data on the institution type and inferences about the institutions resource levels for higher education institutions can be drawn from this data (e.g. a private 4-year university will likely have greater access to resources than a 2-year public college).

Fifty-nine percent (49) of the resources were categorized as N/A (not applicable) or unknown. Of the 34 resources that were from K12 contexts that could be categorized, 59% were from medium-high or high poverty contexts.

Table 11. Summary of Resources by School Poverty Level

Poverty Level	Criteria	Total Resources	% of K12 Resources	% of Total
Low poverty	0-25% FRPL	6	18%	7%
Mid-low poverty	25.1-50% FRPL	8	24%	10%
Medium-high poverty	50.1%-75% FRPL	9	26%	11%
High poverty	75.1%-100% FRPL	11	32%	13%
	K12 Resources Total	34		
Unknown	No data available	8		10%
N/A	Resources that were either not linked to a single school, text based, or from a college or university.	41		49%
	All Resources Total	83		

Student diversity.

Two factors were considered when determining the ethnic diversity represented by the resource. As stated previously, a search of the statistics listed for the school on the school's website or on Great School was one factor. Additionally, the actual diversity of the student body represented in a given video resource was considered. In most cases these two factors were aligned, but if there was a difference, the diversity represented in the video was prioritized because this information is likely to be more salient to an educator viewing the video than information about the school context overall. Consistent with the aim of this study, of the 49 resources that were able to be categorized by ethnicity, 88% represented mixed ethnicity or mostly students of color.

Table 12. Summary of Student Ethnicity in Schools of Selected Resources

Category	Criteria	Total	Percentage
Mostly White	>75% White	7	14%
Mixed	>40% Non-White	31	61%
Mostly Students of Color	>75% Latino, African American, or other	13	25%
	Total Categorized	51	
Unknown		0	
N/A		32	
	Total Resources	83	

School type.

The school type was identified for 46 of the selected resources. Of these, 60% came from public K12 schools, and 8% came from public 2-year or 4-year higher education institutions.

Table 13. Summary of Resources by School Type

School Type	Total Resources	% of Known	% of Total
Public K12	28	60%	34%
Charter K12	9	19%	11%
Private K12	1	2%	1%
4-year Private University	5	11%	6%
4-year Public University	2	4%	2%
2-year Public College	2	4%	2%
Total Known	47		57%
Unknown College	1		1%
Unknown K12	4		5%
N/A	31		37%
Total Resources	83		

Finding 4: Finding resources modeled in target school contexts was less difficult than anticipated

Finding resources modeling teaching strategies in the targeted contexts proved to be less difficult than originally anticipated, which was surprising and worth noting. This finding may be due to the organizations that are creating the most resources having an explicit mission to address the needs of teachers in diverse contexts and to improve teaching in a way that will help reduce known equity gaps.

Source organization characteristics.

The majority of resources collected came from organizations with an explicit mission to create resources to help educators improve their teaching practice. Only four organizations—Teaching Channel, EL Education, PERTS Mindset Kit, and Edutopia—yielded three or more resources. Therefore, in the summary table presented subsequently (Table 14), all other sources are grouped together and labeled as K12 Organizations, K12 Individuals, Higher Education

Organizations, or Higher Education Individuals. The organization that created the greatest number of resources selected for this compendium (17) was the Teaching Channel. All Teaching Channel resources are high-quality videos of teachers modeling a teaching strategy, and many provide links to supplemental materials to help with implementation. None, however, provide references to the evidence-base for the strategies' effectiveness. I discuss this finding in further detail subsequently.

Table 14. Summary of Resources Collected by Source

Resource Source	Total	% of Total
Teaching Channel	17	20%
EL Education	6	7%
PERTS Mindset Kit	6	7%
Edutopia	3	4%
Other K12 Organization	31	37%
Other K12 Individuals	4	5%
Other Higher Education Organization	14	17%
Other Higher Education Individual	2	2%
Total	83	

Finding 5: Poor website search functions may limit access to quality resources.

It is worth noting that the low numbers of resources found on some websites may not be representative of the actual number of useful resources available on the website, but rather due to the website's poor search functions or the resource being poorly tag causing them to not appear in searches. For example, on Edutopia's website, there did not appear to be a way to filter within search results (i.e., by resource type, grade level, or content area), which meant having to wade through hundreds of unrelated resources in some cases. The impracticality of this caused me, and likely many educators, to spend less time searching for resources on their site. Relatedly, even though the Teaching Channel has vast numbers of relevant, excellent resources, many are not

tagged as promoting the mindsets addressed in this study. This is an important issue to address given that one study found that 91% of users do not make it past the first page of search results (Van Deursen & Van Dijk, 2009), and a more recent study found people typically do not make it past the first five results (Advanced Web Ranking, 2014). This finding will be discussed in greater detail within each teaching principle, presented subsequently.

Compendium Resources Results

This next section will discuss the resources collected in greater detail within each teaching principle and sub-category of teaching strategies. See Appendix A for a description of the criteria used to guide the selection of resources for each principle and related teaching strategies. One overarching note about the categorization of resources is that most demonstrated more than one teaching strategy, and some resources even contained elements of multiple principles. For this reason, although each resource in the full compendium in Appendix E was identified as fitting within only one teaching principle, each was typically tagged as supporting two to three teaching strategies. Given how interconnected the principles are within each mindset, and how interconnected growth mindset and belonging are, it was not surprising to see this overlap.

Approximately three quarters of the way through the document analysis process, it became apparent that there were significantly fewer resources available in higher education contexts. This led to the decision to conduct interviews with college level faculty to obtain their feedback on the usefulness of the resources that had been collected thus far. During these interviews, I learned about new sources for higher education resources. Even with the addition of these new sources, I was still only able to locate three growth mindset resources and six

belonging resources for higher education contexts. These resources, however, were more likely to be linked to evidence for their effectiveness, as discussed later.

Finding 6: Fewer K12 resources are linked to evidence.

Only 29 (35%) of the 83 resources cited research evidence for the effectiveness of the proposed strategy. Of these, 31% came from higher education institutions. This is notable given that only 16% (13) of all resources come from higher education contexts. In other words, 69% of all resources from higher education sources cited research on the value of the proposed strategy compared to just 20% for K12 resources. It may be that because higher education institutions often have a focus on research, it is more normative in these contexts to provide, and expect to be provided, evidence to back a claim—a norm that K12 content providers could benefit from adopting. If, as the Common Core standards require, we are to expect higher levels of critical thinking from our students, then it follows that we should apply this same level of rigor to evaluating pedagogical practices. In the following sections I will discuss the findings for each teaching principle in turn.

Table 15. Summary of Resources with and Without References to Research Evidence Base

	Any Grade	K12	Higher Ed	Total
Total Resources Including Supplemental	16	54	13	83
% of Total Resources Collected	19%	65%	16%	
Total Citing Research	9	11	9	29
% of Total Citing Research	56%	20%	69%	35%

Growth Mindset Teaching Principle Results

The three growth mindset teaching principles are *High Standards for All*, *Growth Mindset Language*, and *Effective Feedback*. The subject area categorization for these resources is summarized in Table 16. As noted previously, science is the content area with the fewest

resources. Each teaching principle and its related teaching strategy will be discussed in the following sections.

Table 16. Summary of Growth Mindset Teaching Resources by Subject Area

	Teaching Principle	Math	ELA	Science	Other	Any	Total
Growth Mindset	High Standards for All	6	5	1	0	9	21
	Growth Mindset Language	6	1	1	0	7	15
	Effective Feedback	1	3	0	2	9	15
	Total	13	9	2	2	25	51

High standards for all.

For this teaching principle, two teaching strategies—*Mixed Ability Grouping/All Students Participate*, and *Open (Open-ended) Task Structures/Encouraging Critical Thinking*—were identified and used to guide the selection of resources for this category.

Mixed Ability Grouping /All Students Participate.

The focus for this strategy is identifying resources teachers can use to ensure all students participate equally, know they are expected to participate, and trust that their contribution is valued regardless of their ability level. Six primary resources and five supplemental resources were collected for this strategy. Of the video based resources, two demonstrate the use of simple tracking methods like using popsicle sticks, one demonstrates the use of the cold-calling technique, and two others discuss strategies for having students work together through using *Think-Pair-Share*, or *Consensogram*, before having a larger class discussion. The *Consensogram* resource lacked concrete examples to illustrate how to use the strategy, so I found a supplemental resource that provides examples of completed *Consensogram*.

There was only one resource from a higher education context, but it provides an excellent summary of research, including citations, on why this strategy and others recommended in the

lengthy article are important. It is well laid out and provides 21 strategies for promoting equity and engagement, 10 of which specifically relate to ensuring all students participate. This resource is an example of how one resource can touch on multiple strategies and principles in that it also discusses being mindful of how praise is used and suggests strategies to promote students' sense of belonging, such as getting to know all students' names. Since it provided the most strategies related to Mixed Ability Grouping/All Students Participate, I decided to list it within this teaching strategy section.

Many of the resources describe and model the strategy well, but lack an explicit explanation for why the strategy is important. For example, two resources in this category from The Teacher Toolkit—*Consensogram*, and *Think-Pair-Share*—were exceptionally thorough in describing how and when to use the strategy, offering suggested variations, and providing downloadable templates. However, neither explicitly explained *why* these strategies are important nor provided citations for the relevant evidence. There is a similar level of detailed analysis in Doug Lemov's *Cold Call Technique* resources, where two videos modeling cold calling are accompanied by extensive analysis, but no explanation of the high-level goal and how the strategy can ensure the teacher is holding all students to a high standard. This is important because it is conceivable that a teacher viewing these resources could see the purpose as being a way to have higher performing students help lower performing students, or as a way to force students the teacher perceives as lazy to participate rather than a way to create a norm that conveys high expectations for all students and trust that they can all succeed.

For this reason, and because there were no good examples that included an explanation of why to use mixed ability grouping, I decided to add a resource called *Mixed Ability Grouping—New Zealand*, even though it is from another country, because it includes an explicit discussion

of why mixed ability grouping is important and how it helps to address equity gaps. This video begins with Roberta Hunter, Associate Professor of Education at Massey University, explaining how ability grouping (tracking) can amplify equity gaps and how mixed ability grouping can counteract this pattern. The video also includes teachers talking about what they experienced as they shifted to mixed ability teaching. I added it as a supplemental resource because it discusses a whole school implementation that was supported by an outside consultant who also provided training. I also added two videos to the supplemental resources of researchers (Jo Boaler and John Hattie) talking about the evidence for why tracking and ability grouping leads to worse outcomes, particularly for students of color.

For the resource titled *Teach Like a Champion: Cold Call Technique* from Doug Lemov's Teach Like a Champion blog, I added "Clip 2" to the practice's short link title to specify which clip on the webpage I am recommending for this resource. This is because the first clip on this page, while demonstrating the cold call technique well, is actually a counter example of the Open Tasks strategy that will be discussed subsequently.

Open task structures/Encourage critical thinking.

Resources in this category provide examples of how to structure learning tasks to be open-ended and push students to explain their thinking and think more conceptually. Open tasks are those that can have more than one right answer, more than one way to arrive at the right answer, or more than one way to reach the learning target. Open tasks are more adaptive to meeting the needs of students at different ability levels, which makes them an important complement to implementing mixed ability grouping. Using open tasks and pushing students to be able to explain their thinking process allows them to understand material at a deeper, more

conceptual level, and to be able to generalize knowledge to novel tasks or other content areas more effectively.

Five primary resources were collected for this teaching strategy, all of which provide excellent modeling in classrooms of what this strategy can look like in different grade levels and content areas. One exceptional example is *Learning and Loving Math: A Problem Based Approach* from Two Rivers Public Charter School in the District of Columbia. We are shown what it looks like to give students tasks that ask them to grapple with concepts and work collaboratively to think through what they know and how to apply it. We see this modeled in multiple grade levels with different math problem examples, we can see how active and engaged the students are, we hear from teachers about their experience teaching in this way, and we get to hear from students about why they like this approach to learning math. Like many resources that show multiple grade levels, I had to make a judgment call as to which grade level under which to categorize the resource, ultimately deciding to label it as an elementary resource because most of the classrooms shown were at this level. However, I think the range of classrooms shown will help educators develop a sense of how this practice could be generalized to higher grade levels.

As mentioned in the previous section, the first video in the resource *Teach Like a Champion: Cold Call Technique* shows a teacher using a more traditional closed-task teaching style. In contrast to open math tasks, the structure of the tasks used throughout this video clip emphasize students answering questions that have only one right answer, students are asked to recite rules for solving math problems (implying that there is only one method to obtain the correct answer), they are not asked to explain their thinking or how they know the answer they gave was correct, and they are not asked to think about more conceptual aspects of the math being taught. When viewed alongside the example of *Learning and Loving Math*, the contrast in

the students' engagement and depth of processing of the math content between the two videos is remarkable. This kind of concrete counter example can be powerfully instructive, so I opted to leave it in and discuss this contrast.

This section of the compendium could not approximate completeness without providing at least one of Jo Boaler's excellent videos on how to teach math in a way that promotes a growth mindset: *How the Google Suite Can Enhance Open-Ended Math Exploration*. Boaler has made a truly remarkable contribution to the field of math teaching, not just through her research, but also through her non-profit, YouCubed, which offers low-cost online courses and a vast array of free resources. I have included a link to the webpage with these open-access resources in the supplemental section.

Growth mindset language.

For this teaching principle, two teaching strategies—*Use Process Praise, Minimize use of Person Praise*, and *Support Risk-Taking and Resilience to Mistakes and Failure*—were identified and used to guide the selection of resources.

Use process praise, minimize use of person praise.

Process Praise focuses on the processes that students use to achieve success such as by authentically praising the strategies students use, their persistence (effort), and by minimizing praise for traits that are traditionally viewed as fixed abilities such as talent or smartness. Seven resources related to this strategy were identified; however, all but two are text-based resources. Of the text-based resources, many provide excellent, evidence-backed guidelines accompanied by illustrative examples (see, for example, Edutopia's *Making Sure Your Praise Is Effective*.) Nevertheless, educators have indicated that it is most instructive to see what the strategy looks like in action.

Finding 7: Video Models of Process Praise are Limited

Only two videos of teachers modeling process praise emerged and, although both are excellent examples, they are modeled in elementary grade level classes only. This is an important gap to address for several reasons. First, because early research demonstrating the impact of praising students for effort rather than ability received a great deal of mainstream media attention, many educators have come to wrongly believe that the primary way to instill a growth mindset in students is to praise them for their effort: a misconception that is not only inaccurate, but can be ineffective or worse. Therefore, it is important to provide educators with models of how to use praise effectively at all grade levels.

The second reason this gap is important to address is that research has now shown that praising effort alone can backfire for adolescents. Recent research by Amemiya and Wang (2018) provided insight as to how context factors might influence the effectiveness of praising adolescents for effort:

Because [school practices that emphasize performance-oriented goal structures such as tracking and public honor rolls] suggests that high-ability students learn quickly and more effortlessly than their peers, students may adopt the belief that ability and effort are *inversely* related in how they predict performance: High-ability students need minimal effort to achieve and students who have to work hard are lower in ability. (p. 2)

They elaborated, further suggesting that this backfire effect may be particularly true for members of groups for whom a social stereotype about innate ability exists. Given these new insights, as well as the prevalence of the misconception that praising effort is a broadly applicable growth mindset strategy, it is important to provide educators at higher grade levels more nuanced

examples of how to focus students' attention more on learning. Additionally, as will be discussed subsequently, educators and some researchers have raised the concern that avoiding ability praise entirely may not be recommended in cases where students have historically not received any reassurance that they are intellectually competent.

Addressing the gap in process praise resources for high school and college level faculty will be an important area of focus for future resource development. For this reason, I decided to use one of these two videos, the PERTS/Teaching Channel resource called *Praising the process: See it in action*, for one of the interviews that will be discussed in greater detail subsequently.

Support risk-taking and resilience to mistakes and failure.

This strategy focuses on using language and practices that create a safe environment where students learn to value mistakes and feel comfortable taking risks and persisting through challenges. Six primary resources and one supplemental resource were identified. All of these resources, as with the *Process Praise* section (discussed previously), are for elementary or middle school grades. Five were for math, and one—the only one—was for science. An especially valuable aspect of resource from the Teaching Channel (called *Growth Mindsets for STEM Careers*) is that it is one of the few resources to openly discuss race and gender stereotypes and the role they play in students developing fixed mindset beliefs about their ability in STEM content areas. It also shows the teacher working with students to confront these stereotypes.

Two other exceptional Teaching Channel resources identified were *My Favorite No* and *Highlighting Mistakes: A Grading Strategy* because the strategies modeled by Ms. Alcola are relatively easy to generalize to other content areas and grade levels. Confirmation of this finding came from a focus group conducted with college faculty in which they viewed the second

resource. There was broad agreement from the interviewed college instructors that waiting to give students their grades until after they had reviewed their mistakes and the feedback provided by the teacher was an excellent idea, and several indicated that they planned to try this strategy immediately. This will be discussed in greater detail in the qualitative interview findings section, presented subsequently. These two videos are also examples of excellent growth mindset promoting strategies not being tagged as such in the Teaching Channel library.

The supplemental resource, “*Teach Me Like You Do*” *Growth Mindset Music Video*, is a fun video of students singing about how stressful and boring traditional math teaching is, but how it is much more engaging when it is taught in a way that helps students, “see beyond the rules” and “embrace mistakes.” One complaint that could be made about the video is teachers could view the well-dressed teacher turning into Mr. Cool [casually dressed] Teacher negatively because it makes professionalism seem like superficial learning. I agree that progressive pedagogy should not be equated with reduced professionalism. However, there has been a growing trend toward more casual dress in the business world in general, particularly among millennials (Clemente, 2017), so it is not surprising to me that this teacher, who appears to be millennial age, chose to highlight the contrast in old versus new teaching methods through a change in dress style.

Effective feedback.

Two teaching strategies identified for this teaching principle were *Clear Goals and Formative Feedback Opportunities* and *Develop Self-Regulated Learning Skills*.

Clear goals and formative feedback opportunities.

Six main and two supplemental resources were found in this category. Only one was for the college level, and it is a very simple video. For this reason, I used two resources from other

grade levels in the interviews with college faculty, which will be discussed later. The EL Education video Austin's Butterfly is compelling because it shows that even a first-grade student can create far higher quality work than most would expect, provided he/she is given quality feedback and multiple opportunities for revision. Unfortunately, the practice was not seen as useful for training college level faculty because the students were too young. The resource *Pyramid Papers: A Cooperative Learning Project* provides a good example of how to structure a writing assignment to make goals clear and provide opportunities for feedback. However, the resource's main strength is that it discusses training students' how to give each other feedback. For this reason, it was included as a strategy within Peer Belonging. This finding highlights how many strategies can be effective for supporting more than one teaching principle.

Develop self-regulated learning skills.

This strategy focuses on helping students develop their skill at identifying where they are in their progress toward learning goals, and what strategies can help them progress independently. Four primary resources and three supplemental resources were identified for this strategy group. Although only two are videos and none were identified for college contexts, the resources are all relatively easy to generalize to other contexts and are commonly used strategies such as exit and entry tickets. For example, the EL Education resource *First Five Minutes, Last Five Minutes* was reviewed by four college faculty members who indicated it was a valuable strategy; two respondents said they already used a similar strategy. However, all four indicated that there are logistical challenges with implementing the strategy as demonstrated in the video in college contexts. More details will be discussed subsequently.

Belonging Teaching Principles

The two belonging teaching principles identified for this compendium are *Teacher Caring* and *Peer-to-Peer Belonging*.

Table 17. Summary of Belonging Teaching Resources by Subject Area

	Teaching Principle	Math	ELA	Science	Other	Any	Total
Belonging	Teacher Caring and Respect	1	3	0	0	14	18
	Peer-to-Peer Belonging	0	7	0	1	6	14
	Total	1	10	0	1	20	32

Teacher caring and respect.

The four strategies for Teacher Caring are: *Reduce Ambiguity and Convey Belief in Students' Competence*; *Form Connections with All Students*; *Prioritize Trust/Empathic Discipline*; and *Normalize Belonging Uncertainty in New Settings*. Eleven primary and seven supplemental resources were collected overall.

Reduce ambiguity and convey belief in students' competence.

Students who have experienced poor treatment in academic settings due to racial or gender stereotypes, or who may have experienced similar negative messages from the larger social context may enter the classroom with a mistrust of teachers' motives for providing critical feedback. This mistrust can interfere with students' ability to fully engage with learning opportunities. The importance of this aspect of teacher-student relationship has only recently surfaced so it is not surprising that finding resources was challenging. I was only able to find one resource tangentially related to this strategy, *Rochester Teacher Cares*, in which an African American teacher exposes young African American male students to a new, positive norm for valuing education. This kind of modeling is rich and important; however, it portrays one teacher taking the initiative to start a group outside of the classroom. I included it despite this limitation,

but an important area for future development should focus on creating resources to guide educators on what it looks like to break the cycle of mistrust across the racial divide (Yeager et al., 2014) in their classrooms by conveying high standards to all students with reassurance that they believe all students can achieve those standards.

Form connections with all students.

Although the goals for Teacher Caring were met mostly through resources collected for this strategy, finding them initially proved challenging. Searches using terms such as “Teacher-Student Trust,” “Classroom Belonging,” “Teacher-Student Relationship,” or “Classroom Culture” returned strategies that were mostly related to working with students to create agreements for appropriate classroom behavior or other classroom management strategies. This paucity most surprised me coming from providers like Teaching Channel and EL Education because they have created so many other excellent video resources. A broader search using Google, Yahoo, and DuckDuckGo yielded several resources for K12 contexts. I then found other resources through ACUE, a higher education training organization that I learned about during my interviews with college faculty.

Prioritize trust/empathic discipline.

Fostering greater empathy is important for reducing implicit bias and minimizing the damage to trust that can occur during social conflict. The resources collected for this strategy do not necessarily address the importance of empathy building for cross-race interactions, but many do discuss the important role of empathy and teacher-student trust more generally. The Larry Ferlazzo audio interview resource, *Managing Student Conflicts Before Things Spiral Out of Control*, is excellent in that three teachers candidly discuss the importance of empathy, and describe concrete examples of situations where they were able to implement it successfully with

positive results. However, none of the resources provide video modeling for educators on what this looks like in action. Given that conflict can trigger stress in teachers as well as students, and that elevated stress may cause teacher to default to more authoritarian classroom management practices, helping teachers adopt more empathic approaches may require more than just reviewing these resources. In other words, these resources may be helpful as a starting point, but in order for teachers to internalize the strategy, it may be necessary to offer more opportunities to practice, give observational feedback from trusted colleagues, and do reflective writing activities.

Normalize belonging uncertainty in new settings.

Only one text-based resource, *Building Students' Sense of Social Belonging as a Critical First Step*, was identified for this strategy. Thankfully, the author, Karyn Lewis of Northwest Education, is an expert in social psychology research and belonging research in particular. Thus, even though it is brief, it is well written and provides links to other related articles summarizing relevant research. It also provides a link to the PowerPoint slides for the webinar, which includes more information about the research in this area. Initially, I listed this as a supplemental resource because it is text-based and not grade-level specific. After completing the document analysis phase, I decided to move it to the primary resource category because it is the only resource to discuss the recursive downward spiral that worrying about social belonging can trigger. I placed it in the high school category because students' transition into high school and their transition from high school to college are particularly critical times to help them understand that belonging uncertainty is normal and usually passes with time.

Finding 8: A gap for important Teacher Caring strategies exists.

Although many resources were found related to teachers forming strong connections with all students, very few resources are available to guide educators on the other Teacher Caring

strategies (explicitly conveying high expectations, using empathic discipline practices, and normalizing belonging uncertainty during transitions). These are important areas to target for future resource development because research suggests they could be powerful levers for educators to actively thwart the negative recursive processes that can be triggered by belonging uncertainty and stereotype threat. They can also help mitigate teachers' own implicit bias.

Peer-to-peer belonging.

The teaching strategies that support Peer-to-Peer Belonging are: *Cooperative Learning Tasks*, *Peer-to-peer Feedback and Support*, and *Increase Peer-to-peer Connection*. Fifteen primary resources were collected, but there were no supplemental resources.

Cooperative learning tasks.

There are the fewest resources in this area—only two, in fact, and both are for college contexts. This is likely not because there are none available, but because resources in the other teaching strategy areas emerged more easily, which caused me to discontinue searching due to the time constraints for this study. This is unfortunate because the skills students acquire through collaborative work such as becoming effective at building trust within a team are critical for career readiness (Hansen, 2018). More resources could easily be added later by simply searching for Deeper Learning or Project Based Learning. The first resource, *Pyramid Papers: A Cooperative Learning Project – Miguel Powers, E.d.D.*, is a video I made after my first interview with a college faculty member. He shared this assignment during the interview and because it is such a concrete, well-defined example of this strategy I decided it was worth converting it into a resource for the compendium. The second resource, *Collaborative Learning: Group Work*, created by Cornell University's Center for Teaching Innovation, includes extensive instructions, links to additional resources, and research citations on the effectiveness of this

strategy. Thus, few examples are provided, they are detailed enough that they will likely be useful to teachers in other grade levels.

Peer-to-peer feedback and support.

Six primary resources and one supplementary resource were identified for this category. Several provide guidance on creating or co-create norms for productive, respectful, and useful peer-to-peer academic discussions and do so across grade levels. The resource *Accountable Talk* from The Teacher Toolkit shows a third-grade teacher discussing the strategy; however, the website provides downloadable templates for all grade levels as well as implementation tips. One of the few resources to specifically target working with English language learners (ELLs) was found for this category: *Using Debate to Teach Academic Language*. Given how often I have been asked for guidance on working with ELL students over the years, developing more resources for this sub-group seems likely to be well received by educators.

Increase peer-to-peer connection.

There are six resources in this category. The two modeled in elementary grades have qualities that I think exemplify fostering peer-to-peer connections. In the Teaching Channel resource, *Our Selves, Our Classroom, Our Families*, first grade teacher Kimberly Laurance demonstrates three interconnected strategies embedded into the language arts curriculum that help students get to know each other and learn about similarities and differences they share with their peers both as individuals and culturally. Giving students opportunities like this to learn about their peers' cultural and ethnic identities can help build empathy and reduce prejudice (Pettigrew & Tropp, 2006). In the second resource from CASEL, *SEL in Practice – Oakland*, Oakland Unified School District teacher Katie Bannon models how she helps her fifth-grade students develop their self-awareness and connections with each other using peer-to-peer

discussion and writing activities. She also models the power of being vulnerable by sharing her own learning with students. CASEL is an organization focused on promoting social emotional learning (SEL); thus, she uses language more commonly associated with a SEL framework, such as articulating emotions and developing character strengths. She ends by describing how implementing this strategy led to noticeable improvements in students' academic skills. Both resources are longer than most, but provide rich illustrations of how to implement this strategy. In retrospect, I would have liked to use one or both of these in the interview phase to learn how useful educators in higher grades perceive these resources to be.

Summary of Document Analysis

The goal of this study was to use an evidence-based framework to identify open-access resources that can guide educators on how to help students feel confident that they can grow their abilities and skills (growth mindset), and feel they are valued and respected by their teacher and their peers. The aim of this study was to collect 30 resources—two resources for each of the five teaching principles—modeled in three grade level contexts (middle school, high school, and college), with an emphasis on video resources from ethnically diverse public schools (K12). This goal was far exceeded; in total, 83 resources were collected including elementary grade level resources and supplemental resources, and a significant number are modeled in diverse, low-income schools. As anticipated, many resources were not tagged as supporting growth mindset or belonging; therefore, they did not show up immediately as a result of keyword searches. Additionally, some content providers' search filter functions were so poorly designed that it limited access to potentially quality resources.

Despite the successful acquisition of a large number of resources, gaps exist in the area of Growth Mindset Language resources in high school and college contexts, Effective Feedback in

college contexts, and any resources in science content areas. Within Teacher Caring, although the target number of resources was obtained, there were few resources for the strategies that may be especially important for improving teacher-student trust in contexts where stereotype threat may be activated (e.g., between White teachers and students of color, or between male science or math teachers and female students).

The resources that provided the most information to guide educators on how to implement a strategy tended to be those with both video and text content. In general, resources for higher education were less abundant; however, the college-level resources tended to provide more implementation guidance and were more likely to be accompanied by research references to support the claims for their effectiveness. An additional goal of this study was to link available resources to an evidence base for their effectiveness because pilot data suggested that this was often lacking. This concern was borne out, but only for resources provided for K12 educators.

Interview and Focus Group Results on Generalizability of Resources

Overview

Two interviews and two focus groups were conducted with a total of nine community college faculty members, who reviewed a total of five practices (see Table 3 for which instructors reviewed which resources). In most interviews, there was only time for participants to review one resource. Although doing so was not an explicit goal of this study, two new video resources were created from teaching strategies shared during one interview.

Observed gaps that guided qualitative interviews.

It was understood that gaps in resources might emerge during the document analysis data collection; therefore, interviews were conducted with educators in the gap context areas to gain an understanding of how useful a resource was for educators in a different context (grade level or

content area). Since the gap in Growth Mindset Language and Effective Feedback resources modeled in higher grades became clear early on, interviews and focus groups with nine college instructors were conducted using already-collected resources from these categories.

Rationale for selection of resources for interviews.

As mentioned previously, resources were selected for which a significant gap appeared. At the time of arranging the interviews, the most significant gaps in collected resources were for the Growth Mindset principles of Growth Mindset Language, and Effective Feedback; therefore, resources from these categories were selected for use in the interviews. I selected practices for the focus groups that seemed like they would have the greatest generalizability (e.g., not subject specific) because I was not informed ahead of time what subjects the participants who agreed to be interviewed taught.

Qualitative Interview Results

I conducted two one-on-one interviews and two focus groups. A different resource was presented in each interview or focus group. In the second interview, there was time for the participant to review two resources.

Resource 1: *Praising the Process: See it in Action* (interview 1).

Participant: Miguel Powers, English Professor, Transformation Grant Growth Mindset Coordinator, and Staff Development at a community college in southern California. This interview was filmed and I am using his full name with his permission because two segments of the interview were converted into short videos and added to the compendium.

The resource, *Praising the Process: See it in Action*, was reviewed during this interview. The video shows a first-grade teacher, Chana Stewart, working with her students using the Writer's Workshop model. She is shown interacting with her students to give them feedback on

their writing assignments. Interwoven throughout are segments where she explains what process praise is and how the Writers Workshop model helps emphasize a growth mindset by focusing students' attention on the processes that help them improve as writers and achieve their goals. The Writers Workshop places emphasis on setting small goals in order to achieve larger goals.

Age difference limits utility.

Miguel's reaction within the first few minutes of viewing the video was, "So, my initial thing is, okay these kids are really young. That's already, as a college person like okay, I'm used to this. A lot of stuff is designed for younger people." This response further validates what emerged in the document analysis; resources modeled in lower grade levels are far more common. Near the end of the interview, when I asked how useful this video would be for training college faculty, he said the age difference was too great for it to be of much use.

Similarities to current practice.

Miguel then asserted that the way Chana describes process praise is similar to the work their collage has been doing: "We do a lot with process writing and we use the phrase 'habits of mind' as a campus initiative for the last couple of years. That's something we're well practiced in and emphasize." He returned to this later in the interview to add that he and his colleagues talk with students about metacognition—thinking about their thinking—regularly throughout the semester. He also liked that she has students identify their successes and described how he does this as well when students turn in assignments by asking them to identify which passages they think are their best and which they feel like they could improve. He said, "It allows me to have a dialogue with them before they actually see the grade at all." Another element he identified as similar to his own was breaking down the assignment into smaller goals:

Breaking the tasks into discrete goals I think is useful. I use rubrics as one way to try and do that. Then, like I said, we do checking in and process oriented assignments where there's mini steps along the way directed toward the final product.

The teacher in the video addresses her students as *writers*, a process known as identity signaling (Berger & Rand, 2008; Bryan, Adams, & Monin, 2013). Miguel said he also does this, and that he learned to do this from a colleague who worked with the most academically underprepared students at their college. As he explained, "She felt like they often arrived as having years of struggle in English. She wanted to start off with an identity process." This theme of recognizing that many incoming community college students need support to develop an academic identity emerged in other interviews as well and will be discussed in greater detail in the next chapter.

Differences from current practice.

In terms of differences, Miguel noted that the teacher in the video was intervening early in the developmental stage of writing, as students are forming their ideas, and that this was probably age appropriate. However, with his students, he intervenes later in the writing process, not while they are constructing their ideas. He also stated that he gives feedback either as written comments or during individual one-on-one conferences. He elaborated that he and his colleagues also build in extensive structure and support for peer-to-peer feedback, stating, "[We] often present those as opportunities to grow as writers, the feedback isn't only for the recipient, but actually the person providing feedback can often grow the most. That's part of how we frame it with the classroom."

New practices.

He later described two practices he uses to train students to support each other's learning. Both were excellent examples that were sufficiently rich in detail that I decided to convert them into short videos that were added to the compendium, with his permission. The first, called, "Training Students on Peer-to-Peer Feedback," describes the structured process he uses to train students give effective peer feedback. In the second video, "Pyramid Papers – A Cooperative Learning Assignment," Miguel discusses how he structures an assignment so that it trains students to work collaboratively in a way that deepens their skills as writers while also building in peer-to-peer accountability and connection.

Miguel then described his work leading faculty development workshops over the past several years to encourage faculty at his college to change their practices. From the feedback provided by workshop participants, he has found that what faculty new to this work say has had the biggest impact for them are "changing the structure and sequence of assignments, changing how they give feedback, [providing students] opportunities for revision for full or partial credit, self-reflection, and growth mindset grading process."

Throughout the interview, I was struck by the frequency with which he used "we" rather than "I." This, in addition to what he shared about how he and his colleagues are conducting research to track the impact of changes in their practice, leads me to conclude that he has achieved some success at infusing their college, or at least his department, with a growth mindset culture shift. It is refreshing to hear about faculty embracing changes in their practice to develop a growth mindset rather than the more common focus on simply changing students' beliefs.

I ended the interview by asking what he thought would be the easiest entry point for somebody new to this work to consider with respect to learning how to use effective growth mindset language and feedback. He replied:

I guess one thing I'd want to ask people is, "What do you want students to take away?" Do you want them to take away a learning process or content-based understanding? If you want them to learn about how to learn better, then you want to design your course and provide your feedback with that in mind. I always joke with my students that being smart was never about knowing stuff. If it ever was, it can't be anymore because you'll never be smarter than your phone. Now we need to know how to synthesize, evaluate, collaborate. If we're going to be educators, then we have to help them learn how to learn and prepare them to be independent learners.

Resource 2: *Austin's Butterfly* (interview 2).

Participant: Pam (pseudonym) is the interim Vice President of the Center for Teaching and Excellence at a community college in Florida with over 18 years' experience in this role. At the time of this interview, she had recently returned from retirement to fill the position temporarily. Although she taught for many years, she was not currently teaching; thus, her feedback comes more from the perspective of how the resources could be useful for training other educators. Pam reviewed two resources.

In one resource Pam reviewed, Ron Berger of EL Education works with two groups of students: one group of first graders, and one group of fourth graders. He shows them a series of drawings made by a first-grade boy named Austin, which demonstrates that with the right kind of feedback and by making multiple iterations, he was able to make a "scientifically accurate" drawing of a butterfly.

Non-representative students?

Multiple times throughout the interview Pam, expressed surprise that the students in the video understood and used words like “scientific,” “critique,” and “persevered.” She said, “That’s pretty impressive if they know what those words mean.” Her surprise made me wonder if teachers in general, even elementary level teachers, might think these students were too different from their own for this resource to seem relevant.

College level science and math examples are needed.

She liked the video and indicated that her school’s English faculty already use/implement a similar strategy in that their writing assignments are always iterative with multiple opportunities for feedback. She thought this video would be useful for elementary grade level teachers and training K12 educators, but that an example modeled in a higher grade would be more useful. Specifically, she said,

I’m thinking about math and science teachers and if we could show some kind of step-by-step thing. Not necessarily drawing an object, but something that’s a little bit more relevant to academics...or a drawing that relates to something in biology.

She later added to this by saying, “Because so often in our professional development, a faculty member would say, ‘If you could relate this to math, I’d appreciate it.’” Her comments confirm the noted gap from the document analysis regarding resources relevant to the science domains specifically.

Resource 3: *Getting Better through Authentic Feedback* (interview 2).

The second resource Pam reviewed was a Teaching Channel video of a high school teacher, Sean McComb, using a structured process to get feedback from his students on how he could improve as a teacher.

Liked strategy and already doing.

This strategy was very familiar to her, and she indicated that prior to retiring she regularly taught a workshop for faculty on this strategy. She based much of the structure of her workshop on the book, *Classroom Assessment Techniques: A Handbook for College Teachers*, by Thomas Angelo and Patricia Cross, which they provided to all faculty. Commenting on the questionnaire displayed at the opening of the video, she said, “Almost every question on there was what we used to help faculty try to get feedback.” She then described how she implemented it when she taught:

At the end of my class I would [ask], “How’s my driving?” I would tell the students, “You’ve seen it on the back of cars, so, how’s my teaching? How’s my facilitation? What’s good, what’s not good?” And I would get feedback on a little sheet after every class.

Logistical challenges.

Although Pam likes and used this strategy herself, she also indicated that she did not think that faculty in the science and math areas would have the time to implement it. She elaborated that she often got pushback from the math and science faculty who would say, “We don’t have time to do it. We have too much to cover. Those are those kinds of things that those people in the social and behavioral sciences can do.” This comment led her to talk generally about the challenges of reaching some faculty.

Challenges reaching science and math faculty.

She shared that reaching some faculty, particularly in science and math, is challenging. As she described,

Oftentimes in our courses and our workshops, we are preaching to the choir.... It's the same faculty who go to the Mindset book club, who go to the Grit book club. It's the same faculty who are looking to grow. It's the same faculty who have a growth mindset, basically.

She estimated that roughly 40% of faculty do not believe there is value in participating in professional development outside their content area; they believe it is more valuable to attend content-relevant conferences, possibly because they don't see the value of focusing on pedagogy. She described that in some cases there may be a "source credibility" issue in that some faculty with Ph.D. degrees, particularly if those degrees are from a prestigious university, do not trust that a training at the community college level could be of real value.

New sources for higher education resources.

Two recent college-wide programs described by Pam seem to have had an impact on changing pedagogical practices. The first is the Paul and Elder model—a multi-year training and certification program that focuses on training educators to build a deeper level of critical thinking into curriculum design and pedagogical practices. Since an open-access resource for the Paul and Elder model was available, I added it to the compendium as a supplemental resource.

The second is a blended learning program called ACUE, which she and several faculty members in the subsequent focus groups described as rigorous and structured in a way that helps them implement the recommended new practices. This organization's website had several video models available, which I subsequently added to the compendium.

Untapped repository of curriculum resources.

Pam shared that their college has been paying faculty using Title V funding to develop curriculum (shared through their own website) that would help contextualize their course

assignments to students' academic and career course pathways (also known as guided pathways, a nation-wide initiative to streamline community college students' progress). Their goal is to develop a repository of assignments for each of the core courses that instructors could use to allow their students to choose assignments that are more relevant to their pathways. She felt that the college might be open to sharing these resources, but due to time limitations, I was not able to follow up for the current study.

I am aware of other colleges doing similar resource development work and have long been frustrated by a similar phenomenon in K12 where expert teachers develop exceptional practices that remain hidden in the silo of their classroom or school because they lack the time to share their practice effectively. Learning about yet another example reaffirms my belief that there is a vastly underutilized form of social capital in the field of education simply due to a lack of resources and technological infrastructure dedicated to developing more efficient pathways for curation, dissemination, and ongoing evidence gathering by practitioners regarding which resources and strategies are the most effective.

Focus group 1 – Overall comments.

Participants: This focus group took place at the same community college in Florida and there were three participants: Mariana, Associate Professor of Sociology; Barry, Professor of Criminal Justice; and James, Assistant Professor of Philosophy. All participants were very familiar with growth mindset and said they were implementing related teaching strategies already.

Positive overall response to framework.

As each participant arrived, he/she was given a handout with of the compendium framework in Appendix A. Before sharing the resource to be reviewed, I asked each person to

introduce himself/herself and to share any reflections he/she had on the framework overall. All three liked it and thought it generally reflected good teaching; each commented on areas he/she felt was particularly important. For example, Barry said the strategies for growth mindset language and the idea of empathic discipline really resonated with him. James appreciated the emphasis on building trusting relationships with students and opportunities for students to help each other. Mariana said that the idea of mixed ability grouping was new to her and that she would like to incorporate it in her next class. Their positive reactions suggested that the compendium and the framework used to compile it made sense to educators and would be of some value.

Concerns about the recommendation to minimize person praise.

Mariana expressed concern about the recommendation to minimize person praise. She had read a *Huffington Post* article that made a point that resonated for her,

As a minority myself, as somebody who came here as an international student, I've had my own experiences. I see the students in my classes, and some of them really have issue with their self-concept, and really just need somebody to tell them that, "You are smart."

In the article, San Diego State University researcher, Luke Wood Ph.D., criticizes the idea of process praise in isolation for students of color, particularly Black boys, because according to him, these students have often never been told they are smart by their teachers and have experienced a great deal of racism and oppression. He stated that research he and his colleagues conducted "has demonstrated that validation of ability is among the strongest predictors of success for men of color. In fact, validation (including messages that affirm students' ability) is among the top three most important practices for Black college men" (Hilton, 2017, para. 7).

Since the study he references in this article has not yet been published, I cannot comment on the study's results or methods. In essence, though, I agree that it was a worthy empirical question as to whether validating the ability of students who have experienced very little positive feedback on their abilities and who may have also experienced significant negative stereotyping or racism could be valuable. Based on the weight of existing evidence, however, I believe that any praise of students' abilities should be contextualized by emphasizing that abilities are malleable. I agree with Dr. Wood that there is still much we need to learn about the heterogeneity of treatment effects in this and other areas of social-psychology research. Gaps in our knowledge as we probe new constructs are inevitable, but as we discover them, we need to be mindful not to throw out the baby with the bathwater.

Resource 4 –*Highlighting Mistakes: A Grading Strategy* (focus group 1).

In this video, Leah Alcola, a middle school math teacher, describes how she gives back exams without a grade so that the class can focus learning from their mistakes as they review the problems. She then makes the grade students got on the exam available the next day.

How participants will use strategy.

After viewing this video, Barry's first comment was, "Wow!" Mariana said, "I love it! I like how they didn't see their grade right away, so the focus shifted. I really love that a lot." She elaborated by saying, "I think there are specific subjects that, for example, math, this is excellent to do all the time." James also said he really liked it and was going to implement it for his upcoming midterm exam. He described how he would implement it by explaining that he would have students work in small groups, as was shown in the video, to discuss some common errors, then have students work in groups to review their answers with each other while he provided

support as needed. James also indicated wanting to try it and said that he would likely try it with quizzes to start.

There were several comments about the value of having students work in groups before intervening as an instructor. James said that, in his experience, letting students work together can improve the engagement of students who may be resistant. As he put it,

If I'm trying to encourage them to become engaged in their learning, that's one thing. If their peers [are] saying, "Oh, well it's really not that hard. I just read this part." They give each other tips on how to learn when in those groups.

Barry thought that it would be helpful if the video were accompanied by a list of ideas for how to apply the strategy in other disciplines.

Logistical considerations.

Despite the positive way all three teachers responded to this practice, Barry felt it would take some preparation to get students use to the idea, stating, "I think it requires for the instructor to let the students know this is how we're going to do it. I can see a lot of resistance." He also mentioned that having students work in groups may be difficult depending on how the physical classroom is set up (e.g., lecture hall with seating in stationary rows).

Another consideration is that many instructors teach classes that are a blend of in-person and online, and some courses are only eight weeks long. This might make using this strategy on an ongoing basis difficult. As Mariana put it, "I teach in eight-week sessions in a blended format. I already only see the students twice, and there's a lot to cover. That's a concern that I'll have to just figure out."

Similarities and modification suggestions.

Mariana described a similar strategy she uses with her students where they work in groups to reflect on a theory and write a definition on the board, then correct each other's definitions. She wondered whether in sociology where the content is not as sequential as in math, if this strategy would be as useful to implement all the time. James also described a similar practice in which he does short quizzes to check for understanding and does not give a grade so that they only focus on the feedback he provides.

Concerns about confidentiality and stigma.

Mariana said,

I wish it also had an example of a student who had no mistakes. How does she respond?

How do the other kids in the group respond if they are the student who has no mistakes?

Is it appreciated or is it something that causes tension, perhaps?

Barry seconded this comment. Mariana elaborated that, "Coming back to our student population, and looking at my kids who are now in high school, there are some populations where it's not cool to be smart." She went on to describe a hypothetical scenario where a higher achieving student whose peers did not view academic success positively might intentionally make mistakes to minimize the risk of being ostracized for trying too hard. She added,

I'm wondering how that would work in this particular situation. If it would stimulate the kids to do better and do more, or if it might backfire if they say, "I don't want to have my peers know that I was the one that got 100%." Because it does expose them with the group, and everybody gets their paper back and now we're going to share and look at it.

She later came up with a solution:

Rather than having students write their names on the test, the teacher might be able to code it so that I give James one, you two, three, four. When the tests are given back [randomly, not to the student who's test it was], nobody knows which number was assigned to which student. That way if the student who gets everything correct is embarrassed by it—as crazy as that may sound, it might happen—now nobody will know who that particular student was.

Her concern about students feeling uncomfortable “appearing smart” is one I have heard from many educators both in high poverty inner cities and in rural, White, multi-generation, poor communities. It is especially challenging for educators in situations without school-wide structures focused on creating a different social norm. Identifying and disseminating evidence-based recommendations for addressing this concern would be a valuable area for future resource development. This finding and the concern she raised about the limitations of process praise suggests the need to have the compendium of resources reviewed by more educators of color, and those working in high-poverty contexts in order to surface these kinds of concerns.

Focus Group 2 – Overall comments

Participants: There were four participants in this focus group, which was conducted at the same community college in Florida as focus group one: Isabel, Counseling Faculty for Nursing Program; Nicole, Assistant Professor of Psychology; Sarah, Professor of Education; Jillian, Professor of Geography

Is the compendium's framework broad enough?

As with the first focus group, all participants liked the framework and commented that the proposed strategies seemed like general good teaching practices. One participant, Nicole, said she would like it if the compendium included strategies for how to work with students who,

in her words, “don’t respond to growth mindset strategies.” She gave an example in which a student would not make a simple phone call to get technical support to address a minor issue preventing him from accessing critical online learning activities. To her, this was evidence of the student having a fixed mindset, or perhaps more accurately, in the student’s behavior not changing even though he might have adopted a growth mindset. Either way, it is a frustration many educators who are actively working to promote a growth mindset report. They are perplexed as to why their students’ behavior isn’t changing (Beaubien et al., 2017).

Educators want concrete strategies to help *individual* students who appear to face psychologically-based obstacles. In this case, however, it is not clear that the student is experiencing a psychological barrier. Perhaps it would be helpful to develop a resource to broaden educators’ thinking about other potential issue: for example, a diagnostic checklist of possible non-psychological causes, such as, is there a logistical barrier (e.g., in this scenario, does the student have a phone?), is it a financial barrier (e.g., is paying to use the phone a barrier?), is it a language barrier (e.g., is the student concerned about lacking language skills to describe the computer problem or understand instructions he is given)? These are just a few examples of non-psychological elements an educator could rule out. It might even be useful to provide a list of possible psychological barriers or reasons a psychological intervention may have limited impact (see Table 1 in Walton & Wilson, under review) to help educators recognize the host factors that can influence students’ engagement and learning. For practical reasons, I have chosen to focus only on growth mindset and belonging for this study, but these are only two elements among many that can influence students’ experience of learning. This participant’s comment is a reminder that it may be a disservice to educators to provide only a partial explanatory framework.

Fixed mindsets of colleagues.

Another frequent theme participants described was the fixed mindsets of some of their colleagues. Isabel, who works with the nursing students who are on academic probation, said that the faculty send messages early on to students that, “Not everybody belongs in nursing. Not everybody’s cut out to be a nurse;” the heavy emphasis on reading comprehension and entrance exam results reinforces this message. Jillian echoed what Pam said in her interview, stating,

A lot of the faculty that participate in these kind of things, we tend to see each other in other venues.... It would be nice to know when you send [students] off that they’re going on to someone else who’s going to be teaching the same practices!

Sarah suggested a mentoring program for faculty and shared one experience she had converting a resistant instructor by inviting them to observe a class implementing the new strategies, “All of a sudden they kind of said, ‘Oh!’ An aha moment, if you want to call it that.” She also shared this observation: “I’ve noticed that the faculty who seem to have a fixed-growth mindset have more grade appeals and situations where there are students who are not satisfied.” This is certainly a testable hypothesis via faculty surveys and analyzing existing academic appeals data. Given the human resource cost of such appeals, this could be a meaningful outcome of interest to college administrators. If it is true, it would be important to also probe for what mediators might be driving this effect (e.g., does a fixed mindset classroom culture focus students more on grades? Or do growth mindset classrooms help students take more ownership of their own learning? Or perhaps fixed mindset teaching practices co-vary with less instructor caring practices, which influences students’ perceptions of fairness?).

Resource 5 – *First Five Minutes Last Five Minutes* (focus group 2).

In this EL Education video, teachers across multiple grades and subject areas model using entry and exit tickets to foster self-regulated learning (e.g. by recognizing where they are at in their progress towards learning goals, or what strategies are working best and where they could use support). Several teachers are interviewed about how they use this strategy. The voice over also provides specific details about of the purpose and value of this strategy.

How participants will use strategy.

All three participants said that they like the strategy. Sarah, who teaches in the education department, said, “It’s nice to learn a new activity.... My students have to write their own lesson plans using Bloom’s taxonomy, and...I like that [in this video] they’re using synthesis, analysis, evaluation.” She added that the focus on routines was also useful, saying, “that’s Harry Wong⁷ and that’s another thing that I teach.” She closed by saying, “Great activity, I will use it. [I’ll] do it a little more informally in terms of always something culminating at the end and always something exciting at the beginning.” Isabel said that she does a take-home closing reflection activity, adding that, “The ability to have them reflect on [the lesson] is crucial, because that’s how they develop their critical thinking skills and they begin to, the process of learning. I love this one.” She also felt that this activity “shows that the teacher is prepared, organized, and they have a plan.”

Logistical challenges to implementation.

Nicole said that she liked the activity, and does a quiz at the beginning of each class now, but felt that since instructors can have up to 150 students, reading two reflections from every student every class would make this difficult to implement regularly; “If it’s only for the students to have the process, then it’s great, but if the faculty have to give feedback or do something with

it, I think the process has to be simplified.” Jillian added that making time for this kind of activity can be particularly challenging in the six- and eight-week classes. Another challenge Jillian discussed is that her students do not always show up on time, explaining that many “have so many other personal obligations or transportation issues or jobs or family...college isn’t the only main priority.”

Nicole felt that there might also be resistance from students unless it is well-explained so they understand the value; “Unless something is due for a grade, [they will] write something quick and turn it in but not really put effort and real thought into it.” Isabel agreed and added that, “I make [the purpose of activities] very explicit, but the reality is that they still don’t buy it. I think my students are looking at the work as busy work.” Sarah elaborated by saying, “I think that you have to develop a rapport, there has to be trust...That is the key that unlocks the door and the mind opens. It starts with the relationship, and then the relevance piece.” I appreciated this exchange because Sarah’s comment highlights how growth mindset and belonging teaching principles interact.

Summary of Interview and Focus Group Results

Nine college faculty in two interviews and two focus groups reviewed a total of five resources from the compendium. Overall, participants felt the compendium framework was useful. The three strategies modeled in higher grades were viewed as more useful than the two modeled in elementary grades. The instructors provided valuable insights on how they would implement the strategy they reviewed, what modification they might make, and what logistical challenges they anticipate needing to consider. Many noted similarities to other frameworks. Two

⁷ Author of *The First Days of School: How to Be an Effective Teacher*

new resources were created from one interview, and another interview exposed me to a valuable new source for college level resource.

Interviewees discussed important logistical considerations in translating the strategies modeled in the video resources for college-level contexts. For example, classes are often blended, they may only last six or eight weeks, students may bring long histories of failure or institutional mistrust with them, and students may have many other demands on them outside of school. One interviewee brought up important considerations with respect to validating the effectiveness of recommended practices with students of color and first-generation students. Many participants discussed the challenge of engaging faculty in this work, particularly in domains traditionally viewed as requiring innate ability to succeed (e.g., math, science, and nursing).

Several times in different interviews the challenge of engaging faculty to adopt growth mindset and belonging practices was raised. Participants expressed a desire for recommendations regarding how to address their colleagues' fixed mindsets more effectively.

Chapter 5

Introduction

The goal of this study was to build a compendium of evidence-based, open-access resources on implementing teaching strategies that can foster belonging and a growth mindset by answering two research questions:

1. What open-access internet resources and video models currently exist that demonstrate how teachers can enact belonging and growth mindset strategies, but which may not be highlighted as supporting these mindsets, or which may not relate the strategy to the evidence-base for its effectiveness?
 - a. What supplemental materials could help improve on these existing resources?
2. What do teachers say are the opportunities and challenges of modifying a strategy that is modeled in a different context such as a different grade level, subject area, or school context (e.g. well-resourced school)?
 - a. What, if any, supplemental materials could help improve on their ability to apply the strategy to their context?

In this chapter, I begin by discussing the major findings from this study and their implications based on the existing literature on growth mindset and belonging teaching strategies. Limitations of this study will then be discussed. I close by providing recommendations for the development of additional resources, additional framework domains this compendium could be expanded to include, and recommendations for further research to better understand the boundary conditions for existing teaching principles and strategy recommendations.

Discussion and Implications of Major Findings

In this section I review the goals of the study and four main findings, *Gaps in Available Resources*, *K12 Resources Less Likely to be Linked to Research*, and *Intersections with Other Initiatives*.

Review of Goals and Successes

At the highest level, this study sought to create a compendium of evidence-based, open-access resources that could guide individual educators on teaching principles and strategies for fostering a growth mindset and a sense of belonging in their classrooms (see Appendix A). These two psychological aspects of learning and motivation were chosen as a starting point for several reasons: both areas of research have received a great deal of attention in the media and thus many educators are aware of their importance, they are mutually compatible and provide potentially high-leverage guidance for improving equity outcomes, many schools are attempting to implement large-scale growth mindset or belonging initiatives, and there is a paucity of evidence-based guidance on how teachers can modify their teaching practice to incorporate relevant insights from research.

Focusing on creating an open-access resources library is important for ensuring that educators in all contexts, regardless of their schools' resource levels, have access to quality evidence-based resources. A longstanding challenge in the field of education has been finding systematic ways to ensure research- and practice-based insights are broadly accessible to educators (Bryk, Gomez, Grunow, & LeMahieu, 2015; Erickson, 2014; Payne, 2008; Schneider, 2014). In a recent EdWeek blog post on this topic, Tyler Thigpen, a partner at Transcend and Co-founder of The Forest School, suggested that the field of education would benefit from looking at how the medical field has begun to address this issue with UpToDate—an online library of

evidence-based, physician reviewed, updated information that doctors and patients can use to assist in their decision-making process in real time (Holl & Thigpen, 2018). From the start, the guiding vision for this study and the resulting compendium was to begin creating just such a library.

The initial goal set for this study was to conduct a document analysis of existing online content to identify 30 resources from multiple grade levels, content areas, and school contexts that could help individual educators understand how to implement the target teaching strategies (see Appendix E). In total, 83 resources were identified; thus, this goal was far exceeded. Video-based resources were prioritized “due to [their] unique capability to capture the richness and complexity of elusive classroom practice” (Blomberg, Sherin, Renkl, Glogger, & Seidel, 2014, p. 454). A total of 54 (69%) of the resources collected include video content, and these resources represent excellent diversity in terms of school type and ethnic representations. Pilot data suggested that far more resources existed for elementary grades; thus, although resources from elementary grades were included, I prioritized identifying resources for middle school, high school, and college grade level contexts. Future development work to fill out resources for elementary grades would be beneficial.

Despite far exceeding the overall goal, notable gaps did emerge, particularly for resources modeling strategies at the college level. Other noted gaps include resources modeled in science content areas, and for the teaching principles *Growth Mindset Language* and *Effective Feedback* modeled in higher grades. There were also limited resources identified for the three *Teacher Caring* strategies that may be most important for addressing stereotype threat.

It was anticipated that some gaps might emerge and that interviewing a small number of educators would be helpful to learn how useful a resource would be if it were modeled in a

different context from an educator's content area or grade level. Since the biggest gaps were for college level resources and for the teaching principles of *Growth Mindset Language* and *Effective Feedback*, two one-on-one interviews and two focus groups⁸ with college instructors were conducted to obtain feedback on resources from lower grade levels. A total of five resources were reviewed; participants reviewed a different resource during each interview or focus group, and one participant in a one-on-one interview was able to review two resources.

Two of the resources modeled strategies in elementary grades and both of these were seen as unlikely to be helpful to college instructors due to the age difference of the students in the videos. However, the three resources from middle school (1) and high school (2) contexts were seen as helpful despite being modeled in a different grade and content area from the participant's class. This suggests that generalizing from middle and high school contexts into a college context may be easier because it is less of a developmental leap. However, it is also possible that the reviewed resources from middle and high school were of strategies that were easier to generalize. For example, one of the elementary level resources modeled *Using Process Praise and Minimizing Person Praise*. This recommendation may be harder for educators to grasp generally, but concerns were also raised that students who have never received any person praise may benefit from receiving some amount thereof; this is a topic that will be discussed in more detail later.

Participants raised some logistical concerns about adapting strategies to college-level classes, including: lack of time, particularly in six and eight week compressed courses; students not always arriving on time, making beginning of class activities hard; concerns about students not seeing the value of the strategy; and having too many students (up to 150 in some cases) for

⁸ There were three participants in the first focus group, and four in the second.

some strategies to be practical to implement as frequently as recommended. Suggestions were offered for how to modify the strategies to address some of these concerns. It would be beneficial to include these as supplemental notes in the compendium once it is ready to be shared publicly. Overall, all participants in the interviews and focus groups said they found the framework used to categorize the resources useful, and several mentioned how these strategies aligned with other frameworks with which they were familiar. This is also a topic that will be discussed in greater detail subsequently.

The compendium that was created for this study is a promising starting point for providing individual educators open-access, evidence-based guidance on integrating growth mindset and belonging strategies into their teaching practice.

Gaps in Available Resources

As noted previously, several gaps emerged and will be discussed in greater detail in this section. The gaps fall into three categories: grade level, content area, and teaching principles and strategies.

Grade level gaps.

The largest grade-level gap identified was for college level resources. Although the interviews offer preliminary evidence that strategies modeled in middle and high school may be useful for educators in college settings, there are practical constraints that could limit their direct applicability for many educators. First, most K12 school semesters are 15 weeks long, whereas many 4-year colleges operate on the 10-week quarter system, and in many 2-year colleges there are also six-week and eight-week *compressed* semesters during summer and winter. This means that for many instructors, giving up precious class time is much more difficult to justify. Instructors in the interviews also said that many of their classes are a blend of online and in-

person, which adds to the reluctance to give up face-to-face class time. Therefore, resources that are modeled by college instructors facing similar constraints, especially if they could speak directly to these challenges, would likely increase their face validity significantly. It also may be beneficial to focus on developing resources college instructors could integrate changes that don't require class time such as ways to restructure the sequence of assignments, redesigning curriculum, or changes to grading practices.

Another challenge open-access colleges face is that there is often a wider gap between the high and low performing students in their classes, which is often associated with a wider gap in academic skills like time management and effective study habits and self-regulated learning skills such as effective goal setting, self-monitoring progress, and planning. Many of these lower performing students are also coming in with long histories of academic failure or other negative school experiences, causing them to have a fragile identification with school (Bailey, Jeong, & Cho, 2010; Silva & White, 2013; Steele, 1997b). This means that growth mindset and belonging strategies that help students believe in their ability to succeed, develop their academic and self-regulated skills, and help them learn these strategies from each other could be especially beneficial in these contexts. However, such recommendations would likely be seen as far more credible if they were modeled by college instructors who could describe how the proposed strategy helped them to address these context specific challenges.

Content area gap.

The most significant content area gap in the compendium is for strategies modeled in science content areas at any grade level and math for college level. As discussed in the previous chapter, there are well documented and persistent gender and race gaps in STEM field careers, and these are due at least in part to the prevalence of stereotypes about who is expected to do

well in these fields (Beede et al., 2011; Bianchini, 2013; Steele & Aronson, 1995). These stereotypes, as well as the sheer lack of representation in these fields, can amplify belonging concerns for women and minority students early on academically. Therefore, training educators in these subject areas on teaching strategies to counteract these negative stereotypes and implicit bias may be especially important. However, four interview participants brought up the challenges they have faced trying to share growth mindset and belonging research with science and math faculty, and that they are especially likely to need modeling and evidence that it can be applied in their content area. Pam, the faculty development coordinator with 20 years' experience, put it this way; "So often in our professional development, a faculty member would say, 'If you could relate this to math, I'd appreciate it.' The science teachers said the same thing."

Teaching principle and strategy gaps.

Teacher caring.

The Belonging teaching principle of Teacher Caring holds promise for addressing equity gaps more generally by reducing implicit bias based issues (e.g., disproportionality in discipline practices) and stereotype threat dynamics in the classroom. Although many resources were available for the strategy *Form Connections with All Students*, few resources were identified for the three strategies that could most directly improve teacher-student trust across race lines. This gap is concerning and deserving of more focus, given that approximately 80% of all public elementary and secondary school teachers are White (Taie & Goldring, 2017).

The Teacher Caring strategies I have proposed in this framework as potentially the most effective for improving trust across race lines include *Reduce Ambiguity and Convey Belief in Students' Competence*, *Empathic Discipline/Prioritize Trust*, and *Normalize Belonging Uncertainty in New Settings*. These categories were chosen based on recent rigorous intervention

research in the area of social psychology that is grounded in deeply considering the psychological experiences of underrepresented students. Although I believe this research offers useful insights, there is still much to learn about the complex way structural racism, microaggressions, teachers' racial anxiety, and experiences with implicit bias shape the psychological experiences of students of color. For this reason, these categories should be viewed as a starting point for developing recommendations for educators. However, I believe it is better to start with these categories than to leave this important issue unaddressed and undefined.

Growth mindset language: Use process praise, minimize person praise.

Resources modeling the use of *Process Praise* were only found for elementary grade levels. When a college instructor reviewed one of these resources, he indicated it was not likely to be useful for college level educators. There are several reasons why the gap in resources for this strategy in particular is problematic.

First, the most common misunderstanding about how teachers can foster a growth mindset in students is to simply praise their effort and teach them that having a growth mindset is mainly about working harder, which is not only inaccurate, but also potentially damaging (Dweck, 2015). However, the prevalence of this misperception is widespread and has led to a backlash against growth mindset by some who view it as blaming students' under-performance on "their own faulty thinking" (Kohn, 2015, para. 18). This backlash is not surprising, and possibly even warranted, given how many educators and school district administrators have rushed to implement growth mindset initiatives based on a superficial understanding of the literature⁹, and that there is still much we do not yet understand. Who can blame them? When

⁹ It is worth noting that because most research publications are not open-access, there is a significant barrier for most educators—those arguably most invested in applying research insights—to accessing the necessary information that

educators (or anyone, for that matter) are told that any factor is essential to achieving an outcome they care about but they are not provided clear guidance on implementation, they will naturally set about to test their own best guesses. This is why providing educators with evidence-based recommendations is important, though, as will be discussed in recommendations subsequently, they should also be equipped with the ways and means to evaluate the effectiveness of the recommendation in their local context.

The second reason the gap in resources for how to effectively use process praise with older students is concerning is that there are developmental differences in what kinds of praise are most effective with older students (Amemiya & Wang, 2018), and nuances related to the intensity of positive comments that may be particularly impactful for both adolescents and some subgroups such as those who are unaccustomed to being praised (Brummelman, Thomaes, Orobio de Castro, et al., 2014; Brummelman, Thomaes, Overbeek, et al., 2014). As such, there are likely gaps in our understanding of the complex ways praise can influence the motivation of students within certain subgroups. There may also be differences based on culture or class that influence what kinds of praise will be most effective and how teachers evaluate behavior as praiseworthy that vary by culture (Hart & Risley, 1995; Hilton, 2017; Putnam, 2016; Stephens, Markus, & Phillips, 2014). For example, evidence suggests that what teachers perceive to be praiseworthy may be biased toward an independent, middle-class cultural norm. This may lead teachers to deprive some students from different cultural backgrounds (e.g. interdependent cultures) of praise if their classroom behavior is not aligned with more independent cultural norms (Stephens et al., 2014).

would allow them to become more fully informed. This means that educators are dependent on those with access such as journalists, policy institutes, and research centers, to synthesize and disseminate research findings; a model that seems increasingly outdated and paternalistic.

There is a significant body of evidence to support the recommendation of focusing praise on students' authentic effort, the strategies they have used, and on their progress over time. Doing so has been shown to positively impact students' motivation to learn, willingness to take on challenges, and openness to learning from feedback and mistakes. However, as with teacher caring recommendations, there is still more to learn about developmental factors, cultural factors, and socioeconomic class differences that may influence the effectiveness of teachers' use of praise.

K12 Resources Less Likely to Be Linked to Research

Another notable finding was that far fewer resources directed toward educators in K12 grades link the recommended strategy to evidence of its effectiveness. Only 20% of K12 resources cited research compared to 69% of higher education focused resources. This apparently acceptable norm of providing K12 educators with recommendations in the absence of evidence may be at least partially responsible for persistence of myths about the nature of learning, often referred to as *neuromyths* (Dekker, Lee, Howard-Jones, & Jolles, 2012; Macdonald, Germine, Anderson, Christodoulou, & McGrath, 2017; OECD, 2002). Neuromyths are defined as misconceptions “generated by a misunderstanding, a misreading, or a misquoting of facts scientifically established (by brain research) to make a case for use of brain research in education and other contexts” (Dekker et al., 2012, p. 1). Such myths include learning styles and hemispheric dominance (left brain, right brain) among others. These authors speculate that the popular media is partly responsible due to its tendency to oversimplify and over generalize research findings. In a survey of 242 teachers, Dekker et al. (2012) found that:

When people lack a general understanding of the brain and do not critically reflect on their readings, they may be more vulnerable to neuromyths. Thus, a lack of neuroscience

literacy and reading popular media may be factors that predict the number of misconceptions teachers have about the brain. (p. 2)

The belief in unfounded theories like learning styles is a serious issue and one I have personally encountered even among learning coaches who are responsible for mentoring dozens of teachers on how to improve their pedagogy. It speaks to the need for more effective teacher training on brain science and training for educators on becoming more savvy consumers of information related to effective teaching strategies. It also reaffirms the previously stated observation that we need more effective, efficient processes for helping educators understand the research and know how to apply it practically to their own context and practice (Bryk et al., 2015; Schneider, 2014).

Intersections with Other Frameworks

In the interviews and focus groups, several other frameworks were mentioned that participants indicated shared similarities with some of the compendium principles and strategies proposed in this study. These included Habits of Mind, the Paul & Elders Critical Thinking Model, and Angelo and Cross's Classroom Assessment Techniques for College Teachers. Other frameworks with which I am familiar from elementary and secondary grades that also share similarities include the Deeper Learning movement, Bloom's Taxonomy, Project/Problem Based Learning, and AVID. It can be challenging for educators to be exposed to many similar frameworks; asking them to make sense of this assemblage on their own can feel like a cacophony of random noise rather than a unified symphony. The lack of a clear map that makes these overlaps explicit can lead teachers to mistrust new initiatives and to dismiss them as simply the next new thing that will be gone in a year, a phenomenon often referred to as initiative fatigue (Reeves, 2012).

It can be particularly challenging for educators to make sense of the overlaps when proponents of one model criticize another model without seeming to acknowledge the areas of alignment with their own model or without being specific in their criticism in a way that would help extend understanding of how to apply theory to practices. It can not only cause confusion for teachers, but also negatively impact their trust in new models and initiatives more generally.

One example of this is John Hattie, who has been a vocal critic of growth mindset research due to small effect sizes of interventions¹⁰ and his assertion that there are some situations where it may be more beneficial to have a fixed mindset rather than a growth mindset. In a recent interview, he stated that,

Having a growth mindset...may not be needed for easy tasks, or on performance on tasks that are “novel and ill-defined and that therefore require both creativity and the willingness to abandon unsuccessful strategies.”... It may not help if it [a growth mindset] leads to more practice on a task using already failed strategies, and seeking experts to provide alternative strategies may be more effective than believing that ‘I can’ and other growth notions. (Hazell, 2017, para. 10).

It seems ironic that this prominent scholar whose recommended teaching strategies are included in this compendium as growth mindset promoting seems to have fallen prey to the common misconception that having a growth mindset is purely about persistence. This is not what the literature suggests. Foundationally, mindsets are about the meaning-making processes. It is the meaning making process that informs the goal people choose, which, in turn, shape

¹⁰ It should be noted that the interventions Hattie references are brief (under 30 minutes), have demonstrated consistent effects in several randomized control studies (Paunesku et al., 2015; Yeager, Walton, et al., 2016), and are delivered through the internet and thus retain high fidelity at scale. They are also now available free of charge to all high schools or colleges in the United States. Also, as discussed in chapter 2, the methods Hattie used in his meta-analyses have methodological issues and, thus, his conclusions about meaningful effect sizes of education interventions should be interpreted with caution.

(mediate) the behaviors in which people chose to engage (Dweck & Leggett, 1988; Dweck, 2000). A growth mindset is associated with having learning goals, whereas having a fixed mindset leads to more concerns about being perceived by oneself and others as competent and thus leads to a focus on performance goals (Dweck, Chiu, & Hong, 1995; Dweck & Leggett, 1988). So, yes, having a growth mindset does lead people to persist longer on hard tasks, whereas those with a fixed mindset tend to give up more easily and be less likely to attempt a task if they anticipate performing poorly (Dweck & Leggett, 1988; Mangels, Butterfield, Lamb, Good, & Dweck, 2006b; O'Rourke, Haimovitz, Ballweber, Dweck, & Popović, 2014), but this is just one behavioral difference. Those with a growth mindset also have been shown to use better strategies than their fixed mindset peers, are less discouraged by mistakes and failure, are more receptive to critical feedback, and are more likely to seek out new information if it will increase their learning (Burnette et al., 2013; Dweck, 2000; Dweck & Leggett, 1988; Mangels et al., 2006a; Moser et al., 2011; O'Rourke et al., 2014). Thus, the suggestion that having a fixed mindset is better when facing a novel task, as Hattie proposes, is not supported by the literature.

Hattie also does not provide research evidence to back his claim (Hazell, 2017). It is entirely possible that he did reference research and that the journalist chose not to include it. Either way, reporting contrary opinions should be encouraged, but it should be done in a way that helps to extend our understanding by grounding criticism in evidence. When journalists or researchers make claims that are not grounded in a thorough understanding of the literature, or when they fail to back contrary opinions with evidence, it can negatively impact educators by increasing their confusion and mistrust for evidence-based pedagogy.

However, I do believe the question Hattie raises of whether there are cases where a fixed mindset may be more beneficial is an important topic to explore. Since a deep dive into this

question is tangential to the discussion of results from this study, I have included my thinking on this topic in Appendix F.

Limitations and Risks

Although I attempted in this study to create a relatively complete compendium of teaching strategy resources, this study is not without limitations. First, it was conducted over a relatively short period of time. As such, it is possible that the gaps in collected resources were due to needing more time to identify new sources of resources on the internet. More time may also have allowed for the discovery of good resources within known source organizations that had less than optimal search and filter systems.

Another limitation is that all of the interview and focus group participants were college instructors. The purpose of these interviews/focus groups was to learn how applicable a resource was if it was modeled in a different grade level or content area. College instructors were chosen for good reasons, but it would also be important to learn more about high school educators' perceptions of the usefulness and generalizability of the collected resources. Given the lack of resources modeled in the sciences, it will also be important to learn more about science teachers' perceptions of the compendium resources as well.

Additionally, the interviewed participants all had a relatively high level of prior exposure to growth mindset and belonging. In one sense, this was a strength, especially in cases where the individuals had experience introducing these concepts to other instructors. This allowed them to speak from experience about what is needed to help educators who are new to these ideas become interested in trying a new practice. However, it will also be important to understand how useful these resources are perceived to be by educators unfamiliar with growth mindset and belonging research.

Additionally, this study was constrained to growth mindset and belonging promoting resources for practical reasons, but these are by no means the only psychological factors that are important for supporting students to engage fully in learning and to ensure educators can minimize equity gaps in their classrooms. For example, it is also important to expand the framework to include principles and strategies that can ensure students are finding value and purpose in their studies. There is also a need to help educators understand other, non-psychologically based impediments to student engagement so that they can become more effective in targeting their efforts.

This compendium and the framework developed for this study should also be understood as a starting point. There is still much we need to learn about which strategies are most effective for whom and under what conditions. For example, an individual educator trying a specific practice to convey signals that all students belong and can succeed at high levels may be successful within his/her classroom, but if the school policies and practices send contradicting messages (e.g., the school engages in academic tracking or there are discipline policies that disproportionately affect students of color) then this may override any benefits attained within a single class. This could lead the teacher to conclude that he/she was unsuccessful in his/her implementation, when, in fact, the positive conditions they created were simply insufficient to counteract the other signals being conveyed. It is therefore important to help educators understand the potential negative impact of a lack of what Sun (2015) described as *congruence*. Moreover, it may be that in such cases, some strategies may be more impactful than others. More research is needed to develop a more nuanced process for helping educators identify what they should focus on for maximal impact.

It is also not yet clear that a teacher will be successful at truly understanding and integrating growth mindset and belonging strategies into their practice by simply watching a video or reading information. As Willingham (2018) has highlighted, typically when new information is learned, students and teachers alike progress from surface level understanding to a deeper level with time. However, to arrive at the deeper level requires opportunities to apply new knowledge to novel situations and be able to evaluate the impact of this application. Thus, it may be that an educator learning about a new strategy from this compendium alone, in the absence of some form of implementation support from a coach or professional learning community that could provide the necessary self-reflection and feedback, will not experience meaningful changes in his/her practice. This presents a risk in that they may come to believe they are effectively implementing these strategies when they may not—what Dweck has referred to as a *false growth mindset* (Dweck, 2015). Another potential negative outcome is that if teachers develop a false sense of confidence that they are doing everything right yet their students remain unmotivated, they may come to believe the problem lies within the student, the family, or the community, rather than as a result of factors related to their own teaching and within their control.

It is also likely that educators who are completely new to these constructs would benefit from learning at least some foundational concepts from the growth mindset and belonging research through a structured training that includes activities to integrate and apply these ideas with opportunities to receive feedback. This compendium, however, will prove useful in building such a training.

Recommendations

The following list summarizes recommendations for future directions in research, for how those developing resources and tools to help educators apply research insights, and for administrators and policy makers that have been developed through the course of study.

Researchers

- Growth Mindset
 - Continue exploring the conditions under which holding a fixed mindset or a mixed mindset may be more adaptive.
 - Identify developmental differences and subgroup differences (e.g., ethnicity, socioeconomic status, interdependent versus independent cultural orientation) to better understand what forms of praise are most effective and under what conditions.
- Belonging
 - Develop more evidence for what teacher practices and teacher training can help reduce stereotype threat, decrease unintended bias, and improve trust between educators and students, particularly in contexts where race and gender stereotypes may act as barriers to trust and engagement.
 - Identify what teaching strategies may be most effective for counteracting peer-pressure to disengage.
- Develop more efficient methodologies for researcher-practitioner continuous improvement partnerships so that educators who are actively testing new strategies can do so in way that is evidence-generating for themselves and for the research community.

Education Administrators and Policy Maker

- Support the development of a map that could help educators understand how different theories and initiatives link together or conflict with each other.
- Provide educators sufficient resources and support to participate in ongoing professional learning communities that are grounded in evidence and utilize evidence-generating processes.
- Evaluate where school policies and procedures may not be aligned with or promoting growth mindset and belonging norms. Ideally, this evaluation process would be conducted in partnership with researchers using continuous improvement processes so that localized learning can be shared more broadly.

Content Developers and Professional Development Providers

- Adopt the norm, particularly for K12 resources, of providing evidence for the effectiveness of strategy recommendations and, when possible, include supplemental materials to improve implementation ease.
- Optimize website search filters and add search tags to internet-based resources that will allow growth mindset and belonging promoting teaching strategies to be more easily identified by educators searching local websites and conducting general internet searches.
- Develop more resources for high school and college contexts.
- Develop more resources that provide guidance on how to implement growth mindset and belonging teaching strategies in science content areas.

Closing Thoughts and Future Directions

Using a framework developed through a review of the existing literature, this study sought to identify open-access internet resources that could help educators better understand how

to create classroom norms that support a growth mindset and students' sense of belonging. In so doing, important gaps in available resources emerged, such as for higher grades, science content areas, and teaching strategies such as growth mindset language and teacher caring strategies that can improve teacher-student trust. The document analysis also highlighted the need for a higher standard of evidence to be included in resources directed toward K12 educators.

The interviews with college level instructors revealed that resources can be valuable even when modeled in a different grade level or content area. However, for educators who are new to these constructs, more content and grade level resources would be beneficial. The interviews also highlighted overlaps between the proposed strategies and other frameworks as well as concerns with critiques of the research foundations for some strategies. Helping educators understand these overlaps and critiques will continue to be an important area for future work, as will additional research to clarify where boundary conditions for recommended strategies may exist.

Our understanding of which strategies are most effective and under what conditions will be greatly enhanced if we can use this fledgling compendium of resources in a way that will allow educators to test them in their local context while also receiving implementation feedback that can help them know if their changes in practice are effective. Ideally, this learning process should be designed in such a way that teachers using this compendium can incorporate their learning about which strategies are most effective and under what conditions into the larger body of knowledge. Supporting this kind of knowledge generation will require building more efficient and systematic processes for researcher-practitioner partnerships. One group currently working on developing a system to facilitate this kind of ongoing continuous improvement is PERTS, and the resources in this compendium may well prove useful for their newest innovative project.

This compendium may prove valuable as a starting point for sharing evidence-supported resources, but it should continue to be expanded and refined as our knowledge grows and as more time can be spent reviewing available resources. My ultimate goals are to see this compendium continue to grow and improve, and I would like to see these resources used in combination with other forms of teacher training and support. To reach these goals, I am actively collaborating with organizations such as PERTS, Education First, and the Mindset Scholars Network. I may also seek funding to develop a website that can host this compendium. Additionally, although many excellent content creators are actively developing new video resources, I believe there is still a vast, untapped potential to develop more resources and to help educators share the new strategies they develop more easily.

Appendix A. Growth Mindset and Belonging Teaching Principles and Teaching Strategies

Mindset	Teaching Principle	Principle Description	Teaching Strategies	Strategy Description
Growth Mindset	High Standards for All	Practices that signal an expectation that all students can achieve at a high level.	<p>Mixed Ability Grouping / All Students Participate (Boaler, William, & Brown, 2000; Sun, 2015)</p> <p>Open (Open-ended) Task Structures/ Encouraging Critical Thinking (Boaler, 1998; Ramirez, Hooper, Kersting, Ferguson, & Yeager, 2018; Sun, 2015)</p>	<p>Placing students of different ability levels into working groups and using structured processes to ensure all students participate which creates a norm that all students can contribute. Note that benefits may be mediated by teachers' expectations of students' ability to succeed and structuring tasks to affirm that multiple approaches to mastery are possible.</p> <p>Structuring learning tasks so that they have more than one right answer, more than one way to arrive at the right answer, or more than one way to reach learning target. Asking questions that probe for more than a single right. Training students to be able to explain how they arrived at their answer regardless of whether it is right or wrong.</p>
Growth Mindset Language		Using language that focuses students on learning as a process and builds a classroom culture of embracing challenge, learning from mistakes, and focusing on effective strategies for growth.	<p>Use Process Praise, Minimize Person Praise (Brummelman et al., 2014; Mueller & Dweck, 1998)</p> <p>Support Risk-Taking and Resilience to Mistakes & Failure (Haimovitz & Dweck, 2016; Moser, Schroder, Heefer, Moran, & Lee, 2011; Mueller & Dweck, 1998; Sun, 2015)</p>	<p>Using language that focuses students' attention on the strategies, skills, and effort they use to achieve success. Minimize the use of language that attributes students' success to traits perceived as stable (e.g. smartness) which can negatively affect resilience.</p> <p>Using language that creates a classroom norm that emphasizes the benefit of struggle, risk taking, learning from mistakes. Allowing students to persevere through confusion or frustration rather than immediately providing solutions. Providing opportunities for students to reflect on and learn from mistakes individually and as a class so they are seen as an integral part of learning.</p>

Mindset	Teaching Principle	Principle Description	Teaching Strategies	Strategy Description
Growth Mindset	Effective Feedback	Practices that cultivate students' capacity for self-regulated learning and that helps students to: know what the learning goals are; accurately assess their current progress towards those goals; and know what next steps they can take to reach their learning goal.	<p>Clear Goals and Formative Feedback Opportunities (Butler, 1988; Goodman et al., 2004; Nicol & Macfarlane-Dick, 2006)</p> <p>Develop Self-Regulated Learning Skills (Deci et al., 1999; Nicol & Macfarlane-Dick, 2006)</p>	<p>Providing students opportunities for feedback on their progress towards clearly defined learning goals (e.g. feedback in the absence of a grade and/or opportunities to improve on assignments). Providing exemplars and clear evaluation criteria. Providing feedback that pushes students to deepen conceptual understanding so they can generalize knowledge to novel contexts (e.g. providing task-specific feedback during early stages of learning and more conceptual feedback during later stages of development).</p> <p>Developing students' skills for self-evaluation and identifying strategies for progressing independently towards learning goals. For example, providing self-assessment and planning opportunities; having students indicate the kinds of feedback they prefer; using self-reflective grading practices such as portfolio compilation; developing students' prioritization skills; having open discussions about learning processes and strategies. Minimizing the use of extrinsic rewards which don't provide students with information on how to improve and have been shown to reduce intrinsic motivation and subject interest.</p>
Belonging	Teacher Caring and Respect	Practices teachers use to get to know students and let them know they care about them, believe in them, and respect them.	<p>Convey Belief in Students' Competence / Reduce Ambiguity (Yeager et al., 2014)</p>	<p>Providing assurance that the expectation is that all students can succeed at high levels. Mitigate the potential for students to misinterpret feedback as signaling criticism or dislike by explicitly conveying that the intention for providing critical feedback is to help students improve (e.g. "I have high expectations and I know you can reach them"). May be especially impactful for students susceptible to stereotype threat.</p>

Mindset	Teaching Principle	Principle Description	Teaching Strategies	Strategy Description
Belonging	Teacher Caring and Respect Continued		<p>Form Connections with All Students (Furrer & Skinner, 2003; Kohli & Solórzano, 2012; Wirth, Sacco, Hugenberg, & Williams, 2010)</p> <p>Empathic Discipline / Prioritize Trust (Okonofua, Paunesku, & Walton, 2016)</p> <p>Normalize Belonging Uncertainty in New Settings (Walton & Cohen, 2011; Yeager et al., 2014)</p>	<p>Taking conscious steps to ensure all students receive signals of teacher caring. Examples include: making eye contact with students, addressing students by name and checking to make sure you are pronouncing their names correctly, getting to know about students' interests outside of school, highlighting shared interests with students, and sending home an introduction letter that address students by name (K12).</p> <p>Seeking to gain an understanding of students' perspective and the negative feelings they might be experiencing that give rise to misbehavior before administering discipline. Avoiding chastising students in front of peers and considering the important role teachers can play in maintaining students' trust in their teachers and identification with school.</p> <p>Helping students understand that it is normal to feel belonging uncertainty when transitioning to new environments and that this typically passes with time so that students don't over interpret ambiguous social cues as evidence they don't belong.</p>
Belonging	Peer-to-Peer Belonging	Practices that help students get to know each other and that establish a classroom norm of students supporting each other's learning.	<p>Cooperative Learning Tasks (Johnson and Johnson, 1999, 2009)</p> <p>Peer-to-Peer Feedback and Support (Furrer, Skinner, & Pitzer, 2014; Wentzel & Caldwell, 1997)</p>	<p>Providing opportunities for students to work in small teams on learning tasks that help students see their individual success as tied to the success of their team. For example, having shared goals, sharing joint rewards, dividing resources, and/or having complementary roles. Actively training students on how to be effective collaborators (e.g. strategies for assigning project tasks, project management techniques, and skills for addressing creative differences respectfully).</p> <p>Training students on how to give feedback that is kind, specific, and helpful. Training students to differentiate between task specific and conceptual feedback.</p>

Mindset	Teaching Principle	Principle Description	Teaching Strategies	Strategy Description
Belonging	Peer-to-Peer Belonging Continued		Increase Peer-to-Peer Connection (Gehlbach et al., 2016; Walton, Cohen, Cwir, & Spencer, 2012)	Increasing social connectedness between students by helping them identify shared traits, interests, or other similarities, even trivial ones such as shared a birthday. Helping students learn about their peers' different cultural backgrounds.

Appendix B. Educator Interview and Focus Group Protocol

GENERAL INTRODUCTION (5 MIN)

- Thank you for offering to participate in an interview.
- As you know, for my dissertation research, I am creating a compendium of research-informed, practical teaching strategies for fostering growth mindset and belonging across grade levels and content areas.
- The impetus for this project came from seeing firsthand that many educators are hungry to integrate growth mindset and belonging into their teaching, but that there are very few models available to guide them on how to enact specific practices in a variety of contexts. Also, many of the video models available are from schools that are not necessarily reflective of schools serving high numbers of minority students.

REASON FOR THE INTERVIEW

- I have collected a number of practices for this compendium and I would like you to view a selection of them (two or three depending on how much time they have) and share your perceptions of whether this practice could be useful for your context.

ASK PERMISSION TO RECORD & GET SIGNED CONSENT [IF NOT ALREADY COLLECTED]

- As I mentioned in the email, before we get started, I'll need to get you to sign a consent form. Also, just to confirm, you understand that I will be audio recording our interview. If there are quotes from our interview that I think would be useful to include in the final compendium, I will share the specific quote with you to get your final approval for its inclusion.
- Have them sign form.

PARTICIPANT INTRODUCTION

Before we begin, I'd like to learn a little about you.

- How long have you been teaching?
- What subject do you teach?
- Tell me a little bit about your students and the community you teach in? Probe for:
 - What type of school
 - Demographic make up
 - SES level

FOR EACH PRACTICE: (~30 min per practice)

EXPLAIN [First time only]:

In a moment, I'm going to share one of the practices with you and what I'd like to invite you to do is to verbalize your thoughts as you are watching the video (or reading the practice if it is text based) in an unfiltered way. That is, simply speak your thoughts out loud as you watch reflect the video. If it feels a little odd at first, that's normal. But please know that for me, there are no wrong reactions: frank criticism or even negative reactions are often the most useful. I

want to hear whatever you think because you are the expert; you know your students and what kinds of practices will make the most sense for them.

DO THINK ALOUD

For focus groups, set a timer to allow each person 1-2 minutes to share their reactions to the practice.

ASK FOLLOW UP QUESTIONS:

1. Overall, how useful do you think this practice would be for your teaching practice?
2. How might you implement it in your context?
Probe for:
 - a. What iterations would you make to the materials?
 - b. What steps would they take to prepare?
 - c. When in the semester do they think it would be most useful?
3. What, if any, aspects of it might not be effective with your students/in your classes? Why?
Probe for:
 - a. Specific segments of the video that raise concerns or would need to be modified.
 - b. Particular students that they think it would be less effective with and why.
4. Are there additional materials you think would improve the effectiveness of this practice?

5 MINUTES BEFORE END

- Are there any final thoughts about your practice that you would like to share before we end?
- Do you have any questions for me?

Thank them for their time.

Appendix C. Educator Invitation

Dear [NAME],

I am reaching out to ask if you would be willing to participate in a 45- to 60-minute interview or 60-minute focus group as part of my dissertation research study.

About my Study: I will be creating a compendium of research-informed, practical teaching strategies for fostering growth mindset and belonging across grade levels and content areas. I am collecting practices through a document analysis of free, online resources and am inviting educators to view a selection of these practices (two or three, depending on your available time) to learn about your perceptions of whether these practices could be useful for your context.

The impetus for this project came from seeing firsthand that many educators are hungry to integrate growth mindset and belonging into their teaching, but that they lack accessible, concrete resources to guide them in doing so effectively. Simultaneously, I have also observed that often existing video resources of teachers modeling a practice are from more highly resourced schools. My goal is to build a broadly useful compendium that can help educators in all school and community contexts implement the recommended strategy. Therefore, I would like to learn from expert educators such as yourself how applicable the practice could be in a different context.

What's Involved: If you would be willing to be interviewed or participate in a focus group, please let me know by [RESPONSE NEEDED BY DATE]. Please also let me know if any of the times below will work for you. [LIST SUGGESTED DATES AND TIME]. If none of these work for you, let me know some alternatives that are better.

If you choose to participate, we could schedule our interview [DESCRIBE OPTIONS FOR MEETING. E.G. ONLINE VIDEO CALL, OR IN PERSON]. The interview will be audio recorded.

Thank You Gift: If you participate, I will send you a \$25 Amazon gift card to express my appreciation for your time.

Potential Impact: The resulting compendium of practices will be shared through free, online sites such as the PERTS Mindset Kit, the Mindset Scholars Network, and Sevenzo. These sites reach thousands of teachers! If you choose to participate, your contribution could help educators throughout the United States and beyond learn new research-informed strategies for creating more motivating learning environments.

If you would like any additional information about the project before deciding, please let me know. Thank you for considering my request

Thank you,
Jacquie

Appendix D: Consent Form

University of California, Los Angeles
CONSENT TO PARTICIPATE IN RESEARCH

Study Title: Building a Compendium of Teaching Practices
That Foster a Growth Mindset and Belonging

Faculty Sponsors:

Kathryn M. Anderson-Levitt, Ph.D., and Gerardo Ramirez, Ph.D. from the Graduate School of Education & Information Studies at the University of California, Los Angeles (UCLA) are conducting a research study.

You were selected as a possible participant in this study because of your expertise at fostering a growth mindset and sense of belonging in your classrooms. Your participation in this research study is voluntary.

Why is this study being done?

The goal of this research study is to create a compendium of research-informed, practical teaching strategies for fostering growth mindset and belonging in classrooms across grade levels and content areas. I am collecting practices both through interviews with educators such as yourself to learn about practices they have developed, and through a document analysis of existing online resources. The impetus for this project came from seeing firsthand that many educators are hungry to integrate growth mindset and belonging into their teaching, but that they lack accessible resources to guide them in doing so effectively. Simultaneously, I have also observed that many educators like yourself have developed excellent practices, but often lack an easy way to share out their practices with other educators.

What will happen if I take part in this research study?

If you volunteer to participate in this study, the researcher will ask you to do the following:

Participate in a 45-60-minute interview. Interviews may be in-person (held in an on-campus building at your school site, or a public space like a library), or may be entirely online through video-chat.

You will first be asked about the subject and grade level that you teach and to describe your school site and general student characteristics. You will then be asked questions about the strategy(ies) you have developed to foster a growth mindset and sense of belonging in your classes, how you implement it, what changes you observed in your students after implementing this practice. You may also be asked if you would be willing to share any materials you have created that would help other educators implement the practice you share.

How long will I be in the research study?

Participation will take a total of about 45-60 minutes and possibly a follow up short conversation or email exchange to obtain your consent to share a segment of the interview.

Are there any potential risks or discomforts that I can expect from this study?

There are no anticipated risks or discomforts.

Are there any potential benefits if I participate?

You may not directly benefit from participating in this research study, but the knowledge gained from this study may help other teachers become more effective at increasing their students' motivation and achievement.

Will information about me and my participation be kept confidential?

Any information that is obtained in connection with this study and that can identify you will remain confidential. It will be disclosed only with your permission or as required by law. Confidentiality will be maintained by means of storing all identifying information and recordings on a password-protected computer and server.

What are my rights if I take part in this study?

You can choose whether or not you want to be in this study, and you may withdraw your consent and discontinue participation at any time. Whatever decision you make, there will be no penalty to you, and no loss of benefits to which you were otherwise entitled. You may refuse to answer any questions that you do not want to answer and still remain in the study.

Who can I contact if I have questions about this study?

The research team:

If you have any questions, comments or concerns about the research, you can talk to the one of the researchers. Please contact:

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UCLA Office of the Human Research Protection Program (OHRPP):

If you have questions about your rights as a research subject, or you have concerns or suggestions and you want to talk to someone other than the researchers, you may contact the UCLA OHRPP by phone: (310) 206-2040; by email: participants@research.ucla.edu or by mail: Box 951406, Los Angeles, CA 90095-1406.

You will be given a copy of this information to keep for your records.

SIGNATURE OF STUDY PARTICIPANT

Name of Participant

Signature of Participant

Date

SIGNATURE OF PERSON OBTAINING CONSENT

Name of Person Obtaining Consent

Contact Number

Signature of Person Obtaining Consent

Date

Appendix E. Compendium of Growth Mindset and Belonging Teaching Resources

The compendium is an online, open-access Google spreadsheet which can be accessed by visiting <http://tiny.cc/Compendium>. The spreadsheet is locked to prevent users from making changes. This disables the sorting options, therefore, to take full advantage of the sort functions, please download the spreadsheet as an Excel spreadsheet.

Appendix F. Are there Situations where a Growth Mindset is Less Helpful?

Hattie has proposed that there are some situations in which a fixed mindset may be more beneficial (Hazell, 2017). In this section, I will discuss what is known about such situations, and I add my personal reflection on when this has been true in my own life as an anecdotal foundation to hypothesize on areas where more research may be beneficial.

When Might a Fixed Mindset Be Helpful?

Obviously, there are limitations on the malleability of some traits. For example, no amount of effort or learning of new strategies beyond purchasing a pair of platform shoes will significantly change one's height. In fact, between the ages of 30-70, it is typical to lose between 2-3 inches in height. And while healthy eating and exercise may slow this process, evidence so far suggests it will not prevent it (Briot, Legrand, Pouchain, Monnier, & Roux, 2010). Aging may be another example of where believing too fervently that you can change a trait may not be helpful and could even lead to decreased well-being if one persists at trying to reverse the inevitably declines that await us all. In a 2015 Google talk, Dweck indicated that there is, indeed, research showing that accepting the declines that come with aging is one area where a fixed mindset is associated with higher well-being. Another area is sexual orientation because a fixed mindset leads individuals to be more accepting of who they are (Google, 2015)¹¹.

The role of beliefs about aging is interesting to consider because it makes sense that accepting the inevitable would be more adaptive. However, considerable research by Ellen Langer and others has also shown that adjusting one's beliefs about the nature of aging can have a significant positive impact on health outcomes and longevity (For an overview of Langer's work, see (Grierson, 2014).

¹¹ I was unable to locate the studies Dweck references, so I chose to cite this talk instead.

What this suggests to me is that maybe we need to shift away from thinking about fixed and growth mindset as mutually exclusive or dichotomous and instead consider that perhaps there are some situations where believing a trait is both relatively fixed, but also somewhat malleable may be more adaptive. In other words, for traits or conditions that may be difficult or slow to change, it may be more adaptive to be accepting of the somewhat fixed nature of the condition if it increases ones' patience and self-compassion. Holding too tightly to a belief in the malleability of such traits or conditions could conceivably lead to higher levels of self-judgment and stress.

A Personal Anecdote on When a Mixed Mindset May be More Helpful

This proposal for the possible advantages of what I will tentatively call a “mixed mindset” is based on my own long journey to make sense of being diagnosed with posttraumatic stress disorder (PTSD) from complex early childhood trauma. I am a staunch believer in the benefits of operating with a growth mindset, and in post-traumatic growth—the view that when traumatic experiences are integrated it can lead to increased resilience, and to developing a deeper understanding of oneself, the world, and how to relate more effectively to others (Calhoun & Tedeschi, 2014). However, for many years (I was first diagnosed 20 years ago), I was convinced that I could overcome PTSD permanently with a couple years of therapy, and that, in fact, I had. But inevitably a triggering situation would come out of left field and set off an internal psychological explosion that could take me down for days, or even weeks. My belief that a quick and full recovery was possible was due in part due to well-meaning therapists who shielded me from the truth about this condition in order to keep me hopeful. Perhaps this was appropriate at the time—there is no way to know for sure. But what I know now was especially unhelpful was the widely espoused theory that if you experience negative stress from trauma it is

because you are thinking about the trauma in an unhelpful, victim-oriented ways, and that one can effectively overcome trauma simply through changing how one is thinking (also called reappraisal). This belief is still widely held and was recently the subject of a Mindset Works blog promoting this method of treatment as a growth mindset approach to trauma recovery (Bindreiff, 2017).

In my opinion, this perspective grossly over simplifies the complex social landscape many children and young adults living in abusive situations face as they try to untangle what they do and do not have control over while also trying to make sense of both loving and being terrified of their primary attachment figure. It also leaves out the physiological reactions to trauma that have nothing to do with how you interpreted the trauma. For example, a few years ago I was laying on a massage table deeply relaxed while receiving a massage when, out of nowhere, I was flooded with panic and unable to breath. This happened because when the massage therapist began working on my neck, it triggered a flashback of being strangled when I was five to the point of starting to pass out and believed I was about to die. I assure you, when this flashback happened, even though it was 45 years after the original incident, there was no cognitive appraisal taking place. Appraisal and reappraisal require the prefrontal cortex (PFC) to be online and mediating the signals being sent to the amygdala (Van Der Kolk, 2002). During intense trauma or flashbacks like this one, the older, faster part of our brain that scans for and detects threats to our safety—the reptilian brain—decides the PFC is too slow to participate in the decision-making process and sends all sensory information directly to the amygdala which then send the body into fight/flight/freeze in order to improve survival odds (Van Der Kolk, 2002).

Making sense of such experiences afterwards most definitely does involve higher level cognitive processes, and reappraisal therapies like cognitive behavioral therapy (CBT) are well

established methods for improving trauma recovery but so are CBT approaches that incorporate mindfulness training such as dialectical behavioral therapy (DBT). Mindfulness approaches help with increasing awareness of the physiological processes that occur during stress and focus attention in the present moment to acceptance without judgment. Mindfulness practices can reduce physiological arousal and improve emotion regulation by improving one's ability to detect early warning indicators of triggering (Vujanovic, Niles, Pietrefesa, Potter, & Schmertz, 2016). But it does a disservice to those living with the physiological aspects of PTSD to suggest that if you are still having reactions like this, or the even more pernicious trauma reflex to dissociate, it is because you are thinking in a flawed way.

I now believe that holding an unrealistic expectation for a quick and full recovery—holding too tightly to a growth mindset perspective—actually slowed my recovery progress because each time I faced a recurrence I had the added stress of self-judgment for my ‘failure’ believing it was because I was not ‘trying hard enough’ or ‘changing my thinking’ in the right way. This excessive focus on changing my thinking also prevented me from learning about the neuroscience of how trauma affects the brain and nervous system, particularly when it occurs in early childhood. The greatest recovery advances came for me when I accepted my condition as likely to be with me for a long time—a more fixed mindset perspective—because then I began a rigorous process of strategizing on how to rewire my nervous system beyond just changing my thinking. I also began identifying strategies for minimizing triggers, for managing the symptoms when they did occur which vastly improved my recovery time, and accepted that the process of deactivating triggers is a slower, and less predictable, than I would like.

I have devoted a significant amount of discussion to this topic because I believe improving our understanding of when more of a fixed mindset perspective may be helpful could

have important implications for educators. While the evidence is strong that it is advantageous to help students develop a growth mindset about abilities, especially for students at risk of low achievement and for those from low socioeconomic backgrounds, there is still more to learn about the boundary conditions. For example, we know less about the impact of encouraging a growth mindset belief in students with learning disabilities. I know from the many questions I get when leading workshops on growth mindset that this is a topic many educators care a great deal about. I could imagine a scenario similar to what I experienced where a teacher strongly promotes a growth mindset belief with a student with a learning disability, and that this could lead that student to feel *more* self-judgment for their slower progress, not less. This could be especially true if the student perceives any judgment from their teacher for not improving quickly enough, or if they see their peers advancing more quickly. Similarly, for students of color living in a society laden with structural racism and who may regularly face both implicit and explicit bias, sending them a growth mindset message that in any way implies that their negative emotions in response to these traumas is due to their own flawed thinking seems unhelpful, to say the least.

Therefore, while I don't agree with the analogy Hattie provided, there is a small amount of evidence that a fixed mindset may be beneficial in some areas, and I believe more research is warranted to explore if there are education-related contexts where more of a mixed mindset, or even a fixed mindset, may be more adaptive. In the meantime, we should be mindful of how we—researchers, journalists, and educators—talk about this and other areas where our understanding is still growing so that we avoid creating unnecessary confusion and dissonance for practitioners trying their best to do right by their students.

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