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CHAPTER 19

A Social Psychological Approach to Educational Intervention

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The causes of academic underperformance are a major concern of the educational community and policy makers in the United States. Of particular importance is the achievement gap between at-risk minority students and European American students and its potential remedies. Academically at-risk minority students, such as African Americans and Latino Americans, perform almost a standard deviation below European American students on intelligence tests and earn school grades below those of their European American peers (Jencks and Phillips, 1998; Nisbett, 2009). Between the years 2004 and 2007, while 6 out of every 100 European American young adults had not received a high school diploma or its equivalent, the corresponding figures for African Americans and Latino Americans were, respectively, 10 and 22 out of every 100 in their ethnic group (U.S. Department of Education, 2009). These achievement gaps persist in spite of the local and national initiatives aimed at closing them (Dillon, 2006; Neal, 2005). In a society such as that of the United States, where economic opportunity depends heavily on scholastic success, even a partial remediation of the achievement gap would lead to a positive change in the lives of many at-risk children.

Our research focuses on the impact that social-psychological factors have on the academic outcomes reflected in this gap (Cohen and Garcia, 2008; Cohen et al., 2006; Walton and Cohen, 2007). At the heart of our effort lies the notion of the classroom as a tension system in which various factors, including structural factors such as classroom size and psychological factors such as student perceptions, interact to produce a stable environment that elicits a consistent set of attitudes, behaviors, and outcomes over time. Differences among groups arise from consistent differences both in their objective experience and in their subjective perceptions. These notions can aid us in understanding student performance and help us to develop effective educational practices. They suggest an approach to the achievement gap that we have found to be productive and that has important social policy implications for addressing the pressing social problem of underperformance. Before reviewing our work, we will discuss the idea of a tension system and its relevance to academic performance.

The Classroom as a Social Tension System

Social environments, classrooms included, can be viewed as tension systems consisting of forces in a dynamic state of interaction that remains relatively stable over time (Lewin, 1948, 1951; Ross and Nisbett, 1991). Generally social tension systems transcend single instances. Children, for example, expect to be in a classroom with their teacher through the year. Also, tension systems consist of forces that are unique to them and of other forces that are more general in nature, such as cultural norms and moral codes. In the United States, for instance, the classroom is seen as an environment designed to develop the appropriate and necessary social and intellectual competencies of individuals of a particular developmental stage. It is assumed that a number of forces or factors will be present to promote this goal, including trained instructors, appropriate teaching materials, an adequate physical space, and a program of learning that consists of goals and milestones. Beyond these general factors are others unique to individual classrooms, such as the teacher's personality, the demographic makeup of the students in the classroom, the curriculum priorities of the school, and the administrative leadership.

The forces in a social tension system can facilitate or restrain a given outcome. In both the classroom and the larger school environment, there are a number of

forces that can help or hinder academic performance. Schools are systems that, while designed to promote learning, can also contain forces that make their tasks difficult, or in some cases impossible, to accomplish. For example, a school can lack sufficient material resources to provide students and teachers the necessary tools to reach the desired level of performance, or the environment may be so threatening that students and teachers are unable to overcome it. In interaction, these forces shape the learning environment and determine the overall level of performance of its students. At a macro level, overarching social factors in the form of educational policy, social organization, and political ideology can constitute facilitating or restraining forces in the classroom. Ideas about appropriate class size, the importance of standardized testing, and the impact of socioeconomic class, gender, and ethnic distinctions affect the classroom environment to one degree or another. For instance, the accountability movement, which issued from theories of academic achievement and achievement gaps, has had a large impact on the classroom through its effect on curriculum priorities, teaching methods, and the frequency of standardized testing.

A social tension system that appears fixed has reached a point at which the interaction between its facilitating and inhibiting forces has stabilized. However, this state of balance can be altered or tipped by any number of events that trigger a change in the relationship among the factors, thus leading to a new state of balance or status quo. For instance, the intensity of a particular force can change, or a new force can be introduced. Student motivation could increase, for example, when an esteemed role model visits the school (Lockwood and Kunda, 1997), or teacher preparation could be raised with an increase in subsidies for professional development. The point is that while a social environment, like a classroom, may appear relatively static and resistant to change, it often is not.

To bring about change in an environment, three aspects of tension systems need to be kept in mind. First, because tension systems involve complex interactions among forces, individual forces can impede or amplify one another (Ross and Nisbett, 1991). Social approval from peers, for example, can facilitate school achievement in a context where such approval is tied to academic success. On the other hand, social approval can restrain school achievement in contexts where peers disapprove of academic success or where their approval can be more readily won in some other domain, such as sports. The effect of a given force, in this case social approval, is in large part dependent on context. For instance, Fryer and Torelli (2005) found that academic success was associated with lower popularity for ethnic minority students when they attended predominately White schools, but not when they were in predominately minority urban schools. Although many interpretations are plausible, differences in the salience of race in these different types of schools may affect how high achievement is perceived by students.

Because of the interactive nature of tension systems, processes can, for good or ill, feed off one another's effects. This can convert small initial differences between individuals and groups into large and long-term ones, thus exacerbating inequality. This is especially the case in environments that allocate rewards and punishments based on merit and that define merit largely in terms of observable performance along a few set criteria. For instance, students who begin school slightly ahead in academic preparation may be given opportunities and provided with higher expectations, while their low-achieving peers are assigned to low-expectation tracks and viewed as less able and less worthy of attention and mentoring (Rosenthal and Jacobson, 1992; see also Jussim and Harber, 2005; Woodhead, 1988). As a consequence, lower-achieving students could then perform still worse, which in turn could reinforce teachers' expectations, in a potentially repeating cycle. Each of these situations reflects a recursive process in which the "rich get richer" or "poor get poorer." In this way, an "underachieving environment" can emerge in the latter case and call forth consistent underperformance from some groups of students. Some support for this notion is found in the finding that low-achieving boys entering a new grade may show a large gain in performance by apparently leaving behind the norms, expectancies, and channels of their previous classroom (see Dweck et al., 1978). This cycle may also help to explain the downward spiral in performance commonly observed in junior high school (Eccles, Lord, and Midgley, 1991), particularly among minority students (Simmons, Black, and Zhou, 1991). This period is a time when school becomes more evaluative, the performance standards shift upward, and failure processes become more likely to feed off of one another.

The second aspect of tension systems to keep in mind when attempting to effect change is that many of the forces in a system go unobserved or underappreciated until efforts to change it are made (Ross and Nisbett, 1991). As Kurt Lewin remarked, "If you want truly to understand something, try to change it." The *Move to Opportunity* program provides an example of this phenomenon. The program was designed in part to offer disadvantaged children educational opportunities by providing poor families the chance to move to less impoverished neighborhoods. This program has had many positive effects, but the hoped-for long-term effects on children's academic test scores did not materialize (e.g., see Sanbonmatsu et al., 2006). This lack of improvement may have occurred because of underappreciated restraining forces involved in the situation. On moving to their new neighborhoods, poor families are faced with a number of pressing priorities, such as remaining close to relatives and friends, which can restrain their ability to identify and act on the new academic opportunities available to their children.

Finally, although objective structural factors obviously affect behavior, the mental and psychological processes of individuals are also critical elements in a social tension system and thus must be considered in predicting the effects of such systems on behavior (Ross and Nisbett, 1991). With respect to the classroom, while such processes include the student's level of intellectual ability, psychological factors not directly related to ability can also affect performance. These form what we call the individual's *psychological environment*—that is, their perceptions of themselves and their environment. Among the most important of these are factors related to people's perceptions of the fairness of their social environment (Tyler, this volume; see also Cohen and Steele, 2002; Huo et al., 1996; Tyler, 2004). Indeed, perceptions of whether fair procedures are used in making decisions and allocating rewards and punishments are consistently a better predictor of compliance and internalization of organizational norms than are the actual allocated rewards and punishments (Huo et al., 1996). Also, one of the strongest predictors of people's compliance with authorities in an organization, such as students' compliance with teachers in their school, is their perception of procedural justice, the perceived fairness of the processes and procedures in their environment.

Moreover, the social psychologists Al Bandura and Carol Dweck have documented how psychological processes can shape students' perceptions of the academic environment and affect their intellectual performance (Bandura, 1986; Dweck, 1999). For instance, two children with the same level of ability and confronted with the identical objective level of failure can respond in a completely different ways due to differences in their psychological functioning. Students with low self-efficacy—those who doubt their ability to succeed in school—or students who believe that their level of intelligence is a fixed quality, are more likely than their peers to give up, persevere in ineffective strategies, experience negative emotion, and fail to return to their original performance level following failure. By contrast, students with high self-efficacy, or those who believe that intelligence is a malleable quality that expands with practice, are more likely to view a situation as a challenge, try harder, entertain novel strategies, and return to and even exceed their original performance level.

In summary, both social structural factors and psychological factors have a large impact on performance. Many psychological factors, as we will see, can act as powerful restraining forces, preventing positive forces in both the student and the environment from asserting their full impact on behavior. Just as drag can prevent a car from achieving its top speed and efficiency, psychological forces can lessen the efficacy of a school system. Psychological forces can, on the other hand, also have substantial impact by acting as tipping or triggering agents that permit the positive forces to fully assert themselves.

The Minority Achievement Gap

The notion of the school as a dynamic tension system informs many current educational initiatives, interventions, and policy aims. It is evident in policies to reduce the number of students in a class, provide school meals, and increase parents' involvement in their children's education. These policies assume that the school environment is complex, and that key environmental factors interacting with the student affect the system's overall performance.

The notion of school as a tension system is also evident in analyses of the persistent achievement gaps found in American classrooms. One of the more accepted explanations for the gap in academic achievement between White and Asian students on the one hand, and their African American and Latino American peers on the other, is that it is primarily due to differences in socioeconomic status (SES). Central to this explanation is the idea that there are factors linked to SES that can interact with the classroom in ways that affect a child's academic performance. Among these are the presence of college-educated adults who can serve as role models or resources, the availability of books in the home, the level of vocabulary and the amount of social engagement, Socratic questioning, and negotiation that occurs in the family (Brooks-Gunn and Furstenberg, 1986; Gordon and Lemons, 1997; Hart and Risley, 1995). While low SES does predict lower academic performance, it does not sufficiently explain the performance differences between certain groups. Critically the SES explanation offers a testable hypothesis that can be stated as follows: when a significant number of individuals from these lower performing racial or ethnic groups attain middle-class SES and above, the performance differences between them and European-Americans and Asian-Americans will diminish significantly or cease to exist. Much to the disappointment of many, the authors included,

this has not occurred to the degree one would expect given changes in the economic status of racial and ethnic minorities. At every level of social economic status in the United States, the racial and ethnic achievement gap persists in spite of the increasing number of minority individuals attaining middle-class and higher status levels (Hacker, 1995; Jencks and Phillips, 1998; Nisbett, 2009; Steele, 1997; see also Bowen and Bok, 1998).

Given this, we revisited the problem of the achievement gap to reconsider the factors at work in the classroom and how these might interact to produce the gap. Our thinking shares the emphasis on the importance of the situation at the heart of the SES explanation: the individuals in lower-performing ethnic and racial groups are not inherently less capable of performing well.

A Social Psychological Constraint on Performance: Identity Threat

The work of Claude Steele and his colleagues provided an intellectual underpinning for our initial thinking and the research results to buttress it. In a series of what have become seminal studies, Steele and his associates Joshua Aronson and Steve Spencer demonstrated that the achievement gap between African Americans and their European American peers on standardized intellectual tests, and between males and females on the math portion of these tests, could be dramatically lessened by altering the *psychological environment* (Steele, Spencer, and Aronson, 2002; see also Davies, Spencer, and Steele, 2005; Schmader, Johns, and Forbes, 2008).

Members of such groups may worry that their poor performance could confirm the negative stereotype about their group in the eyes of others, a preoccupation called *stereotype threat* (Steele, Spencer, and Aronson, 2002). This threat can cause stress that undermines performance. As a consequence, altering the psychological environment to render the stereotype irrelevant can boost performance. In a study conducted by Steele and Aronson (1995), African American college students were told that the Graduate Record Exam (GRE) they were about to take was "diagnostic of academic ability." This raised the possibility for them that they could reinforce a negative stereotype about their race's intelligence if they performed poorly. This preoccupation led African Americans students to perform at only half the level of European American students, controlling for prior ability level as roughly measured by previous test scores. However, African Americans' performance equaled that of European American students (again controlling for prior ability level) when the same test was presented as "non-diagnostic of ability," that is, irrelevant to the stereotype. Similar effects were shown for the performance of female college students on a difficult standardized math test in a series of studies conducted by Spencer, Steele, and Quinn (1999). Women's performance on a math test was significantly lower than that of their male peers. By contrast, when informed that the same test produced no gender differences—that men and women performed equally on it—women achieved a level of performance equal to that of men. Such effects have been documented among other stereotyped groups, including Latino Americans (Schmader and Johns, 2003; see also Aronson, 2002) and low-SES students in school (Croizet and Claire, 1998), high-performing White students reminded of the stereotype of Asian superiority in math (Aronson et al., 1999), and White men in the domain of sports (Stone et al., 1999). Stereotype threat has been replicated in more than a hundred studies and tends to occur on relatively difficult tasks that pose the risk of confirming a stereotype (Ben-Zeev, Fein, and Inzlicht, 2004; O'Brien and Crandall, 2003; Spencer, Steele, and Quinn, 1999). Among the replications are recent studies by a variety of investigators (e.g., Grimm et al., 2009; Rydell, McConnell, and Beilock, 2009; for reviews, see Schmader, Johns, and Forbes, 2008; Shapiro and Neuberg, 2007; Steele, Spencer, and Aronson, 2002; Walton and Cohen, 2007; Walton and Spencer, 2009).

This research provided a basis for our examination of the classroom as a social tension system. It highlights the idea that if outcomes differ systematically for groups of individuals in a social environment, then what appears to be the same environment for everyone may in fact be different. That is, social environments can differ radically both objectively and psychologically for the groups in them. It is not difficult to think of ways that this could be true in a classroom for individuals of certain racial or ethnic groups. At the objective level it is possible, due to discrimination, that such individuals could receive fewer material resources, be given less access to teachers or other learning specialists, or be held to lower standards than their White peers.

However, even in classrooms where the environment does not differ in any apparently objective way, the psychological or subjective environment can differ for individuals in these groups. The awareness that racial prejudices might be in play could make for a different psychological environment for stereotyped students. To begin with, it would be an environment where their group or social identity would be, for better or worse, salient to them (Cohen and Garcia, 2005; Steele and Aronson, 1995). This salience could call forth a host of attitudes and behaviors associated with that identity, including a sense of solidarity and a set of coping behaviors. It could also give rise to chronic concerns not only that they may be judged in light of a negative stereotype about their group, but also that fellow group members may be so judged as well—a preoccupation termed *collective threat* (Steele, 1997; Steele and Aronson, 1995; Steele, Spencer, and Aronson, 2002; see also Aronson, 2002; Aronson and Inzlicht, 2004; Cohen and Garcia, 2005; Cohen and Steele, 2002; Cohen, Steele, and Ross, 1999). Such concerns can arise irrespective of the actual level of prejudice and discrimination in an environment.

For racial and ethnic minorities who find themselves the target of negative stereotypes that place their intellectual abilities under suspicion, the psychological environment of the classroom is one in which their identity is at risk in at least two ways. First, it can be threatening to their self-worth, regardless of their race or ethnicity, because of the constant evaluation of their skills and the specter of possible poor performance and its consequences. We are not suggesting that such evaluation is necessarily bad, only that it can be stressful. Second, the environment can also threaten them by raising the possibility that a valued aspect of their identity, their group, will be devalued. This is something White students do not generally experience in the classroom. Because there are two sources of stress for minority students, the normal stress associated with a chronically evaluative situation and the stress linked to their social identity, it is more likely that these students could reach stress levels that inhibit their performance. Interestingly, those who are highly identified with academics and invested in doing well are often the most likely to suffer such performance-inhibiting anxieties (Marx, Brown, and Steele, 1999; Steele, 1997).

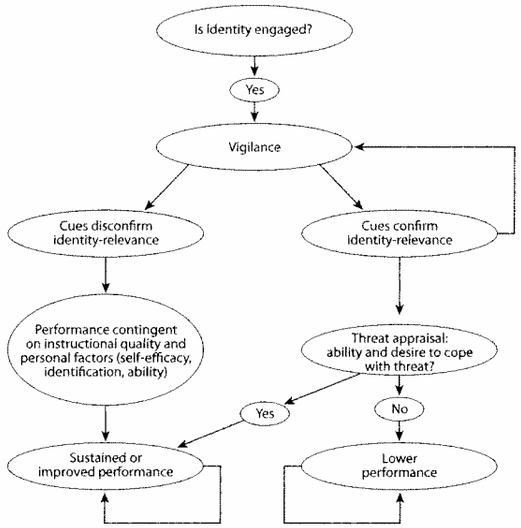
There are other aspects of the classroom that can be particularly troubling for minority individuals that are not generally present in the classroom environment of Whites (see also Branscombe, Schmitt, and Harvey, 1999). These students cannot necessarily lessen the threat to their identity by a strong performance, since they may understand that those holding a negative stereotype will often discount counterstereotypic behavior. These others may characterize those who perform well as exceptions to the rule (Richards and Hewstone, 2001) or single out the behavior of a single minority that confirms the stereotype (Henderson-King and Nisbett, 1996). Such knowledge can lessen the likelihood that they, in spite of having performed well, will benefit from a positive recursive cycle in which high performance sustains itself or promotes even higher performance. Also, these students understand that regardless of how well they do, there will always be some individuals in their group who will perform poorly and potentially provide evidence in support of the denigrating stereotype. We have shown that the mere possibility that a fellow group member could do poorly on an intellectual task can change the psychological environment for an individual and trigger performance-debilitating psychological effects even among elite college students (Cohen and Garcia, 2005).

Not only do the social environments of at-risk minority students and White students differ in critical ways, but the environment in which the former students function makes it more likely that they will suffer long-term performance deficits. Like their White peers, their skills as students are continually being evaluated, and so they are subject to all the psychological consequences that follow from being in such an environment. However, beyond the possible aversive consequences present for them personally, they carry an additional burden. They must also contend with the potentially aversive consequences that the environment holds for their group, and by extension, that aspect of their identity related to their group, known as their social identity. Because their group is the target of a negative stereotype regarding the intellectual abilities of its members, these students must be concerned about whether they and their fellow group members will be judged in light of this widely known negative social judgment. This can then intensify psychological factors such as stress that inhibit motivation and performance. It will also increase the chance that poor performance will yield still poorer performance in a prolonged recursive process.

The Identity Engagement Process

The presence of an *identity threat* for targeted minority students that their White peers do not experience underlies differences in the psychological environments between these groups and is key to understanding the differences in their performance. While it is imperative to gain a greater understanding of identity-threat processes and how these interact with other factors in a range of social environments, the urgency and importance of the issue of minority achievement leads us to focus on examining these processes in school (see Cohen et al., 2007, for the role of similar processes in intergroup conflict).

Obviously there are a number of factors that identity threat could interact with in the classroom. However, we will limit our examination here to those factors that could interact with identity threat in a way that affects the academic performance of minority students. Our general notions about how such



19.1. The identity engagement model.

interactions can play out in the social context of the classroom are introduced in figure 19.1 (see Cohen and Garcia, 2008). It displays our model of how identity processes can affect performance and is more fully developed in the discussion that follows.

Upon entering an important social environment, like a classroom, an individual tends to make a general assessment. He or she asks, "Is this a situation in which my identity could be a factor in my outcomes?" If the answer is yes, the person's identity will be psychologically engaged. Here we focus on cases where the person's identity has possibly negative, rather than positive, consequences for the individual. For instance, most African Americans know that school and work fall into a class of situations in which they could be judged negatively because of their race, whereas certain sports settings are situations in which they could be seen positively because of their race (Steele and Aronson, 1995; Walton and Cohen, 2007). Assessments of the environment are often made nonconsciously and informed by personal experience, historical knowledge, and socialization.

People tend to become vigilant in environments where their identity is engaged (Frable, Blackstone, and Scherbaum, 1990; Kaiser, Brooke, and Major, 2006; Purdie-Vaughns et al., 2008). They monitor such situations for cues related to whether their identity is relevant to their outcomes, for instance, whether it affects how they are treated by important figures in their social environment. A minority student, for example, might scrutinize a teacher's nonverbal behavior or feedback for evidence of bias (Cohen and Steele, 2002; Crocker and Major, 1989). As in any hypothesis-testing process, people may be more sensitive to bias-confirming evidence than to bias-disconfirming evidence (Darley and Gross, 1983; Kleck and Strenta, 1980; Walton and Cohen, 2007). Vigilance of this sort is a general and adaptive process. If one believes that one could be treated poorly or unfairly, it is adaptive to monitor for the possibility of such treatment until one either is given or gathers information to the contrary. For instance, a person might suspect that a superior doubts his or her abilities and could disparage or penalize him or her openly or behind closed doors. In encounters with this superior, it would be both natural and adaptive for the individual to attend to whether this situation is one in which the superior's suspected predisposition will play a role. The individual might focus on the formality of the superior's greeting, his or her nonverbal behavior, such as body language, the valence or quality of the superior's feedback, or how the superior treats others. This would enable the individual to prepare, both psychologically and behaviorally, for an aversive situation.

If the cues *disconfirm* the relevance of their identity to the situation, people will tend to feel that they are viewed as individuals, and their performance will depend on structural and personal factors such as the quality of instruction and their level of self-efficacy, identification with school, and skill. In one study, for instance, African American students responded as positively as White students to critical feedback when it was made clear that the critical nature of the feedback was motivated not by racial bias but by high standards and a belief in their ability to *reach* those standards (Cohen, Steele, and Ross, 1999). When the threat of group-based devaluation was disconfirmed, students could better avail themselves of the learning opportunities in the feedback.

If, on the other hand, the cues *confirm* the relevance of their identity to the situation, a threat-appraisal phase follows. People will assess whether they have the ability to deal with the threat, and, if they do, whether they want to do so (Lazarus and Cohen, 1977). Students might see the degree of bias in a classroom as surpassing their ability or desire to overcome it. If so, their performance will suffer either directly by lowering the motivation to perform or indirectly by triggering psychological factors, such as stress, that undermine performance. One possible outcome is *disidentification*, or *devaluation*, in which students downplay the importance of school or of the criteria being used to evaluate their merit (Schmader, Major, and Gramzow, 2001; Steele, 1997). If, on the other hand, students perceive that they have the ability and desire to contend with the threat, this could lead to maintained or improved performance, as individuals marshal the psychological resources to meet the challenge (Cohen and Garcia, 2005).

A key aspect of this process is *recursion*, a cycle of repeated steps or outcomes, each based on the result of the one before. By definition, the consequences of such a cycle can themselves become causes for subsequent behavior. In the case of the classroom, a student's performance could not only directly affect him or her, but also, because it is socially interpreted and acted upon, lead to feedback from others that then further affects the person's performance. For instance, a chronically underperforming student may be viewed by teachers as less able or may be assigned to a lower academic track, either of which could inhibit later performance (Rosenthal and Jacobson, 1992). Negative recursion tends to occur in chronically evaluative settings in which opportunities are allocated based on a small set of behavioral criteria used to assess merit. Recursion, with similar outcomes following one another, occurs not only at the social level but also at the psychological level. When students perform well, they feel efficacious and less threatened, and as a result they perform better the next time, which in its turn can make them feel more efficacious (Bandura, 1986). Likewise, when students perform poorly, for example as a result of stress, even worse performance can follow due to increases in stress, threat, and vigilance (Wilson, Damiani, and Shelton, 2002).

The recursive nature of chronically evaluative environments also offers an opportunity. Because a recursive process depends on a continuous feedback loop, an early interruption of that loop could produce long-term benefits. Additionally, because even small early gains in performance compound with time, the recursive process can be turned to one's advantage, increasing the likelihood and longevity of student success (Cohen et al., 2006, 2009).

Interventions

The process of identity engagement suggests four important approaches to intervention. The first, most obviously, involves reducing prejudice and stereotyping, so as to change the actual and perceived outcomes associated with a social identity. This is done in programs designed to reduce prejudice in schools, such as the jigsaw classroom described later in this chapter (Aronson and Patnoe, 1997). The second approach highlights the value of changing the failure process in the social environment, so as to block downward recursive processes fueled by the social environment (Woodhead, 1988). Such changes could include substituting remedial programs with programs that challenge even low-performing students with high standards (Fullilove and Treisman, 1990; Steele, 1997; Steele et al., 2004). Modifications could also involve broadening the criteria of merit by using alternative modes of assessment, for instance student portfolios, that are less susceptible to identity-threat processes (see Tierney et al., 2003).

Reducing an individual's tendency to interpret their experience in light of social identity at the vigilance stage and buffering individuals from any detrimental psychological or emotional impact of this tendency at the threat-appraisal stage are two psychological intervention strategies suggested by the identity engagement process (Cohen and Garcia, 2008). Contrary to common wisdom, neither approach involves directly confronting the stereotype. Indeed, it is possible that doing so may do more harm than good, because directly raising the stereotype may be distressing to some individuals. Below we will review research featuring randomized, double-blind experimental designs testing these two strategies in real-world classrooms.

Taking Social Identity off the Table at the Vigilance Stage

This strategy involves helping students to make constructive attributions for the challenges they face in school through the use of *attributional retraining* (see Wilson et al., 2002; Wilson and Linville, 1985). Students are taught to attribute adversity and hardship to factors not directly relevant to race, the stereotype, or a personal lack of ability or sense of belonging. Instead they are encouraged to attribute adversity and hardship to the challenges inherent in school. In one of the experimental conditions in a study by Good, Aronson, and Inzlicht (2003), for example, students were exposed to role models who discussed their initial difficulties after moving from elementary to middle school but who reported getting increasingly better grades as they learned the ropes and kept working. In another experimental condition, they were led to view intelligence as expandable rather than fixed, lessening the tendency to see frustration in school as evidence of intellectual limitation (see also Aronson, Fried, and Good, 2002; Blackwell, Trzesniewski, and Dweck, 2007). Compared to students in a control group, students in both conditions went on to earn higher statewide test scores. Similar positive effects of such interventions on grades were displayed in a New York City school by low-achieving African and Latino American students from economically disadvantaged backgrounds (Blackwell, Trzesniewski, and Dweck, 2007).

In another experiment, freshmen at a predominately White university were asked, at the end of the

difficult first year of college, to review the results of a survey of upperclassmen at their school (Walton and Cohen, 2007). The results conveyed, first, that almost all students regardless of race felt uncertain of their belonging in the first year of college and, second, that these doubts lessened with time. The results led students to view their doubts about belonging as a common occurrence rather than unique to them or members of their racial group, and as transitory rather than fixed. For instance, as one student stated in the survey, "I worried that I was different from other students. . . . Now it seems ironic—everybody feels they are different freshman year from everybody else, when really in at least some ways we are all pretty similar." Students were also led to internalize the message by giving a speech in front of a video camera, ostensibly for viewing by incoming freshmen, describing how their experiences were consistent with these survey results. Students thus came to see the difficulties they were experiencing in school as part of the normal learning curve that most students go through when they enter a new environment and face new challenges. While the intervention had no consistent effect on Whites, it buttressed African Americans' sense of belonging on days of hardship. Additionally, in the following semester, intervention-treated African Americans earned a higher college GPA, an effect that follow-up data indicate persisted into students' junior year.

Lessening the Impact of Social Identity Threat at the Appraisal Stage

Instead of affecting people's sensitivity to the possibility of being stereotyped, the second psychological strategy demonstrates the efficacy of intervening at the threat-appraisal stage by increasing people's psychological resources. Underpinning this strategy is the notion that people want and need to see themselves in a positive light—to have a sense of self-integrity. In other words, people want to believe that they are good people and that they can cope with their environments. Moreover, it is possible to assure people that they do indeed have self-integrity by having them engage in *self-affirmations.* In this process people reinforce self-integrity by reflecting on important domains of identity unrelated to the provoking stressor (Steele, 1988; see also Sherman and Cohen, 2006). People are better able to cope with threat in one domain, school for instance, if they can shore up their self-integrity in another, such as family. More important, as self-affirmation reduces stress arising from evaluative performance settings (Creswell et al., 2005), we assumed that this, in turn, could improve performance (Martens et al., 2006).

Two field experiments were conducted in a suburban middle-class middle school where African Americans made up approximately 50% of the student body. Seventh-grade students completed an affirmation exercise in class early in the school year, a stressful time. They wrote about a personally important value, such as religion or relationships with friends (Cohen et al., 2006). The exercises, which were usually given before a test or exam, had students integrate the value into their lives in the context of a series of structured writing assignments. Students' writing touched on diverse issues of personal significance. For instance, one student wrote, "[Art] is important to me because it makes me feel calm. When I'm very upset, like I'm going to cry I sit down and start listening to music or start drawing a picture." Another wrote, "My friends and family are most important to me when I have a difficult situation that needs to be talked about. My friends give me companionship and courage. My family gives me love and understanding."

African Americans who had been given the opportunity to self-affirm earned a higher course GPA than students of their race completing control exercises requiring them to write about neutral topics (Cohen et al., 2006). The intervention was associated with a roughly 40% reduction in the race gap in GPA in the course in the fall term. Follow-up data indicate that the intervention had an effect on overall GPA that persisted for at least two years, roughly eliminating 30% of the difference in GPA that had existed between African Americans and European Americans in previous years (Cohen et al., 2009). Perhaps more tellingly, at the practical level the intervention reduced the percentage of African Americans earning a D or below in the first term of the course from 20% to 9%. The latter rate was no different from the rate observed for White students. The potential importance of the latter finding is underscored by the fact that the poorest-performing students in school often require a disproportionate amount of a school system's resources to provide for their needs. Additionally, preliminary follow-up data related to state achievement-test performance indicated that the intervention again benefited African American students' performance. Unlike most other interventions, this intervention most benefited the most "at risk" students, reducing group-based differences in performance while not adversely affecting other students (compare Ceci and Papierno, 2005).

Although these results seem unique, in fact they are not unprecedented. Social psychological research provides ample evidence that seemingly small interventions can have large and long-term effects (Dholakia and Morwitz, 2002; Freedman, 1965; Wilson, 2006; see also Benartzi, Peleg, and Thaler, this volume; Thaler and Sunstein, 2008). Insofar as psychological interventions appear to have disproportionate impacts in relation to the time, effort, or resources they require, preexisting environmental processes must be instrumental in the transformation of their initial effects into larger and long-term outcomes (Woodhead, 1988).

With regard to the results of our research, one such process involves recursive performance cycles. For instance, as with other effective psychological interventions, the affirmation intervention interrupted a downward performance trajectory (Blackwell et al., 2007; Wilson et al., 2002). The intervention buffered students against the negative consequences of early poor performance, consequences that would otherwise compound into increasingly worse performance as the result of a recursive cycle. The GPAs of minority students in the control group declined throughout seventh and eighth grade, something not uncommon in the middle school years (Eccles, Lord, and Midgeley, 1991). Indeed, the greater the decline in grades prior to the experimental manipulation, the greater the decline later (Cohen et al., 2006). By contrast, the GPAs of intervention-treated African Americans declined less over the two years that were examined. In fact, not long after the first intervention, their grades improved, so that any decline in performance they had experienced prior to the intervention bore no relationship to their later performance. The intervention thus seemed to interrupt a downward trajectory and perhaps initiated another, now positive, recursive cycle.

Even if the effects on performance are initially small, they can become large if they accumulate in an additive fashion across multiple trials or tests. As an analogy, in professional baseball, small differences in the number of successful at-bats during individual games can compound over an entire season and career and lead to one being considered an all-star rather than just another good player (Abelson, 1985). Similarly, in the classroom, a small but consistent intervention effect on individual evaluations can compound into a meaningful effect on final grades.

One way in which relatively small initial performance benefits can be carried forward is through social-psychological processes. Students could, for instance, feel self-affirmed by performing well relative to their standards, even if the improvement was objectively relatively minor, such as going from their usual C– to a C on an exam. As a consequence of being affirmed, the factors inhibiting their performance could be reduced. This could be especially powerful if a trend of increasingly poor performance is interrupted and deflected upward, as was the case with students completing the affirmation intervention (Cohen et al., 2006). Students could see this as particularly strong evidence of their competence and integrity. This reinforcement of their self-efficacy and self-integrity would increase the likelihood that they would at least begin to perform up to their actual skill level.

A meaningful portion of the achievement gap, in our view, is due to social-psychological processes that inhibit minority students from manifesting their actual academic skills. There is some evidence to support this notion in our work. Not long after receiving the affirmation, for the first time since the beginning of the school year, minority students did not experience a decline in their performance. In fact these students displayed nearly the same level of performance as their White peers (Cohen et al., 2006). Social comparison processes may have come into play at this point. The sense of efficacy and integrity of minority students receiving the intervention may be reinforced because they see themselves performing almost as well as their White peers. These students would also have first-hand evidence that intellectual performance is malleable rather than fixed—improvable with effort and practice—a notion that would further their motivation and performance (Dweck, 1999; see also Aronson, Fried, and Good, 2002).

Because they are performing better, these minority students may also become less vigilant in regard to the stereotype and so less likely to interpret their classroom experience in light of it. This would reduce the likelihood that they would experience stereotype threat and the stress associated with it. Consistent with this expectation, the intervention reduced the cognitive accessibility of the racial stereotype among minority students (Cohen et al., 2006). Because the psychological availability of mental concepts affects the encoding of social experience (Fiske and Taylor, 1991), this could in turn have led students to see less bias in their school. Indeed, follow-up data suggest that minority students receiving the intervention proved relatively more likely to maintain their trust in their teachers over the course of the year than did their fellow students (see also Sherman and Cohen, 2006). These perceptions may then have led students to interpret their teacher's behavior more charitably and may have helped to sustain their sense of adequacy in school even in the face of adversity (Cohen et al., 2009; Huo et al., 1996; Tyler, 2004). In summary, as a result of the intervention, the students have gone from an environment in which they could expect only deteriorating performance to an environment in which it is possible to *do well*, and, perhaps more

important, one in which they believe their teachers will recognize their success.

Social processes can also act as factors that facilitate the transformation of initial benefits into long-term ones. Students receiving the intervention, upon performing better, may be seen by their teacher as more able. Such students may then receive more attention, mentoring, and challenge in the classroom (Rosenthal and Jacobson, 1992). They may also be more likely to affiliate with similarly high-performing students. The powerful effects of peer influence could then be yet another factor contributing to the transformation of the intervention's short-term impact into long-term effects (Cohen and Prinstein, 2006; see also Hanuschek et al., 2006).

As a consequence of the impact of these processes, the social identity of minority students receiving the intervention may become even less of a source of concern. Psychological intervention in this sense is not at all small, as its effects can often be reinforced by the powerful self-validating nature of perception, motivation, and performance.

How can psychological interventions be transformed into practices that can be implemented throughout a school, a district, or a nation? Scaling up interventions into pedagogical practices suitable for widespread dissemination constitutes a substantial scientific endeavor. Several empirical questions immediately present themselves. For instance, will intervention effects be generalizable, or will they be primarily moderated by important features of the context, such as its racial composition (Cohen and Steele, 2002)? Social identity threat appears to be more acute when people constitute a numerical minority (Inzlicht and Ben-Zeev, 2000). An implication following from this, although speculative, is that interventions aimed at lessening such threat may be relatively more effective in institutions with a significant number of White and other nonstereotyped individuals. Will teachers be able to administer the interventions independently without the input of researchers with equal success? Experimental trials often try to minimize practitioners' and beneficiaries' awareness of the purpose of an intervention to protect the experiment's validity. But when an intervention is scaled up, its purpose and underlying rationale often become widely known. How is the effectiveness of a psychological intervention affected by students' or teachers' being aware of its purpose?

In an effort to address such questions in order to reach our aim of turning social-psychological interventions into widespread educational practices, we have continued working at our original school site with sustained success (Cohen et al., 2009). Moreover, we have expanded the project to include another school site with a more economically disadvantaged and predominately Latino American student body, where we have also obtained positive results. This is encouraging given that Latino Americans constitute the fastest growing minority group in the United States.

General Lessons about Intervention: Changing a Tension System

We now turn to some general observations that emerge from the consideration of social tension systems, which, among other things, are interactive in nature and constituted by social and psychological factors that can often be difficult to identify. If we are to maximize the possibility of bringing positive change to the classroom and other settings, it is imperative that we increase our understanding of how the factors making up a particular tension system can be enlisted in the process of creating and implementing interventions across a range of domains. The outcomes of interest could not only include academic outcomes, the focus of our discussion, but, among others, those related to health, well-being, and conflict (Boehm and Lyubomirsky, 2009; Cohen et al., 2007).

Sometimes Small Things Matter

A theme that emerges in the research summarized both in this chapter and in other chapters in this volume is that seemingly small interventions can have large effects when they target important social-psychological processes (Benartzi, Peleg, and Thaler, this volume; Thaler and Sunstein, 2008; Wansink, this volume). This is not a new idea because much of what made classical research in social psychology so noteworthy is that it demonstrated how seemingly subtle factors could have long-term effects. When these factors alter people's underlying values, attitudes, or self-concepts, those effects are particularly likely to persist (Freedman, 1965). This is especially true when these factors set in motion recursive cycles that can carry forward, and even augment, short-term effects (Cohen et al., 2009).

The notion that subtle shifts in psychological functioning can have considerable effects on important social outcomes can be seen not only in education but also in other domains, such as that of health. For instance, Pennebaker and his colleagues have consistently shown that having individuals engage in expressive writing requiring them to reflect on their thoughts and feelings related to a stressor in their lives can reduce stress. This in turn can improve health outcomes, even among cancer survivors and HIV+ patients (Petrie et al., 2004). Self-affirmation seems to underlie some of these health benefits (Creswell et al., 2007).

No Intervention Is an Island

A corollary of the notion that small things matter is the idea that the effects of an intervention can, in turn, depend on contextual factors that can be obvious or subtle (Bertrand et al., 2005). One critical implication of that concept is that the impact of any intervention will depend on the forces already at play in a given social environment. Interventions should not be thought of independently from the context in which they are administered (Bertrand et al., 2005). Although patently obvious, this point is often underappreciated or even ignored. Social policy, including that involving education, is replete with instances, for example, the educational policy geared towards the reduction of class size. In response to educational research showing a negative relationship between class size and academic performance, well-intentioned policy makers enacted initiatives designed to reduce the number of students in classes. However, implementing these initiatives could, at least initially, require employing less well trained and less experienced teachers, even though a lack of teacher training and experience is associated with negative academic outcomes for students. At least in the short term, the implementation of these initiatives could put at risk any potential gains that would result from a reduction in class size, and in turn, having any number of negative outcomes, including the waste of scarce resources and the rejection of a potentially useful strategy for improving student performance.

Any initiative undertaken to alter outcomes in a social environment must interact with preexisting elements in such a way that permits it to have its desired end. Moreover, as highlighted in our discussion of recursive cycles, the outcomes of such interventions may take time before they become apparent. Again, these notions carry several implications for policy makers. In our hypothetical situation, they could give rise to two pragmatic implications. The first would be that class-size effects are based on the assumption that all other factors in the classroom are kept more or less constant, so provision for such constancy should be made in the implementation of the initiative. The second is the possibility that an intervention's real impact may not be observed until a significant amount of time has passed, so sufficient resources should be provided to allow for a fair test of the intervention's effectiveness. For instance, in our example, this would involve waiting until a sufficient number of trained and experienced teachers are produced or recruited.

Another implication of the idea that intervention effects can depend on the contextual factors is that the impact of interventions can appear disproportionately large given the resources and time dedicated to them. This is what we believe occurred in the case of our affirmation intervention. Such an apparently disproportionate effect is contingent on existing factors that facilitate motivation and performance. Without adequately trained and committed teachers, sufficient material resources, social support, and students who have acquired the skills to perform better, psychological interventions stand little or no chance of having a significant impact of any size. For example, although our affirmation intervention might lead a student who does not know how to spell to have a more positive sense of self-integrity in the face of his or her inability to spell, it will not suddenly turn this student into an adequate speller. Moreover, psychological interventions might prove less effective in a disadvantaged school where students may have been consistently exposed to less qualified teachers and had fewer resources dedicated to them over time than in a middle-class school.

However, when such resources are present, psychological interventions can catalyze their impact (Cohen et al., 2006, 2009; Menec et al., 2006), and lead to a situation in which an intervention's effects seem unusually large or influential. What appears to be a small or brief event if viewed in isolation acts as a catalyst for a process that realigns the elements in the environment so as to allow positive conditions, which were not previously fully realized, to manifest their impact more completely. For example, critical feedback had a strong and positive impact on stereotyped students' performance, but only when accompanied with a message that ascribed the rigor of the feedback to the evaluator's high standards and belief in the student's potential (Cohen and Steele, 2002). When the identity threat was alleviated, the learning resources could assert their full impact.

Look Before You Intervene and Above All Do Not Oversimplify

The fact that key outcomes in tension systems can rarely, if ever, be attributed to a single factor carries with it still another implication, that is, to question explanations and initiatives that seek to oversimplify the processes underlying intervention effects. In a classic article concerning this issue, Woodhead (1988) observed, "One of the problems in communicating the messages of [intervention research] is that the experimental design itself encourages disproportionate attention to be directed toward the critical manipulated variable as *the* cause of observed differences between experiment and control groups, no matter how remote in time or nature the outcome measures are

from the intervention" (p. 452). Focusing on a single cause can be an impediment to reaching the desired outcome because it can obscure our understanding of a social environment and keep us from addressing other critical factors in it.

Woodhead (1988) provided a concrete example of the potential dangers of ignoring this caution in his discussion of the effects of preschool interventions on long-term high school retention rates. He showed how their effects were mediated by other factors in the social environment. Early preschool interventions did produce a small gain in intellectual performance and student engagement in school when students began first grade. However, it was the positive impact that these gains had on the impressions of children held by teachers and by the school staff that made it less likely that the children would later be retained in a grade or be assigned to special education classes. Obviating these outcomes, in turn, made it more likely that the students would continue their education. The long-term impacts of the preschool interventions on later high school graduation rates, and even on postgraduation employment, were a result of how their effects interacted with other factors in the environment. In this case, the other factors were the perceptions of the students held by key "gatekeeper" individuals in the environment and the practices of holding low-achieving students back in a grade or assigning them to special education classes. Social context is key to understanding children's performance over time and the processes likely to impede or amplify the effectiveness of interventions (Bronfenbrenner, 1979).

Given the role that unobserved or underappreciated aspects of tension systems can have in producing critical outcomes, identifying the factors at work in an environment and examining how these interact with one another is essential to the creation of successful interventions. These activities increase the likelihood of developing strategies that can systematically alter the nature of the interactions taking place in a tension system so as to produce desired outcomes. For example, strategies could alter these interactions by introducing some new element into the environment or by changing the intensity of an existing factor in it. Clearly, a total or even comprehensive inventory of the factors making up a particular social environment is rarely, if ever, possible. Fortunately, based on our research findings, such an inventory is not necessary in order to effect significant and long-lasting change (Cohen et al., 2006). Although there are a multitude of factors at work in the majority of social environments, often only a few of them exercise a major role in producing critical outcomes, and still fewer are subject to manipulation.

For instance, during a careful observation of classrooms, researchers discovered a factor that exacerbated interracial antagonism in the classroom—competition over scarce resources, in particular the students' struggle for their teacher's attention and praise (Aronson and Patnoe, 1997). Given that competition can increase intergroup conflict and prejudice, the researchers reasoned that restructuring the classroom to facilitate more cooperative relationships between students could provide the basis for an effective intervention. The resulting jigsaw classroom, as their intervention was termed, accomplished exactly this. The children in a classroom were first separated into groups. Each child was then given a piece of the lesson plan to learn and to convey to others in his or her group. In order to learn the whole lesson plan, children were obliged to acknowledge and depend on others in their group regardless of their race or ethnicity. In other words, the intervention made it in the students' self-interest to cooperate with one another irrespective of each other's race or ethnicity. The jigsaw classroom creates a structure in which the processes leading to desired outcomes are more collective than individualistic, and as a consequence, intergroup antagonism is lessened. Although seemingly small, this intervention promoted positive intergroup relations by triggering processes that reduced what was often thought to be intractable long-term intergroup antagonisms.

Sometimes It Is Psychological

The observable level of student performance or other school-related behavior could be an inaccurate display of students' actual abilities. Indeed, Vygotsky (1978), the renowned education psychologist, introduced the construct "the zone of proximal development" to indicate the difference between a child's current level of performance and the level that he or she would be capable of attaining under optimal situational conditions. The restraining forces in an environment may depress students' willingness or ability to demonstrate their true ability. Underperformance can thus be characterized as an "ecological problem" (Cole and Bruner, 1971). Obviously, restraining forces can include objective impediments. An overcrowded classroom could lessen the likelihood that any individual student could be called upon to demonstrate what they know. However, there are also psychological factors that can act as restraining forces in such environments. A classic study showed that while young street vendors in Brazil were able to solve complex arithmetic problems in out-of-school settings, for instance rapidly adding up the price of several coconuts, they failed to solve the same basic problem when it was presented on a written test in school (Carraher and Schliemann, 2002).

The label of "underachiever" captures the essence of such situations, because it implies that an individual has a level of skill that he or she is unwilling or unable to demonstrate. Work on test-anxiety has shown that the stress related to taking tests can impede performance, so much so that simply reducing their stress by removing testing time limits improves their performance to equal that of nonanxious students (Sarason, Mandler, and Craighill, 1952; see also Morris and Liebert, 1969). Paradoxically, it is sometimes those individuals who care most about performing well who are most unable to display their actual skill level when needed. This outcome is often characterized as choking under pressure in the "big game" or on a high-stakes standardized test. A similar phenomenon was found in seminal research that showed that the performance of low-income minority children on IQ tests and evaluative interviews was inhibited by psychological threat and "wariness" (Labov, 1970; Zigler, Abelson, and Seitz, 1973; Zigler and Butterfield, 1968; see also Cole and Bruner, 1971). Fortunately, there are other psychological factors that can mitigate such forces. In fact, this pivotal research also revealed that small procedural interventions that raise students' comfort in the test-taking situation, such as a friendly test proctor, can significantly increase these children's IQ scores and verbal fluency, sometimes dramatically.

As we stated earlier, it is critical to keep in mind that although a classroom or testing situation may appear to be the same for all those in it, this may not be the case. Due to differences in students' social identity and personal background it may have a radically different meaning, evoking different psychological reactions and apparently "objective" outcomes. As a consequence, in the words of Cole and Bruner, "it is not sufficient to use a simple equivalence-of-test procedure to make inferences about the competence of the two groups being compared" (1971, p. 871).

One Size Does Not Fit All

Our approach suggests the value of a targeted approach to psychological intervention. Like medical treatments, psychology-based interventions should ideally only be given to those needing them and who will benefit from them. This should be done not only to make the most effective use of time and material, but more important, to minimize the possibility of unforeseen adverse consequences. More generally, some interventions may prove less effective than others, and scaling them up before conducting a small-scale pilot study could not only waste resources and time, but also yield unforeseen negative consequences. For instance, attributional retraining can be ineffective when at-risk students receive poor instruction or lack the resources needed to improve (Menec et al., 2006). That situation may make it critical in disadvantaged areas to pair such interventions with skill-development workshops that provide students with the school resources they need (see Blackwell, Trzesniewski, and Dweck, 2007). Furthermore, the message of optimism that often surrounds such interventions may contradict students' actual experiences in the classroom, and lead to increasing frustration, disappointment, or mistrust (Wilson, Damiani, and Shelton, 2002). Interventions suggesting that the concerns of minority students are common and shared by majority-group members may be ineffective, and even counterproductive, when cues in institutional settings are continually reinstantiating identity threat in these students. For example, color-blind messages that downplay the importance of ethnicity can undermine minorities' trust and belonging when such messages are provided in the absence of actual institutional diversity, or when they convey that the positive distinctive qualities of one's culture will be ignored or should be suppressed (Purdie-Vaughns et al., 2008). In summary, psychological interventions will be more effective if the institutional setting provides adequate material and human resources. More generally, interventions need to be rigorously tested in any new context to monitor for unforeseen consequences, and ideally they should be given only to those who would benefit from them.

Timing Is Almost Always Important

The most critical aspect of an intervention can often be when it is administered, that is, its *timing*. Research on leadership offers an example with findings that show that a leader in work or school can change an organization's norms for the better, but only at certain junctures. Specifically, a leader's greatest impact occurs early in a project, prior to norms having been set; in the middle of the project, when groups naturally monitor their progress; and at the end, when group members take stock of the project (Hackman, 1998). A similar example is provided by research in early child education showing that interventions that target early childhood experiences, through preschool enrichment programs for instance, can have particularly high returns (Heckman, 2006).

The importance that *timing* can have in psychological interventions cannot be overstated. Psychological interventions, for instance, may be most effective

when administered at times of high stress as a means of interrupting a downward slide in functioning. In the educational domain, it could prove worthwhile to administer interventions at times of academic transition, such as those into middle school, high school, or college. These are times when the performance standards students are expected to meet shift upward, when their sense of identity is in flux, and their existing social support circles are disrupted. Each of these factors, alone or in concert, can heighten stress and feelings of exclusion. Intervening early in these transitions can have relatively larger benefits because they can interrupt recursive cycles triggered by such factors that would otherwise set students on a downward trajectory (Cohen et al., 2009).

It is also important to time an intervention to occur during the period in which it will have the most impact on an individual's *psychological environment.* If given too early, for instance, before students feel uneasy, the attributional retraining intervention could set off the very concerns it is intended to alleviate. It could, by suggesting to students that they *should* be wondering about their ability and belonging, make these thoughts salient when they otherwise would not have been (Wilson, Damiani, and Shelton, 2002; see also Pennebaker, 2001). Similarly, counting one's blessings or engaging in altruistic acts, activities that are often part of strategies designed to increase people's happiness, can be rendered ineffective by subtle changes in their timing or frequency (Boehm and Lyubomirsky, 2009).

One implication issuing out of the importance that timing can have in the development of interventions is the necessity of being able to identify not only *who* needs an intervention, but also *when* it is most needed. As in medical science, because the effects of psychological interventions can be harmful, unintended, or simply ineffective for certain individuals, it is as a general rule inadvisable to administer interventions indiscriminately. Likewise, for many of the same reasons, as well as others, it is inadvisable to administer an intervention too often, not often enough, or at times when it is inappropriate or irrelevant. Given this, in developing an intervention it is often critical to create methods for determining who needs it and when they need it. For instance, in our affirmation intervention research we have used, in conjunction with the intervention itself, validated climate assessments designed to assess students' perception of the school environment, as well as their psychological state, at more or less regular intervals to aid us in administering the intervention in a more targeted manner and at the most appropriate time. It is even possible to micro-time psychological interventions to occur at moments of maximal need for a given individual. For instance, through mobile technology it is possible to deliver interventions to people as they go about their normal lives and to tailor the timing and content of the intervention to each person's distinctive experiences and needs (see Heron and Smyth, 2010). We hope that ultimately practitioners and researchers will be able to apply psychology-based interventions in the way that physicians intervene medically. They will use a body of scientific research knowledge and its associated diagnostic technologies to help identify who should receive a treatment and when they should receive it.

Conclusion

The obvious but often overlooked notion that social environments such as schools and classrooms are complex tension systems composed of interacting factors, including recursive psychological processes, deserves the attention of researchers, practitioners, and policy makers. So does the idea that timely interventions, of whatever duration and magnitude, that address people's need for meaning, self-integrity, and belonging can have large and long-lasting effects on behavior and attitudes. Because of the interactive nature of social environments, an intervention's duration and magnitude depend on how it interacts with important processes existing in the environment. As a consequence, although a particular structural factor or set of factors—such as small class size, qualified teachers, or adequate funding—may be necessary to produce optimal outcomes, they may not be sufficient. Other factors in the environment, such as psychological processes, may suppress or obscure their impact.

In our view, unappreciated psychological factors have led to the questioning of the role of structural factors in schools, such as small class size and the degree of funding, in student achievement (see Heckman, Layne-Farrar, and Todd, 1996; for a review, see Burtless, 1996). However, as the research highlighted in this chapter shows, the introduction of new factors into a social environment, or the changing of preexisting ones, can make it more likely that such structural factors will exert their full impact (Lewin, 1951; Ross and Nisbett, 1991). For instance, the systematic introduction into the classroom of a psychological factor that was new, or if present already of relatively low intensity, increased students' ability or desire to avail themselves of the learning resources in the environment and their willingness or ability to demonstrate the skills and knowledge they had acquired (Blackwell, Trzesniewski, and Dweck, 2007; Cohen et al., 2006, 2009; see also Cohen and Steele, 2002; Cohen, Steele, and Ross, 1999; Menec et al., 2006). The psychological factor introduced by the intervention catalyzed the impact of existing structural and material resources in a way that was subsequently expressed by students' improved motivation and performance.

The experiences, insights, and wisdom of the individuals intimately involved with a particular social environment must play a critical part in the scientific endeavor of determining if, when, and how interventions, including psychological interventions, can be made systematically effective. Already many educators, as well as others in the educational community, regularly use psychological strategies in their daily practice, often intuitively. For instance, among the many examples that exist (see Cose, 1997), some teachers have found that expressive writing, in which at-risk children associate their troubles with important values and literary stories, can have dramatic positive effects on students' engagement with school (Freedom Writers and Gruwell, 1999). The teacher portrayed in the movie *Stand and Deliver* and in the book by Mathews (1988), Jaime Escalante, found that challenging urban minority students with high academic standards and providing them with intensive support to reach those standards led them to earn achievement test scores as high as their more privileged White peers. Such examples convince us that partnerships of equals between practitioners and scientists hold the greatest promise for the development and implementation of psychological interventions of long-lasting and widespread impact.

Notes

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