A Review of Attributional Retraining Treatments: Fostering Engagement and Persistence in Vulnerable College Students

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Cultural metaphors abound embracing the virtues of persistence in overcoming life's hurdles. From an early age, North American children are schooled on a popular reader about the "little engine that could" – the laughingstock of the local rail yard until he conveyed an enormous cargo over a mountain that stymied his bigger-engined brothers. His secret to success was repeating over and over in the rhythm of steel wheel on steel track "I think I can; I think I can; I think I can; …." In Aesop's fable of the "tortoise and the hare," the slow-footed tortoise bettered his fleet-footed running mate to finish first through inexorable persistence, while the hare dallied along the way. And in his "grasshopper and the ant" fable, Aesop's ant survives winter by doggedly storing food during the summer, while the grasshopper fiddles his time away in the pursuit of pleasure.

In metaphor, fable, and folk wisdom alike, the dominant theme reverberates that effort and persistence are instrumental to attaining life's goals. But also subtlety conveyed in these messages are the merits of self-regulation strategies focusing on volition and tenacity. Similar to the situation encountered by the "little engine," first-year college students face an uphill struggle that requires intellectual ability, content knowledge, emotional stamina, unflagging motivation, and unrelenting goal striving. The challenge for students is to maintain their persitence and singleness of purpose in the face of unanticipated impediments that undermine commitment and persistence, and for higher education institutions to enable students to excel despite such impediments.

The present chapter addresses these issues in the context of a theory-based treatment designed to assist failure-prone students in higher education settings. Attributional retraining (AR) refers to a motivational treatment that helps students reframe the way they think about success and failure by encouraging them to take responsibility for academic outcomes and adopt the "can-do" attitude of the little-engine-that-could. Our chapter describes the theoretical underpinnings of AR as a motivational treatment to enhance academic engagement and performance and reviews three decades of empirical research on the effectiveness of AR treatments (Forsterling, 1985; Perry et al., 1993; Wilson et al., 2002). In so doing, we focus on the capacity of AR to foster adaptive attributional thinking, perceptions of control, and motivation in college students, and outline a five-step protocol for implementing AR in college classrooms.

J.C. Smart (ed.), *Higher Education: Handbook of Theory and Research*,

Prior to discussing these issues, we consider the nature of the higher education learning environment in which AR treatments are typically administered, specifically the first year of college that embodies the transition from high school to college. Perry (2003) argues that unfamiliar learning conditions encountered in the first year of college, and new achievement settings more generally, can adversely affect achievement motivation, goal striving, and persistence. These novel and unpredictable conditions include increased pressure to excel, more frequent failure, unfamiliar learning tasks, ineffective instruction, stringent grading practices, critical career choices, and new social networks. Supporting this contention is an extensive literature showing that unpredictable or noncontingent failure events erode motivation and goal striving, eventually leading to "learned helplessness" and failure (Garber and Seligman, 1980; Glass and Singer, 1971; Skinner, 1996; Thompson, 1993).

Lost in Transition: The Paradox of Failure

Pursuing a college degree requires tenacity, perseverance, and singleness of purpose in the face of novel and unanticipated challenges. Despite increasingly stringent admissions criteria, however, US college students are taking longer to graduate or simply withdrawing altogether (Astin, 1997; Choy, 2002; Elkins et al., 2000; Horn, 1998). Likewise, European studies show that only 8% of 18–21-year-old German students enroll in university and that 30% leave before obtaining a degree, most during their first year of studies (HIS, 2005; OECD, 1998, 2002; US Library of Congress, Federal Research Division, 1995). Austrian, French, and Dutch studies reveal comparable patterns of academic failure and withdrawal (Brandstatter and Farthofer, 2003; Van den Berg and Hofman, 2005). Accounting for such failure rates requires consideration of factors other than Scholastic Aptitude Tests (SATs), American College Tests (ACTs), and high school grades, yet their use continues despite determining only 16–20% of college grades (Anaya, 1999; Britton and Tresser, 1991; Chemers et al., 2001; Szafran, 2001).

Perry et al. (2001) describe this deficiency in selection criteria as a *paradox of failure* in which disproportionate numbers of bright students fail their first year of university, after having met stringent admissions criteria. Perry (2003) suggests that stringent admissions criteria reduce aptitude and performance differences between students, and hence the psychosocial attributes of students and the nature of learning experiences take on greater prominence in accounting for academic success. For our purposes, psychosocial variables are generally considered to include a range of noncognitive variables related to personality, belief systems, motivation, and emotion, among others. Excluded from this category are typical academic and demographic variables involving intellectual aptitude, disciplinary knowledge, academic skill preparation, socioeconomic status, gender, and English-language fluency. In attempting to account for the paradox of failure in relation to

psychosocial variables, the nature of classroom environments and learning experiences must also be taken into account. However, as students become more familiar with the contextual factors inherent in these academic settings, they should have less influence on motivation and performance in contrast to psychosocial differences between students.

In a longitudinal study of first-year students, Perry et al. (2001) examined one key psychosocial student difference in university classrooms, *perceived control*, defined as a student's subjective belief about his/her ability to influence or predict important academic outcomes (Perry, 1991). Students who felt "in control" upon entering university reported that they tried harder and were more motivated during the year, experienced less boredom and anxiety, used self-monitoring strategies more often, felt more in control of their course assignments, and obtained higher final grades. In a 3-year follow-up study, Perry et al. (2005a) showed that students with high perceived control had better grade point averages (GPAs) and withdrew from fewer courses over a 3-year period.

Studies such as these indicate that unsatisfactory performance requires consideration of variables other than intellectual ability, discipline knowledge, and academic preparation used for college admissions. In a comprehensive meta-analysis of studies on college GPA and retention, several psychosocial factors, notably perceived control and motivation, were better predictors of college outcomes in comparison to socioeconomic status, standardized achievement, and high school GPA (Robbins et al., 2004). Another longitudinal study of over 10,000 college students showed that two of the "Big Five" personality traits, conscientiousness and openness, predicted SAT and GPA scores even after high school grades were controlled (Noftle and Robins, 2007).

The Eternal Panacea: "Teach Better!"

In response to the paradox of failure, and attrition rates more generally, stakeholders in postsecondary institutions insist that the panacea for failing students is "professors should teach better!" This one-size-fits-all remedy is supported by research showing that students do benefit from effective teaching in higher education classrooms (Feldman, 1998; Marsh and Dunkin, 1992; McKeachie, 1997; Murray, 1991). Meta-analytic reviews of field studies dating back 80 years show that certain teaching behaviors significantly relate to end-of-term course grades (e.g., Cohen, 1981, 1983; Feldman, 1989). Instructor organization and instructor clarity, for example, correlate positively with final grades ($r=.50+$), meaning that roughly 25% of course performance is explained by these teaching behaviors. Instructor interaction, feedback, stimulation, and elocution generate equally strong positive correlations with final grades, endorsing the contention that teaching makes a difference to the scholastic attainment of college students (Perry and Smart, 1997, 2007).

When Good Teaching Fails

Although this evidence is persuasive, it ignores the fact that effective instruction does not benefit all students. It has long been recognized that teaching methods differ in promoting learning and performance depending on student attributes, course content, class size, and so on. Race, gender, age, social class, ethnicity, and religion are but a few manifested student differences, augmented by less apparent, but equally important differences in intelligence, motivation, and knowledge. Alongside enthusiastic, determined, and responsible students sit apathetic, bored, and failure-prone students, mixed with still others possessing different attributes. Not surprisingly, this diversity in students represents a fundamental challenge for higher education institutions, making it difficult to ensure that teaching effectiveness and learning opportunities are optimized for all students.

One group of students who do not benefit from effective instruction is those who develop low perceived control resulting from their classroom learning experiences (Perry, 2003). As noted, perceived control is a student's subjective belief concerning his or her capacity to influence and predict academic outcomes. Students with low perceived control believe that academic outcomes are beyond their control, attributing performance to uncontrollable factors such as course difficulty, unfair professors, bad luck, etc. For these low-perceived-control students, a psychological profile emerges involving low expectations, negative affect, de-motivation, and poor performance, despite the presence of highly effective instruction. Simply put, vulnerable, failure-prone students are most "at risk" and in need of enriched educational opportunities such as effective instruction, but are unlikely to derive the academic benefits that normally accrue in such learning conditions.

In addressing this issue directly, Perry and colleagues conducted a series of laboratory experiments involving simulations of effective college teaching behaviors (Perry and Dickens, 1984, 1987; Perry et al., 1986; Schonwetter et al., 1993). Videotaped lectures were developed wherein the content of the lecture remained constant, but the effectiveness of specific teaching behaviors varied (e.g., enthusiastic versus non-enthusiastic). The general pattern of results from these studies is depicted in Fig. 1. In keeping with the research literature on college teaching, effective instruction produced better post-lecture performance than ineffective instruction, but only for high-control students. For low-control students, however, effective instruction produced no better performance than ineffective instruction.

In these laboratory studies, effective instruction increased performance overall when student differences in perceived academic control were not considered, but this main effect belies the reality that effective instruction (enriched treatment) did not benefit some students. Only when student differences in academic control were directly included in the analytical model, along with instructional quality, was it apparent that "effective instruction" did not produce the expected performance increments for all students. This student aptitude × instructional quality interaction pattern was replicated for several other student attributes including students' explanations (attributions) of prior test results (Perry and Magnusson, 1989),

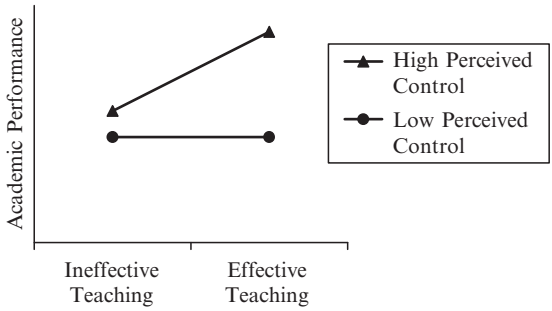

Fig. 1 Hypothetical illustration of the teaching effectiveness × perceived control pattern of interaction reflected in several studies, e.g., Perry and Dickens (1984, 1987); Perry et al. (1986); Schonwetter et al. (1993)

students who differed in Type A/B behavior patterns (Perry and Tunna, 1988), and locus of control (Magnusson and Perry, 1989). Paradoxically then, and contrary to common wisdom, "at risk", failure-prone students most in need of assistance do not necessarily benefit from effective teaching.

Aptitude × Treatment Interaction (ATI)

These findings highlight the contextual challenges of delivering enriched educational programs such as effective instruction, when classrooms are heterogeneous in terms of student differences like perceived control. In these circumstances, an aptitude × treatment interaction (ATI) is inferred when an educational treatment varying in quality (e.g., ineffective versus effective instruction) is more or less effective for students who differ in critical attributes such as perceived academic control (Cronbach and Snow, 1977). An ATI can take several forms, one being that a given treatment has positive educational benefits for some students, but not others (see Fig. 1). Broadly defined, aptitude simply reflects some characteristic that varies across individuals, such as ability, personality, perceptions, and motivation, among others. Specifically, Snow defined aptitude as "any measurable person characteristic hypothesized to be propaedeutic to successful goal achievement," where "*propaedeutic* means needed as preparation for response to the treatment" (1991, p. 205). As long as there are at least two levels of an aptitude, treatments may function differently at each level of that aptitude. Thus, classroom heterogeneity resulting from student differences can increase the likelihood of an ATI in which a given treatment does not benefit all students.

Given that vulnerable, failure-prone students do not benefit from enriched learning experiences in the form of effective instruction, as in the case of low perceived control (Perry, 1991, 2003), other treatments must be considered to meet the learning needs of these students. Specifically, treatments designed to remediate deficiencies in perceived control, and by extension, achievement motivation, can be particularly relevant (Perry and Hall, in press). One such treatment is

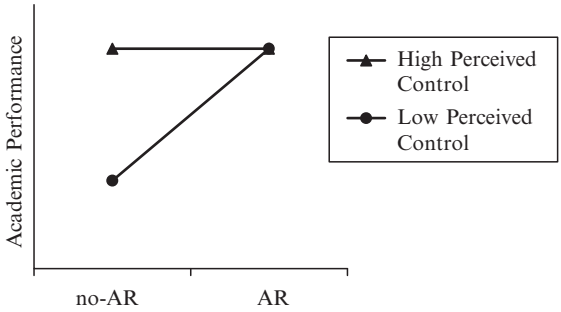

Fig. 2 Hypothetical illustration of AR × perceived control pattern of interaction reflected in several studies, e.g., Perry and Penner (1990); Menec et al. (1994); Perry et al. (2008); Ruthig et al. (2004)

Attributional Retraining (AR), discussed in this chapter as a classroom-based intervention; AR is designed to enhance both perceived control and motivation, thereby assisting vulnerable, low-control students. As was the case with effective teaching, the effects of AR often reflect an ATI. However, whereas teaching effectiveness treatments are most beneficial for high-control students and least beneficial for low-control students, the opposite pattern occurs with AR: AR is most beneficial for low-control students, and least effective for high-control students (AR × perceived control interaction; see Fig. 2).

The remainder of this chapter focuses on the application of AR treatments in higher education settings. First, we present the theoretical underpinnings of AR from the perspective of attribution theory (Weiner, 1985), then we outline the empirical research on AR in higher education settings, highlighting several key issues involving ATIs, study design (laboratory versus field), and AR delivery and content. Finally, we discuss the administration of AR in college classrooms with an emphasis on best practices for AR implementation.

Attribution Theory

According to attribution theory, humans are strongly motivated to seek explanations for important outcomes in their daily lives (Abramson et al., 1978; Forsterling, 2001; Jones et al., 1972; Kelley, 1967, 1973; Weiner, 1985, 1995). This need to understand the causal "rules" that govern one's environment is part of a basic human motive to maintain a "sense of control" in one's environment (Bulman and Wortman, 1977). There is also an obvious evolutionary value of identifying cause-and-effect relationships in one's environment (Schulz and Heckhausen, 1999). Given this, it is unsurprising that attribution theorists describe all humans as "naïve scientists" striving towards prediction of the environment through the identification of causal relationships (Kelley, 1967; Forsterling, 2001; Weiner, 1995).

The conceptual framework for current psychological theories of causality was constructed by Fritz Heider (1958) who is credited as the founder of attribution theory. Heider's (1958) attribution theory rests on the assumption that an individual's subjective perceptions about causality are often a better predictor of how an individual will behave than is the objective causal reality. Thus, reasoned Heider, it is not so much a particular event that determines an individual's subsequent reaction, as much as the causal attributions ascribed to that event. Heider's (1958) initial theorizing was advanced by Kelley (1967, 1973), Jones et al. (1972), and Weiner (1972, 1985; Weiner et al., 1971). Attribution theory has since become a dominant theoretical framework in social psychology in the 1970s and 1980s, and continues to grow, with applications to many areas of psychology including clinical, developmental, educational, health, organizational, and social psychology (Forsterling, 2001).

While several distinct attribution theories exist, we focus on Weiner's (1972, 1974, 1979, 1985, 1995, 2006) attribution theory of motivation. Weiner's theory provides a perspective on how students react to unexpected, negative, and important academic outcomes that are common in the first year of college. This theory has several advantages for studying psychosocial variables in achievement settings due to its emphasis on performance, its range of cognitive, affective, and motivational variables, and its path analytic framework. Indeed, a seminal review of social cognition theory (Fiske and Taylor, 1991; pp. 53–54) notes that Weiner's theory is "admirably specific in hypotheses; … easily subject to empirical validation; … has exerted considerable influence on researchers in many countries, and has received substantial cross-cultural support." Further, Graham (1991; p. 6) states that "this theory is more complete than other attributional conceptions, and it remains the framework of choice for most educational psychology researchers." Given its comprehensive nature, and widespread application in achievement settings, this chapter will focus on Weiner's theory.

From Weiner's (1985) perspective, students try to make sense of their learning experiences by searching for the causes of success and failure within themselves and also within the learning environment. Causal attributions that reside within the student typically include intelligence, skill level, effort, and strategy; in the learning environment, course difficulty, quality of instruction, grading criteria, class size, and social support are commonly cited (Van Overwalle, 1989). According to Weiner (1985), all attributions can be classified on the basis of three causal dimensions: *locus of causality* differentiates between causes that are within a person (internal) versus outside a person (external); *stability* establishes the cause as either subject to change over time (unstable) or not (stable); and *controllability* distinguishes between causes that can be controlled (controllable) and those that cannot (uncontrollable). Thus, Weiner proposes a $2 \times 2 \times 2$ taxonomy involving locus (internal, external); stability (stable, unstable); and controllability (controllable, uncontrollable). This taxonomy results in eight possible "cells" within which any given attribution can be classified (see Fig. 3). It is important to note, however, that this taxonomy is a heuristic and that in reality the dimensions of locus, stability, and controllability are continuous, not dichotomous (Weiner, 1983, 1985).

	Internal		External	
	Stable	**Unstable**	**Stable**	**Unstable**
Controllable	Never studies	Insuffcient effort	Instructor is biased	No help
Uncontrollable	Low ability	Sick the day of test	Test difficulty	Fate

Fig. 3 Weiner's (1985) three causal dimensions: Hypothetical attributions for poor academic performance

The dimensional properties of any given attribution are theorized to exert powerful effects on subsequent cognition, emotion, motivation, and behavior (Weiner, 1985, 1995). Figure 4 is adapted from Weiner's original theory (1985) and illustrates several germane consequences associated with each causal dimension. For example, the stability of an attribution for poor academic performance is a critical predictor of subsequent expectations about future performance and feelings of hope: A stable attribution for failure, such as low ability, produces lowered expectations for future success (cognition) and a resigned feeling of hopelessness (emotion), whereas an unstable attribution, such as low effort, is likely to produce a greater expectation of future success and feelings of hope. Similarly, differences in attributions along the locus and controllability dimensions also result in diverse patterns of cognition, emotion, motivation, and behavior.

Although the above example may seem simplistic, consider the implications of habitual attribution of failure to internal/stable/uncontrollable causes such as low ability. The continual use of such pejorative attributions to explain poor academic performance can result in a downward spiral wherein negative emotional states contribute to continued poor academic performance, which then further undermines emotional functioning, and so on (Hayes and Hesketh, 1989; Wilson et al., 2002). Often referred to as the *exacerbation cycle*, this maladaptive attributional mind-set is credited as a major contributor to emotional disturbances such as depression and anxiety (Abramson et al., 1978; Abramson et al., 1980; Beck, 1972; Ellis, 2001; Wilson et al., 2002).

Attributional Retraining (AR)

One solution to ameliorating the severe deficits in motivation and performance caused by maladaptive failure attributions is Attributional Retraining (AR). AR treatments are designed to restructure individuals' explanations about the causes of negative events or outcomes in their lives. Based on attribution theory (Heider, 1958; Jones et al., 1972; Kelley, 1967, 1973; Weiner, 1974, 1985, 1995), the primary

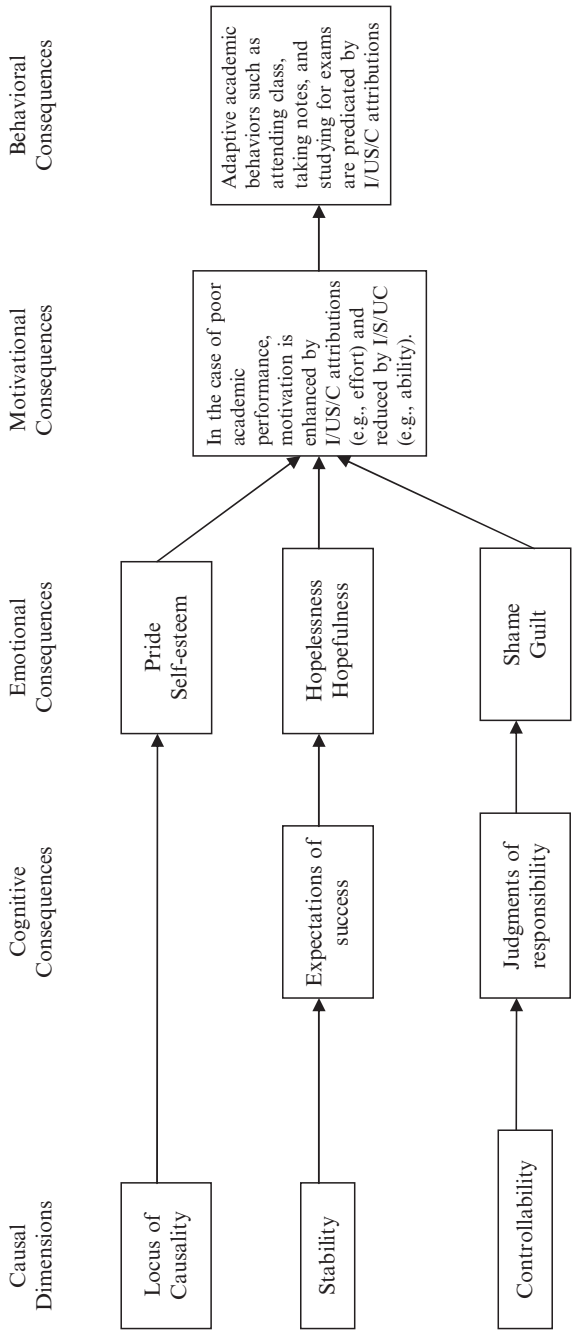

Fig. 4 Selected process variables from Weiner's (1985) attribution theory
Note. I/US/C = Internal/Unstable/Controllable
I/S/UV = Internal/Stable/Uncontrollable

objective of AR is to replace maladaptive, self-defeating attributions with more adaptive, self-helping attributions. Through these changes to attributional thinking, AR is intended to promote more adaptive patterns of subsequent cognition, emotion, motivation, and behavior. Various terms have been used in the AR literature to describe such treatment interventions including attribution(al) training, reattribution(al) training, attribution retraining, reattribution therapy, etc. For our purposes, we use AR to refer to such treatment interventions throughout the chapter.

The principles inherent to AR treatments were first applied in the early 1960s (e.g., Schachter and Singer, 1962; Schachter and Wheeler, 1962) when social psychologists began focusing on the potential of attribution-based treatments to attenuate undesirable behavioral symptoms (e.g., Nisbett and Schachter, 1966; Ross et al., 1969). Storms and Nisbett (1970), for example, developed an attribution-based treatment to assist insomniacs in terms of falling asleep faster at night. The treatment was designed to encourage participants to attribute their night time anxiety/arousal to an external source (i.e., a placebo pill) instead of internal factors such as neurosis, mental disorder, etc. As hypothesized, participants taught to attribute their arousal to an external source reported falling asleep faster than participants in a control group who were not given the attribution treatment.

Clinical psychologists have also employed psychotherapy methods that have parallels to AR treatments, including cognitive behavioral therapy (CBT; Beck, 1972) and Rational Emotive Behavioral Therapy (REBT; Ellis, 2001). These treatments are designed to help clients identify irrational and self-defeating beliefs and to purposefully replace them with more rational and self-helping beliefs. By attaining a more rational belief system regarding the causes of failure/success, individuals are likely to behave in more adaptive ways. Thus, similar to AR, these approaches embody a cognitive model of behavior that is characterized by the assumption that environmental stimuli alone do not determine an individual's reaction, but rather it is the cognitive processing of that stimuli that matters. There are, however, important differences between AR and these clinical treatments including the target audience (low-control college students versus clinically diagnosed individuals) and the delivery method (informal group sessions versus one-on-one therapy).

Since these early applications, AR treatments have been used in a wide range of settings including athletic achievement (Miserandino, 1998; Orbach et al., 1999; Sinnott and Biddle, 1998; Rascle et al., 2008); career and employment decisions (Jackson et al., in press; Luzzo et al., 1996a, b; Szabo, 2006); health settings (den Boer et al., 1991; Sarkisian et al., 2007; Weinberg, 2001); clinical treatment settings (Green-Emrich and Altmaier, 1991); parenting (Sanders et al., 2004); and social skills training (Carlyon, 1997). Despite this widespread application, the majority of AR studies have been conducted in the academic achievement domain. The earliest applications of AR in academic settings were among elementary school children (e.g., Andrews and Debus, 1978; Chapin and Dyck, 1976; Dweck, 1975; Reiher and Dembo, 1984), and subsequently expanded into secondary school settings (e.g., Ziegler and Stoeger, 2004; Ziegler and Heller, 2000), special education settings

(Borkowski et al., 1988; Schunk and Cox, 1986), and higher education settings (for a review see Perry et al., 1993). Although AR research is conducted within a range of academic achievement settings, this review will focus exclusively on AR research in higher education settings.

Higher education settings are particularly appropriate for studying AR because they involve a transition from a familiar to a novel learning environment (i.e., high school to college). The shift from high school to college is a developmental transition faced by many individuals as they move through the life span: other common transitions include beginning a new job, moving to a new city or country, getting married, and bringing home a new baby, among others. These developmental transitions often involve diminished opportunities to exert control (Schulz and Heckhausen, 1999). For example, in the transition from high school to college, perceived control can be threatened by such factors as unexpected academic failure, higher academic standards, and a new physical and social setting (Perry et al., 2001). These factors can result in a perception of the college environment as a "low control setting" wherein academic outcomes are determined by factors beyond the student's control, thereby making AR treatments particularly applicable (Perry et al., 2005b).

Theoretical Considerations

Education-based treatments can vary in terms of the express purpose or goal of the intervention. Three common purposes of such treatments are: knowledge transmission, skill development, and motivation enhancement. Knowledge transmission can involve, for example, remedial tutorial workshops in freshman statistics or math classes in which the focus is on teaching an understanding of mathematical concepts, statistical applications, etc. Other treatments designed to inculcate specific skills include study skills seminars that assist students in taking notes in class, setting up a study routine, etc. Finally, a third type of education-based treatment is specifically aimed at increasing student motivation. AR is classified in this final category as a motivation-enhancing treatment that is intended to modify students' attributional thinking, and thereby improve motivation and performance.

AR has several strengths as a motivation-enhancing treatment: it is supported by a solid body of research (Perry et al., 1993), readily adapted to achievement settings (Menec and Perry, 1995), and is derived from a well-established theory (Weiner, 1986, 1995). Indeed, because AR is based on Weiner's attribution theory, it is possible to identify several theoretically based processes by which AR is theorized to assist students. First and foremost, AR treatments are theorized to produce changes to students' causal attributions – specifically to encourage students to reconsider maladaptive attributions for failure outcomes, and to adopt more adaptive attributions instead. For example, students are encouraged to attribute unsatisfactory academic outcomes to internal/unstable/controllable factors such as effort and strategy in place of external attributions such as luck, or uncontrollable factors such as ability. In so doing, students are more likely to begin taking responsibility for their academic outcomes. In this way, causal attributions are the pivotal process variable of AR treatments.

As previously outlined, causal attributions are linked to a variety of outcomes described in Weiner's (1985) theory. The changes in attributional thinking resulting from AR are, in turn, presumed to affect students' overall perceived control. Recall that perceived control involves a student's subjective beliefs concerning his/her capacity to influence important academic outcomes, and that perceived control is heavily informed by causal attributions about academic success and/or failure (Perry et al., 2005b). A student who explains academic outcomes with controllable attributions, such as effort or strategy, is likely to have a high level of perceived control, whereas a student who explains academic outcomes with uncontrollable attributions, such as test difficulty or luck, is likely to have a lower level of perceived control. In this way, AR-induced changes to attributional thinking can have a direct impact on students' overall level of perceived control.

Finally, causal attributions and perceived control are key determinants of a student's motivation to achieve. Students are motivated to strive for success when they perceive academic outcomes as within their own influence. Conversely, when outcomes are seen as uncontrollable, there is less motivation to strive for success. The bottom line is, the more control a student feels, the more motivated he/she will be. Thus, AR treatments encapsulate several theoretically based processes involving causal attributions, perceived control, and motivation. Although these three processes can be considered overlapping and highly related, they can each be assessed independently, and the direct effect of AR on each process can be estimated.

We now begin our review of the empirical AR research in higher education settings. In reviewing this literature, we consider several critical issues including study design (laboratory versus field), ATIs, AR delivery method and content, and the testing of AR processes. We begin with a discussion of early laboratory work that established the internal validity of AR and the applicability of the ATI concept to AR treatments. Next, we review the early field work that established external and ecological validity in terms of the utility of AR to influence outcomes in actual achievement settings. Finally, we examine the more recent AR research that has addressed two oversights of the early laboratory and field studies involving the applicability of the ATI framework in the field, and the assessment of AR process variables (attributions, perceived control, and motivation).

Early Attributional Retraining Research

Attributional Retraining in Laboratory Settings

Research on assisting vulnerable, failure-prone students with enriched learning conditions in a laboratory setting reveals an ATI in which low-control students do not benefit from effective teaching, whereas high-control students do benefit (see Perry, 1991 for a review). With this research as a backdrop, Perry and Penner (1990) proposed that AR treatments, as motivation-enhancing interventions, can provide enriched learning opportunities for failure-prone students, separately or in

combination with effective instruction. External locus of control was identified as an individual difference (aptitude) that may predispose some students to be failure-prone and consequently to be more in need of AR. Students have an external locus of control when they attribute academic outcomes to external causes such as luck, and an internal locus of control when they attribute the outcomes to internal causes such as effort (Rotter, 1966).

Perry and colleagues conducted a series of laboratory experiments using a Locus of Control (external, internal) by AR (AR versus no-AR) by Teaching Effectiveness (effective versus ineffective) $2 \times 2 \times 2$ design. Within an ATI framework, the broad aim was to examine: whether AR treatments were beneficial for external- and internal-locus students; if so, whether AR effects maintain despite impoverished learning conditions (ineffective teaching); and finally, whether AR effects are augmented by other enriched learning conditions (effective teaching). In an initial study, Perry and Penner (1990) assigned students (internals and externals) to one of four groups: AR followed by effective instruction (high-expressive lecture), AR followed by ineffective instruction (low-expressive lecture), no-AR followed by effective instruction, and no-AR followed by ineffective instruction.

Students in the AR conditions viewed an AR videotape that consisted of a male psychology professor who described his freshman year at university and recounted his early failure. He then discussed how he persisted and went on to succeed in graduate school. The professor encouraged students to attribute poor performance to lack of effort and emphasized that the amount of effort that a person expends is not a stable trait, but is actually controllable. All groups were then shown a half-hour videotaped lecture that varied in terms of effective or ineffective instruction. Finally, students in all groups were given a test immediately after the lecture, and a second test 1 week later that was based on a homework assignment unrelated to the lecture.

In support of an ATI, the vulnerable, external-control students who received AR outperformed their no-AR counterparts on both the post-lecture achievement test and on the homework test that followed the treatment. This pattern was not replicated for internal-control students who were not considered at risk and arguably did not need AR. These findings suggest that AR may inoculate *at-risk* students from the potential hazards of an impoverished learning environment (i.e., ineffective teaching), and may enable these vulnerable students to derive maximal benefits of an enriched learning environment (i.e., effective teaching). Furthermore, they also imply that AR may have motivational benefits beyond the classroom setting in which formal learning occurs, as revealed in the finding that AR students outperformed no-AR students on homework test a week later.

In a follow-up to Perry and Penner (1990), Menec et al. (1994) selected students who scored at or below the median on a Graduate Record Examination (GRE)-like test (failure-prone) and who differed in locus of control (internal versus external). All students were allocated to either an AR or no-AR condition, and then randomly assigned to receive a half-hour lecture from either an effective or ineffective instructor in a locus of control by AR by instruction $2 \times 2 \times 2$ design. Thus, internal- and external-locus-of-control students were assigned to one of four conditions: AR followed by effective instruction (high-expressive lecture), AR followed by

ineffective instruction (low-expressive lecture), no-AR followed by effective instruction, and no-AR followed by ineffective instruction. Students in the AR conditions viewed an AR videotape treatment of a male graduate student who discussed how his early academic failure was due largely to a lack of effort and lack of appropriate strategies. All groups were then shown a half-hour videotaped lecture by either a high-expressive or a low-expressive instructor. Finally, students in all groups were then given a test based on the content of the lecture.

An AR × instruction interaction emerged in that external-control (at-risk) students who received AR before the high-expressive lecture outperformed external-control students who did not receive AR before the high-expressive lecture. This finding indicates that AR may help vulnerable students benefit from effective teaching, perhaps by helping them prepare to learn. Moreover, for students in the high-expressive lecture condition, a significant AR × locus interaction replicated Perry and Penner's (1990) findings such that AR resulted in greater performance gains for externals than internals. This is another instance in which students with external locus of control benefited more from AR than students with internal locus of control in an ATI framework.

Perry and colleagues' laboratory research suggested the importance of AR as a method of orienting students to take advantage of the benefits of an enriched learning environment. While these laboratory studies offer a high level of precision in terms of inferring causal connections, they also compromise the ecological validity of the findings. Indeed, some researchers argue that the control inherent to laboratory experimentation distorts participant's reactions, resulting in an imitation of reality (Black, 1955). Affect, intergroup relations, motivation, and learning are listed as processes that are difficult to study in the laboratory because the contrived testing is highly artificial (Black, 1955). AR field studies respond to these ecological validity concerns.

Attributional Retraining in Field Settings

In the landmark field study of AR in higher education settings, Wilson and Linville (1982) developed an AR treatment to assess whether AR could improve academic performance among vulnerable freshman students. They recruited 40 undergraduate students who, at the end of first semester, had GPAs less than 3.50, were worried about their past performance, and indicated that they could have performed better. Students were randomly assigned to either an AR-treatment or a no-AR control group. The AR treatment consisted of a pamphlet and videotaped message that students viewed in individual sessions. The AR pamphlet comprised a survey of senior students indicating that many students struggle in their freshman year and get lower GPAs than expected, but that performance improves as students move on in their undergraduate career resulting in higher GPAs. The pamphlet was followed with the AR videotape containing "interviews" (actually scripted performances) of senior students. The content in the pamphlet was repeated in a videotape as the

senior students described early academic experiences, and emphasized their own improvement as they progressed in their college careers.

Thus, Wilson and Linville's AR treatment was designed to emphasize the temporary nature of poor academic performance, thereby targeting the stability dimension of causal attributions (Weiner, 1985). No specific attributions were prescribed in the AR treatment, and students were free to select any unstable causes to explain their academic performance such as a new environment, homesickness, etc. Relative to students in the control condition, those who received AR had higher performance on a subsequent test involving GRE-like items. Moreover, at the end of the second year of university, AR students were significantly less likely to have dropped out of college than no-AR students (AR = 5%, no-AR = 25%), and had attained greater increases in their GPAs than the control group. Overall, Wilson and Linville (1982) concluded that a brief, one-time exposure to the AR videotape treatment could result in dramatic differences to students' actual academic profile up to 2 years later.

In response to criticism (see Block and Lanning, 1984), Wilson and Linville (1985) conducted two replication studies. Study 1 was a direct replication of their initial findings, whereas Study 2 involved giving the AR intervention earlier in the academic year. Based on their original study and these two replications, Wilson and Linville concluded that the weight of the evidence supported the effectiveness of a single-exposure videotape-based AR treatment. However, an independent replication by Jesse and Gregory (1986/87) failed to demonstrate the same performance gains in GPA among students who received the AR treatment. Nonetheless, Wilson and Linville's (1982, 1985) original studies set the stage for subsequent AR field studies in higher education settings.

Conceptual Developments in AR Treatment Methods

Researchers adopted Wilson and Linville's (1982, 1985) AR treatment method (i.e., videotape interviews of senior students) in subsequent studies; however, the content of AR treatments changed to include both the locus and the controllability dimensions of causal attributions. For example, Noel et al. (1987) developed a mock-interview AR videotape that emphasized a switch from external to internal attributions for poor performance. Noel et al.'s (1987) simulated interviews with senior-undergraduate students highlighted how attributing academic failure to external (versus internal) causes is often used as a self-protective strategy. The AR treatment implied that although the use of external attributions such as test difficulty or bad luck may protect a student's self-esteem, these attributions do not improve motivation or future achievement striving.

In so doing, Noel et al.'s (1987) AR treatment encouraged students to switch from self-protective external attributions (i.e., luck) to more internal attributions (lack of effort). Failure-prone introductory psychology students were assigned to either the AR or the no-AR condition, and results indicated that the AR group had higher subsequent test performance and received better grades in introductory psychology as compared to the no-AR group. Thus, in addition to Wilson and

Linville's (1982, 1985) stability-focused AR, Noel et al.'s (1987) study demonstrated that treatments designed to target the locus dimension of causal attributions (see Weiner, 1985) could also be effective.

Unlike previous AR treatments that addressed the stability and the locus of attributions, Van Overwalle and colleagues targeted the controllability of attributions (Van Overwalle and De Metsenaere, 1990; Van Overwalle et al., 1989). To achieve this emphasis, they included a brief presentation by a psychology professor in addition to the usual senior-student interviews in the content of the AR videotape treatment. The professor discussed the results of a strategy training program for Physics students and described how the treatment had only been effective for students who implemented the study strategies taught in the program. The professor concluded the presentation by underscoring the importance of two controllable causes of performance: effort and study strategy. As such, Van Overwalle's AR treatment was the first to specifically target the controllability dimension of causal attributions by emphasizing both effort and strategy attributions.

Van Overwalle et al. (1989) selected college freshmen who had failed their economics mid-term and assigned these students to either an AR or no-AR group. Results indicated that AR students attained higher grades on the next economics test, and had higher average marks across all subsequent economics tests. A second study demonstrated that first-year economics students who received a similar AR treatment had a reduced failure-rate of the two-semester economics course (Van Overwalle and De Metsenaere, 1990). These two studies demonstrated that AR treatments targeting the controllability dimension of causal attributions through an emphasis on effort and strategy attributions can be effective in assisting college students.

In summary, early AR research (1982–1994) included both laboratory and field studies. The early laboratory studies involved highly controlled experiments that established the internal validity of AR treatments and suggested the importance of an ATI perspective for examining AR treatments. Early AR field studies demonstrated the ecological validity of AR to affect educational outcomes in real-world college classrooms. However, early AR research had two main limitations: First, it did not systematically test the applicability of the ATI framework to AR treatments in the *field*. Second, it did not assess underlying process variables of AR treatments as outlined in Weiner's theory, i.e., whether AR actually produced attributional changes (e.g., Wilson and Linville, 1982, 1985; Van Overwalle and De Metsenaere, 1990; Van Overwalle et al., 1989; for an exception see Noel et al., 1987). The next section reviews more recent (i.e., 1996–2008) AR research in higher education that has focused on addressing these two oversights of early AR research.

Recent Attributional Retraining Research

Recent research on AR in higher education settings consists primarily of field studies, a number of which have focused on addressing two pitfalls of early AR laboratory and field studies: First, researchers have attempted to demonstrate the utility of an

ATI perspective for examining AR treatments in field settings, as was done previously in laboratory settings, in terms of showing that AR treatments are particularly beneficial for vulnerable, low-control students. Second, several studies have attempted to document the process variables that underpin AR treatments from an attribution theory perspective. We begin this section discussing field-related evidence of AR treatments consistent with an ATI perspective, and then review the empirical documentation of several process variables of AR.

Much of this research has been conducted by Perry and colleagues, and has involved two main AR treatment methods: an AR videotape treatment (Hall et al., 2004, 2006; Haynes et al., 2008; Perry and Struthers, 1994; Perry et al., 2009; Ruthig et al., 2004; Struthers and Perry, 1996) and an AR handout treatment (Hall et al., 2007; Haynes et al., 2006). Although videotape and handout AR treatments differ in delivery method, the content of each is relatively consistent. The treatment emphasizes that attributional thinking can affect the way students perform in college, and outlines how thinking that academic performance is *controllable* can have positive consequences for subsequent achievement. Finally, the AR treatment details how lack of effort and poor strategy are valid reasons why many first-year college students perform poorly on tests and assignments. Readers are referred to a later section of this chapter for a detailed discussion of each of these AR delivery methods (see *A Protocol for Administering Attributional Retraining*).

AR × Perceived Control

The utility of the ATI framework for examining AR treatment effectiveness in higher education settings has been demonstrated in relation to students differing in perceived control. In new achievement settings, such as high school-to-university transitions, students' perceived control can be threatened by unpredictable and unfamiliar experiences that include novel academic tasks, poor performance, and increased competition. On entering university, low-control students are particularly vulnerable in such circumstances and can suffer from low motivation, negative affect, and frequent failure as a consequence (Perry, 1991, 2003). From the perspective of Weiner's (1985) attribution theory, the tendency to make maladaptive attributions for failure accounts for the vulnerability associated with having low perceived control. Thus, to the extent that AR is a control- and motivation-enhancing intervention, it is well suited to assist low-control students in modifying their attributional thinking.

The interaction of AR with perceived control is somewhat distinctive because of the characteristics of perceived control as both the "aptitude" (independent variable) in the ATI with which AR interacts and the objective outcome (dependent variable) because AR is a control-enhancing treatment. Although this may seem unorthodox, researchers have indeed been encouraged to examine state-like aptitudes, and, in turn, aptitude changes in response to treatments (Snow, 1991). The results presented next meet this requirement because AR (treatment) is expressly intended to increase perceived control (outcome) in students with low perceived control (aptitude).

An empirical study by Hall et al. (2006), for example, examined the effectiveness of an AR treatment for students with different types of perceived control. They hypothesized that poor-performing students with a maladaptive profile of perceived control who received AR would outperform their no-AR counterparts by the end of the academic year. These results were largely supported: Following AR, unsuccessful students with a maladaptive profile of perceived control scored approximately 10% higher in final course grades than students who did not receive AR. Further, only the vulnerable, low-control students benefited from AR: Students displaying an adaptive profile of perceived control did not benefit from AR. Thus, Hall et al.'s (2006) study demonstrates the applicability of the ATI framework for AR treatments among college students with varying levels of perceived control.

Perceived control is related to numerous student aptitudes (individual differences) such as attributional mind-set, academic performance, perceived success, and optimism. More specifically, students are at risk of experiencing low perceived control to the extent that they: have a maladaptive attributional mind-set, experience objective academic failure, perceive themselves as unsuccessful, and have unrealistically optimistic expectations. Thus, students possessing these characteristics are likely to be good candidates for AR. We adopted an AR × perceived control ATI framework for reviewing studies in which these student aptitudes were considered in relation to an AR treatment.

Struthers and Perry (1996) reasoned that students who explain failure using unstable and uncontrollable attributions, such as professor quality, are likely to have lower perceived control than students who explain failure with controllable attributions, and hence should benefit from a control-enhancing AR treatment. Struthers and Perry identified four attributional mind-sets: stable-uncontrollable, stable-controllable, unstable-uncontrollable, and unstable-controllable. Students who were classified as having an unstable-uncontrollable attributional mind-set benefited most from AR, and showed a significant improvement in overall course performance compared to their control-group counterparts (B compared to C+, respectively). Students with more adaptive attributional mind-sets who were not considered at risk did not show the same patterns of improvement following AR, suggesting once again the specialized benefit of AR for low-control students.

Poor performance may be especially deleterious for students in new achievement settings to the extent that it is a highly negative and unexpected event that erodes perceived control. Perry et al. (2009) administered an AR treatment to three groups of students shortly after they wrote a test in a two-semester psychology course at the start of the academic year. The three groups were differentiated according to their performance on the test as follows: low performance (M = 50%), average performance (M = 70%), and high performance (M = 86%). Results indicated that low and average performance students who received AR did significantly better than their no-AR counterparts in terms of subsequent class tests, final course grades, and overall GPA in all first-year courses. No effects were found for high-success students, who arguably did not need AR. In this study, student aptitude was defined in terms of three levels of initial course performance such that the resulting ATI was manifest as the AR treatment having an effect for poor and average performance students but not high-performance students.

Of course not all students interpret objective measures of achievement in the same way. For some students, 75% represents success; for others, this is a complete failure. Accordingly, rather than looking at objective achievement rates, some researchers have focused on students' subjective feelings of success. Just as AR is beneficial for objectively low-performing students, it should also benefit students with subjective perceptions of low success. Perry and Struthers (1994) gave AR to students with low levels of perceived success following their first class test. High school grade was used as a covariate in the analyses to ensure that student differences in perceived success were based on subjective perceptions and not on objective performance differences. Low-perceived-success students who received AR had higher subsequent test scores and final grades relative to high-perceived-success students in the AR group and students in the control group.

Over-optimism is another individual difference variable related to academic vulnerability and low perceived control that can undermine students' academic engagement, motivation, and performance. Over-optimism is defined as unrealistically high expectations that do not necessarily correspond to the realities of an objective situation (Radcliffe and Klein, 2002). Haynes et al. (2006) argue that overly optimistic students are those who base their optimistic academic expectations on uncontrollable attributions. For example, overly optimistic students may expect to get high grades because "this course is easy" or "the teacher is an easy grader." Consequently, these students are at risk for unmet expectations and low perceived control: characteristics that make them good candidates for AR. Haynes et al.'s (2006) study revealed a significant AR × optimism interaction in which overly optimistic students who received AR outperformed their no-AR counterparts in terms of final course grades and overall GPAs.

In practical terms, this meant that overly optimistic AR students scored approximately 10% higher in their final course grade in an introductory psychology course and at least one half GPA point better than over-optimists who did not receive AR. Ruthig et al. (2004) found a similar pattern of results showing that highly optimistic students who received AR performed significantly better than did the no-AR group. These associations imply that over-optimism may be associated with low perceived control, making it a useful academic marker in higher education settings for identifying students in need of AR.

In summary, recent research in higher education settings demonstrates that AR benefits students who are vulnerable in terms of low perceived control. Furthermore, low perceived control can arise from a variety of individual difference variables (student aptitudes) such as a maladaptive attributional mind-set, unsatisfactory performance (objective or subjective), and over-optimism. Given that AR is a control- and motivation-enhancing intervention, research suggests that it is particularly well suited to meet the needs of students with these characteristics. In addition to demonstrating the utility of an ATI framework for studying AR in field settings, recent research has also begun to address a critical oversight of early research by systematically considering several theoretically-based process variables that underpin AR treatments. The next section highlights studies that have examined three theoretically-based AR process variables: causal attributions, perceived control, and motivation.

Underlying AR Processes

Early AR field studies focused on the external validity of AR treatments to improve academic outcomes such as course grades, GPA, and attrition, but neglected to assess the processes by which AR treatments produce such effects. Specifically, researchers did not assess whether AR treatments successfully modify causal attributions or other process variables. Weiner's (1985) attribution theory points to several critical process variables underlying the effectiveness of AR treatments, and recent studies have begun to document the effects of AR on three particular processes: causal attributions, perceived control, and motivation. A review of this research follows, organized according to the process variable tested. Issues associated with study design and measurement of the process variables are highlighted in the context of distinguishing between provisional and more reliable empirical evidence. Further, Table 1 presents a summary of each study in terms of the AR process variable assessed and the related findings.

Causal Attributions

Several recent field studies have assessed whether AR treatments produce changes to causal attributions among college students. Hall et al. (2006) examined students' attributions categorized into controllable (effort and strategy) and uncontrollable (ability, luck, teacher, and test difficulty) groupings in keeping with Weiner's controllability dimension. A significant AR main effect emerged for uncontrollable attributions, indicating that AR students were less likely than no-AR students to attribute their performance to uncontrollable causes 5 months after receiving an AR treatment. No main effect emerged for controllable attributions, suggesting that the AR treatment was more likely to reduce uncontrollable attributions than to enhance controllable attributions. Hall et al. (2007) replicated this pattern in showing that AR participants were less likely to attribute academic outcomes to uncontrollable causes than no-AR participants (see Table 1).

Perry et al. (2009) used a multivariate analysis of variance (MANOVA) procedure to examine the effects of AR on four attributions: effort, strategy, quality of teaching, and test difficulty. An AR multivariate main effect on the four attributions was followed with discriminant function analysis which revealed a composite attributional structure emphasizing the controllable attributions (effort and strategy) and de-emphasizing the uncontrollable attributions (quality of teaching and test difficulty). Students in the AR group were more likely to endorse this controllable attribution profile than students in the no-AR group. Nevertheless, the findings from Perry et al. (2009) and Hall et al. (2007) are limited because the experimental designs lack a baseline assessment of attributions. A pre-post control design is important for assessing the process variables of any treatment intervention wherein both the treatment and the control group are assessed on the dependent variables *prior to* and *following* the experimental manipulation (Campbell and Stanley, 1963). This pre-post measurement allows for a

baseline assessment of potential process variables of the treatment, and is essential for determining causal connections between a treatment and a process variable.

Haynes et al. (2006) used a repeated-measures longitudinal design to examine pre- to post-AR changes in attributions among college students. Five attributions were assessed both before and after the AR treatment: effort, ability, luck, test difficulty, and quality of teaching. Results demonstrated a pre- to post-AR increase in effort attributions for AR students, and no corresponding increases among the no-AR students. The use of a pre-post study design provides more confidence regarding the capacity of AR to cause increases to at least one controllable attribution (i.e., effort). In summary then, recent studies have begun to document the efficacy of AR treatments to successfully modify students' attributions; however, more research is needed with particular attention paid to pre-post study design.

Perceived Control

To the extent that AR treatments modify causal attributions, they are also likely to impact subsequent perceptions of control. Controllable attributions give students a greater sense of personal control over their academic performance, whereas uncontrollable attributions engender less personal control over academic outcomes. Thus, if AR encourages an adaptive pattern of causal attributions for poor academic performance (i.e., internal/unstable/controllable), it should also result in increases to perceived control. Hall et al. (2004), for example, measured perceived control pre- and post-AR with a 24-item measure that assessed students' *academic-specific* perceived control, *general* perceived control, and *desire* for control. An AR main effect emerged for perceived control, while covarying for pre-AR perceived control, such that AR students had higher perceived control than no-AR students 5 months following the AR treatment.

In a follow-up study, Haynes et al. (2006) assessed students' general perceived control pre- and post-AR 4 months apart. Paired t-tests indicated that AR students experienced an increase in their perceived control from pre- to post-AR, while no such changes were observed for no-AR students. Haynes and Perry (2008, unpublished data) replicated this pattern with a domain-specific measure of perceived *academic* control. The AR students experienced an increase in perceived academic control over the year, whereas no such increase was evident among the no-AR group. As such, it appears that AR may serve to increase both general and domain-specific forms of perceived control among college students.

In sum, a number of field studies have verified that AR treatments modify attributional schemas and also increase students' perceived control over academic outcomes (see Table 1). According to Weiner's (1985) attribution theory, the modification of attributional schemas and perceived control are directly associated with changes in motivation. Based on this reasoning, researchers have begun to investigate the direct impact of AR on student motivation as a third process variable.

Table 1 Process variables in recent AR field studies (1996–2008)

Study	AR format	Process variable(s) assessed	Results
Hall et al. (2004)	AR videotape emphasized controllable attributions (effort and strategy)	Pre- and post-AR assessment of perceived control	AR group had higher levels of perceived control than no-AR group at a 5-month post-AR assessment
Hall et al. (2006)	AR handout or videotape emphasized controllable attributions	Post-AR measures of controllable (effort, strategy) and uncontrollable attributions (ability, luck, teacher, test difficulty)	AR group had lower levels of uncontrollable attributions than no-AR group at a 5-month follow-up
Hall et al. (2007)	AR handout emphasized controllable attributions (effort and strategy)	Post-AR assessment of controllable versus uncontrollable attributions Post-AR assessment of intrinsic motivation and expectations	AR group had lower levels of uncontrollable attributions and higher levels of intrinsic motivation and expectations, at a 5-month follow-up. Expectations mediated the relationship between AR and grades
Haynes et al. (2006)	AR handout emphasized controllable attributions (effort and strategy)	Pre- and post-AR assessments of attributions (effort, ability, luck, test difficulty, and quality of teaching) Pre- and post-AR assessment of general perceived control	The AR group showed increases in a controllable attribution (effort) and perceived control pre- to post-AR (spanning 4 months). This pattern was not replicated for the no-AR group
Haynes et al. (2008)	AR videotape and handout emphasized unstable and controllable attributions	Pre- and post-AR assessments of mastery and performance motivation	Mastery motivation increased pre- to post-AR (spanning 5 months) for AR group, but not for the no-AR group. Mastery mediated the relationship between AR and grades
Haynes and Perry (2008)	AR videotape and handout emphasized unstable and controllable attributions	Pre- and post-AR assessments of domain- specific perceived academic control	The AR group showed increases to perceived academic control at a 5-month follow-up, whereas the no-AR group did not
Perry et al. (2009)	AR videotape, handout, and aptitude test emphasized unstable and controllable attributions	Post-AR assessment of four attributions (effort, strategy, quality of teaching, and test difficulty)	Compared to the no-AR group, students who received AR had a more adaptive attributional profile involving high levels of strategy and effort attributions at a 5-month follow-up
Struthers and Perry (1996)	AR videotape emphasized unstable and controllable attributions	Pre- and post-AR assessment of motivation (operationalized as expectations)	Motivation improved among all students pre- to post-AR (spanning 5 months), but to a greater degree among those who received AR

Motivation

Several field studies indicate that AR treatments can have a direct impact on students' achievement motivation (see Table 1). Hall et al. (2007) assigned students to AR or no-AR conditions and measured their post-AR intrinsic motivation (i.e., interest in learning) and expectations (i.e., expected success). An AR main effect was found for both intrinsic motivation and expectations in which AR students reported higher intrinsic motivation and success expectations than did their no-AR counterparts at a 5-month follow-up assessment. These findings are limited to the extent that a pre-AR baseline assessment was omitted. Using a pre–post design, Struthers and Perry (1996) examined the effect of an AR treatment on achievement motivation measured in terms of academic *expectations* (expected grade) and *value* (importance of receiving a good grade). Motivation improved among both AR and no-AR students; however, the increase was somewhat larger among those who received the AR treatment. Struthers and Perry (1996) concluded that, although motivation can improve over time without AR, it appears that AR serves to further strengthen motivation levels.

Most recently, Haynes et al. (2008) examined pre- to post-AR changes in mastery motivation (motivation to learn, understand, and master content) and performance motivation (motivation to get good grades relative to others) among first-year college students. Differential effects of AR on the two types of motivation were observed in which AR students exhibited increased mastery motivation, but no changes in performance motivation. Hence, AR encouraged students' motivation to learn, understand, and master the content of their college courses, rather than simply to achieve good grades (performance motivation). No corresponding changes in motivation were observed among the no-AR students.

A final methodological development in recent research involves the assessment of mediational models that test the extent to which AR treatment effects on performance outcomes (i.e., final course grades, GPAs, etc.) are mediated by motivation (see Table 1). In testing several mediation models, Hall et al. (2007) demonstrated that expectations significantly mediated the direct relationship between AR and performance, pointing to motivation (academic expectations) as an important process variable underpinning AR treatments. In addition, Haynes et al.'s (2008) mediational analyses also demonstrated that mastery motivation mediated the relationship between AR and GPA, again indicating that motivation is a key process variable of AR.

This section has summarized recent AR research in higher education that has addressed two critical oversights of early AR research by: demonstrating the utility of an ATI perspective for examining AR treatments in field settings, and by documenting several theoretically based process variables that underpin AR treatments. Overall, the preceding reviews of both early and recent AR research provide 3 decades of support for the effectiveness of AR treatments in higher education settings. A logical question extending from this body of empirical evidence involves the estimation of the magnitude of AR treatment effects. The next section will briefly comment on this issue, before we begin our discussion of AR applications in classroom settings.

Magnitude of AR Effects

To put the effects of AR treatments into perspective, consider the efficacy of treatment interventions undertaken in other research domains. Meyer et al. (2001) conducted a comprehensive review of over 125 meta-analytic studies of several well-established treatment–outcome relationships in the health domain. The meta-analytic studies present effect-size correlations which reflect the point-biserial relationship between a treatment and an outcome variable. A selection of effect–size correlations from Meyer et al.'s (2001) for comparison purposes are as follows: aspirin and reduced risk of death by heart attack, $r(22{,}071) = .02$; hypertension medication and reduced risk of stroke, $r(59{,}086) = .03$; calcium intake and bone mass in premenopausal women, $r(2{,}493) = .08$; ultrasound examinations and successful pregnancy, $r(16{,}227) = .01$; mammogram results and breast cancer detection after 2 years, $r(192{,}009) = .27$; and height and weight for US adults, $r(16{,}948) = .44$.

The typical effect size of AR on academic outcomes in higher education settings, such as course grades, GPAs, etc., ranges from $r = .14$ to .42 (see Hall et al., 2004, 2006, 2007; Haynes et al., 2006, in press; Perry et al., 2008; Perry and Struthers, 1994; Ruthig et al., 2004). In relative terms, these AR effect sizes compare favorably to several of medical treatments noted above. Indeed, effect sizes of AR are greater than the widely recognized associations between aspirin intake/reduced heart attacks (.02), blood pressure medication/reduced risk of stroke (.03), calcium intake/bone mass (.08), and ultrasound exams/successful pregnancy (.01). Furthermore, the typical AR effect size is within the same range as the relationship between mammogram use and breast cancer detection (.27), and approaches the effect size of the relationship between height and weight (.42). The effect sizes of AR are statistically meaningful according to Cohen (1988) who suggests correlations between .10 and .20 are small, .20 and .40 are moderate, and above .40 are large. The squared value of an effect–size correlation represents the percentage of variance in a dependent variable that is attributable to the treatment; thus, in practical terms, this means that AR can explain up to 17% variance in academic outcomes such as final course grades or cumulative first-year GPAs.

In sum, 3 decades of research support the efficacy of AR treatments to modify attributions, perceived control, motivation, and improve academic outcomes among college students. Further, the magnitude of AR effects relative to other treatments suggests that AR is a promising option for widespread use in college classrooms. We now turn to a detailed discussion of the best practices for implementing AR treatments in college classrooms.

Attributional Retraining in Classroom Settings

We begin with a detailed description of an AR treatment protocol comprised of five components that has been successfully implemented in a number of previous studies (e.g., Hall et al., 2004, 2006; Haynes et al., 2006; Ruthig et al., 2004).

The depiction of this procedure should be useful for several groups interested in applying AR to various learning situations, including classroom instructors, faculty developers in teaching centers, and university administrators. For each of these groups, the prevailing question is, "How can I implement AR in a specific learning environment for the benefit of failure-prone students?" In outlining the fundamental components of AR treatments, we describe successful protocols developed by researchers for the effective administration of AR in higher education settings.

We also discuss several practical issues surrounding the use of AR in higher education classrooms. For instance, large-scale administrations by educators would involve training individuals to administer AR; however, no recommendations or guidelines for such training have been put forth. The popularity of the internet allows for widespread electronic administration of AR; however, the best way to administer such an intervention has not been explored. Finally, potential dangers associated with improper administration of AR are noted to facilitate the successful administration of AR treatments.

A Protocol for Administering Attributional Retraining

The protocols for administering AR described here are based on a number of theoretical and conceptual developments, as well as findings from the research literature. Foremost, AR treatment procedures are predicated by *causal search* which is a cognitive process involving the search for, and selection of, explanations (causal attributions) for outcomes and events (Weiner, 1985). Recent research, for example, demonstrates that first-year college students' engage in most causal search following negative and unexpected grades on initial class tests (Stupnisky et al., 2006, 2008). AR treatment procedures build on Weiner's theoretical framework by using other theoretically based procedures to reinforce and consolidate the AR content that include elaborative processing (Entwistle, 2000) and emotional expression (Pennebaker, 1997). Further, the procedures are designed specifically with the learning experiences of college students in mind to maximize their receptiveness to the treatment (Pascarella and Terenzini, 2005).

The AR treatment protocol described here consists of five components that are administered sequentially over an entire academic year (see Fig. 5) and based on procedures used extensively in laboratory and field studies. The procedures have been largely developed and tested on college students enrolled in two-semester courses beginning in September and ending in April, the majority of them being in their first year of college, which is a critical time for optimizing the effectiveness of AR. These procedures have been shown to positively influence the attributional schemas (Hall et al., 2006; Haynes et al., 2006; Perry et al., 2009), perceived control (Hall et al., 2004), motivation (Haynes et al., in press), and academic achievement of college students (Perry et al., 2009). Other methods of administering AR exist, and can be incorporated with those described here depending on the conditions under which AR is given (e.g., Andrews and Debus, 1978; Borkowski et al., 1988; Schunk and Cox, 1986).

Pre-AR Diagnostic Assessment

Approximately 1 month after the start of the academic year (October), the pre-AR diagnostic assessment component is implemented in which students complete a questionnaire to assess a range of psychosocial variables and learning conditions students have experienced to that point in the academic year (see Fig. 5, Stage 1). The assessment of psychosocial variables (individual differences) is intended to identify students that are academically vulnerable and failure-prone as candidates for AR. By this time, most students have received feedback on their first tests in their courses so that they have some initial academic experiences on which to base an assessment of their new learning environments. Typical measures include demographics (e.g., gender, age, ethnicity), educational factors (e.g., year in university, faculty), and "student aptitudes" (e.g., perceived control, optimism, attributional style), that identify vulnerable students for whom the AR treatment is targeted.

Causal Search Activation

The causal search component takes place prior to, or concurrently with, the pre-AR diagnostic assessment component. The causal search process is initiated by instructing students to rate their *perceived success* to date by reflecting on their performance on their first class test in a specified course and in their undergraduate program generally. Students are then asked to report attributions for their academic performance on the class test. These initial ratings of causal attributions can also be used as a pre-AR baseline to determine whether AR was effective in altering causal attributions.

The pre-AR diagnostic assessment and causal search activation components are designed to encourage students to think in depth about their academic performance up to that point in the year, with a specific emphasis on encouraging contemplation of causal attributions for academic performance (see Fig. 5, Stage 2). The timing of the causal search activation component is important as it "primes" students to be active recipients of the information provided in the next two stages (Bargh, 2006; Bargh et al., 2001). Thus, causal search activation should occur shortly *after* students receive performance feedback early in the academic year, and directly *before* administration of the treatment component of AR. This sequence is designed to maximize the induction of the attributional content in the AR treatment.

AR Induction

The AR induction component takes place immediately following causal search activation and is considered to be the critical element of the treatment (see Fig. 5, Stage 3). In empirical studies, a sample of students are randomly assigned to the AR treatment condition, referred to as the experimental or AR group, and another

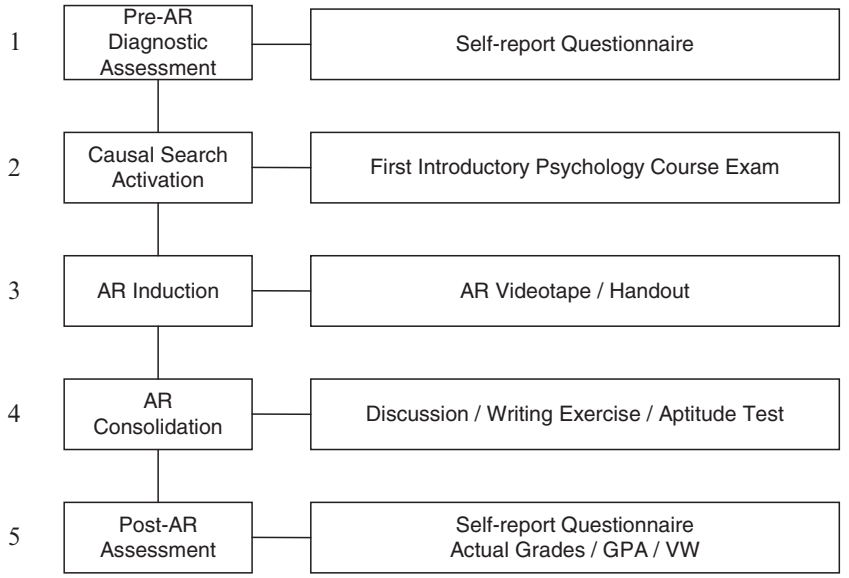

Fig. 5 Components of Attributional Retraining (AR)

sample is designated as a no-treatment/control condition, referred to as the control or no-AR group. Students who are not selected for the AR treatment are dismissed following the pre-AR diagnostic questionnaire, and as such, constitute the no-AR/control condition; students in the AR condition remain after the diagnostic questionnaire in order to receive the AR treatment.

The content of the AR induction component is intended to encourage students to make adaptive rather than maladaptive attributions for academic performance based on Weiner's (1985) taxonomy of causal dimensions (see Fig. 3). The content of many AR treatments focus on highlighting the controllable factors and downplaying uncontrollable factors following failure. Following failure, for example, specific adaptive attributions include lack of effort or bad strategy (i.e., internal, unstable, controllable), whereas maladaptive attributions include poor teaching or difficult test (i.e., external, stable, uncontrollable). The goal is to have students embrace controllable factors as legitimate causes of their future academic performance so that they adjust their academic strategies, efforts, and planning to maximize their achievement potential.

Two methods of AR induction are described here and, together with the AR consolidation components (see below), take 30–90 min to administer, depending on the other procedures being used. The first AR induction method involves presenting the attributional content using an *AR videotape*. As described in Menec and Perry (1995), this method involves a videotape presentation to students in a classroom setting. Three versions of the AR videotape have been developed by Perry and colleagues (see Menec et al., 1994; Perry and Penner, 1990; Struthers and Perry,

1996). The Menec et al. (1994) and Perry and Penner (1990) AR videotapes are described above (see *Early Attributional Retraining Research*), and a brief description of Struthers and Perry's (1996) AR videotape is presented below.

The attributional content of the AR videotape method developed by Struthers and Perry (1996) involves two undergraduate students having a discussion about their first-year university experiences. The male student explains that he performed poorly on several tests and started to doubt his academic abilities. He reveals that, after doubting his abilities, he realized that he had not studied enough and thus, began to put more effort into his courses and his performance improved. The female student shares a similar recollection of academic failure and discusses how she focused on changing her study strategies, which improved her academic performance. In conversation, the students describe several ways in which academic performance can be affected by causal attributions, and emphasize how a change in thinking led to better subsequent academic performance. After the students' discussion, a commentator (psychology professor) concludes by summarizing the main points and reemphasizing the importance of using internal/unstable/controllable attributions for poor academic performance (see Hall et al., 2004, 2006; Haynes et al., 2008; Menec et al., 1994; Perry and Struthers, 1994; Perry et al., 2009; Ruthig et al., 2004; Struthers and Perry, 1996).

The other AR induction method involves presenting the attributional content using an *AR handout*. The handout lists commonly used maladaptive attributions for poor academic performance on the left side of the page and adaptive attributions on the right side of the page (see Appendix A). This AR handout has been administered several ways, the most common method being to distribute it to students in a classroom setting. Students are asked to read the handout carefully, and to think about their own academic experiences and attributions for academic performance. The handout is then displayed on an overhead projector and explained in detail by reviewing several examples and encouraging discussion (see Hall et al., 2006, 2007; Haynes et al., 2006). Alternatively, the AR handout can be presented online by requiring the students to read the AR handout from a computer screen (Hall et al., 2005a, b).

AR Consolidation

The AR consolidation component immediately follows the AR induction component (see Fig. 5, Stage 4) and is designed to reinforce the AR attributional content through several techniques such as paraphrasing the main points of the AR treatment and applying the AR information to one's own personal academic experiences, among others (Weingartner and Parker, 1984). Four distinct AR consolidation procedures have been developed to reinforce the attributional content presented in the treatment: group discussion, aptitude test, writing assignment, and handout.

The first consolidation procedure involves *group discussion* wherein students are organized into small groups and encouraged to discuss their attributions concerning recent academic experiences. The groups are instructed to think about a time when

they performed worse than expected, then generate three important reasons (causal attributions) for their unsatisfactory performance. The students are given 5 min to discuss these reasons with their group, after which a spokesperson reports them to the AR coordinator and to the other discussion groups. The coordinator lists the reasons on an overhead, reviews them with the students, and identifies which are adaptive (controllable) and which are maladaptive (uncontrollable). For each uncontrollable attribution, the coordinator and students discuss alternate controllable attributions to replace the uncontrollable ones. This AR discussion procedure for consolidating attributional content has been shown to improve the academic performance of college students who regard themselves as unsuccessful academically (Perry and Struthers, 1994).

The second AR consolidation procedure involves an *aptitude test* wherein students experience failure immediately following the AR induction. This failure experience allows the students to practice what they have learned from the AR induction by endorsing controllable attributions to explain their failure. In previous studies, students completed the Abstract Reasoning and Performance Test (ARPT, Perry and Dickens, 1984, 1987) which is an aptitude test that is intentionally designed to be difficult to ensure that students experience failure. The ARPT is comprised of three sections: verbal analogy, quantitative, and sentence completion, which contain 10, 5, and 10 questions, respectively. Students have 5 min to complete each section, after which the treatment coordinator summarizes the information presented during the AR induction component to reinforce the AR content. The aptitude test procedure has been used in several studies to consolidate adaptive attributions in order to improve academic performance (see Hall et al., 2004; Perry and Penner, 1990; Perry et al., 2009; Menec et al., 1994).

A third AR consolidation procedure involves a *writing assignment* intended to encourage deeper processing of the attributional content through elaboration. Specifically, students respond in writing to several questions concerning the AR content, taking as much time as they like (see Appendix B). Two different writing assignments have been developed; one requires students to elaborate on their attributions in detail, the other to describe the emotions aroused by an important failure experience. The *attribution-elaboration* assignment is intended to achieve three goals related to elaborative processing: depth, by fostering interconnections of the content through summarization; breadth, by associating the content with a variety of related information; and personal meaning, by creating personally relevant examples (Entwistle, 2000). Thus, students summarize the main points of the videotape in their own words, then list important reasons for why students may not perform as well as they could in their courses, and finally describe how the main points of the videotape apply personally to their own lives (see items 1–3 Appendix B). This procedure has been shown to increase students' end-of-year perceptions of control and academic performance (Hall et al., 2004, 2006).

The *emotion-elaboration* writing assignment is an alternative consolidation procedure based on research by Pennebaker and colleagues involving written emotional expression (Pennebaker, 1997; Pennebaker and Seagal, 1999; Smyth,

1998). Students are asked to recall an exam or another academic experience in which their performance was unsatisfactory, then describe their feelings about the event and how they learned from it, or reinterpreted it in a positive way (see Appendix B). Students are reassured that their responses are confidential to encourage emotional embellishment in keeping with the Pennebaker paradigm. This emotion-writing assignment has been shown to elicit affective responses from students (Haynes et al., 2008), and to increase adaptive attributions, perceived control, and academic performance (Hall et al., 2007; Haynes et al., 2006).

Finally, the fourth AR consolidation procedure consists of the AR handout described earlier as an AR induction method (see above). As a consolidation procedure, the AR handout has been combined with the AR videotape induction technique. At the end of an AR videotape administration, for example, students would receive the AR handout and be encouraged to keep it readily accessible for studying, such as in a course notebook or in close proximity to their study area. As such, the handout is a salient reminder for students to make adaptive attributions for their academic performance.

Post-AR Assessment

The post-AR assessment component occurs several months after the administration of the AR treatment (see Fig. 5, Stage 5) and consists of a questionnaire designed to reassess students' attributions, perceived control, motivation, etc., allowing for pre- to post-AR comparisons on a range of psychosocial variables. In addition, objective performance measures (e.g., test scores, final grades, and GPA) and indicators of persistence and attrition (e.g., number of courses completed, number of courses dropped) are obtained from course instructors and institutional records as part of the post-AR assessment.

In sum, the AR treatment described here involves a multicomponent protocol based on a strong theoretical framework, powerful reinforcement of attributional information, strategic administration of the intervention, and systematic collection of pretreatment and posttreatment measures. Administrations of AR treatments that have followed this multistep sequence have successfully improved the attributions and academic performance of college students (Perry and Hall, in press). Having described the specific details of an AR treatment, the next section considers the issues involved in implementing an AR treatment in higher education settings.

Implementing Attributional Retraining

To date, AR treatments have typically been available to college students only as part of their participation in research studies – AR has yet to be systematically applied in college classrooms. The prospect of administering AR to large groups of students in college classrooms, or to make it available over the Internet, is certainly enticing.

Educators could assist students in a timely, inexpensive fashion with the reassurance of administering a treatment intervention that is both theoretically grounded and empirically supported. However, prior to the implementation of AR in college classrooms, several issues must be considered to increase the likelihood that AR treatments will be effective.

Large-Scale Administration

A key factor to consider when implementing an AR treatment en masse involves the expertise of the individuals administering the intervention. In the studies discussed above, AR sessions were led by experimenters who were well trained in attribution theory and research methodology. However, if university instructors administer an AR treatment, a question arises concerning their background knowledge. A basic understanding of attribution theory would be beneficial for understanding causal search and when it is likely to occur (i.e., following negative, unexpected, important events) and would ensure that AR would be administered strategically. Knowledge of Weiner's (1985) typology of causal dimensions (locus of causality, stability, and controllability) would aid AR users in identifying maladaptive attributions and explaining how adaptive attributions are beneficial.

Additionally, characteristics of the students who receive AR can be a critical determinant of the effectiveness of AR. As outlined in an earlier section (see *Recent Attributional Retraining Research*), AR is particularly effective for students with low perceived control. These vulnerable students are susceptible to maladaptive attributional thinking, and benefit from AR because it replaces maladaptive attributions with more adaptive ones. Alternatively, students with high perceived control are likely to already be making adaptive attributions, and hence do not gain significant benefits from AR. This pattern highlights the importance of considering student individual differences when administering an AR treatment.

Another factor to consider when administering AR to large groups is the type of induction and consolidation methods implemented. For example, very large classrooms would make it difficult for instructors to monitor the content of an AR consolidation group discussion. Specifically, when groups are too numerous, noise levels create difficulty for meaningful conversations to take place; when groups are too large, student participation is not likely to be evenly distributed. In contrast, AR consolidation activities in large classrooms that are independently completed, such as writing assignments, allow students to elaborate on the AR content in an efficient, yet highly personal manner. The administration of individually oriented consolidation treatments also makes it unnecessary to externally regulate an unstructured classroom discussion, thereby requiring much less direct instructor supervision.

The learning environment in which AR treatments are administered can also play a role in their effectiveness. As outlined in detail earlier, teaching effectiveness can be an important factor affecting AR effectiveness (Menec et al., 1994; Perry

and Penner, 1990). Additionally, the subject material of the course in which AR is administered may also influence the efficacy of AR. For example, students enter courses such as introductory psychology with attentiveness to cognitive processes and are primed to receive information about human behavior. Alternatively, students in courses such as mathematics or engineering are focused on learning more abstract information and may be less receptive to the AR content.

Online AR

An increasingly important consideration is the medium through which AR is administered. The majority of today's college students are familiar with using computers and the Internet, and may be receptive to an intervention administered online. There may be several advantages to online-AR delivery as opposed to more traditional means. For instance, online methods may allow for the delivery of AR to nontraditional college students, such as those who are physically disabled, hearing impaired, and students living in remote communities. Furthermore, online-AR may eliminate the need for an AR administrator, as the procedure will play out automatically for the students, thereby reducing the number of AR administrators that need to be trained.

Despite these advantages, there may also be several potential disadvantages to administering online-AR. First, online-AR may reduce the probability of proper delivery of the AR content. For example, students could inadvertently skip important information, or they could disregard information that they find less interesting. Second, when delivering online-AR, there is the possibility of computer malfunctions. For example, delivering an AR video may not be possible based on the constraints of the computer or its Internet connection that include risks associated with computer crashes and freezes. Ironically, research shows that computer crashes can be a major contributor to students feeling out of control, which is particularly problematic given the central role of computers in students' academic development (Hall et al., 2005b).

An exploratory study of online-AR found that students in the AR group had higher test scores and final course grades as compared to students who did not receive the online-AR (Hall et al., 2005a). The authors note, however, that the effects of online-AR were smaller than traditional in-person-AR. Nonetheless, online-AR techniques involving independently completed consolidation exercises hold considerable promise by allowing large numbers of students to reflect on the attributional process in a structured yet meaningful way, while at the same time reducing costs associated with instructor supervision.

Precautions and Limitations

Although AR treatments have been repeatedly shown to foster adaptive attributions and academic performance in college students, there are times when AR may be ineffective or potentially harmful. Formal AR treatments may be ineffective among students who have already been exposed to informal AR messages by teachers,

parents, or peers. These people may unknowingly be providing AR by encouraging students to work hard and attribute academic outcomes to effort. In these cases, formal AR interventions may be less effective as students may have already received the information. Further, not all AR techniques will be effective for all populations. For example, the AR discussion consolidation procedure may be ineffective for students who have difficulty disclosing personal information in the presence of their peers (Hladkyj et al., 1998). As previously mentioned, careful consideration should be given to the specific AR methods employed.

In terms of potential harmful effects of AR, some empirical research has indicated that increases to perceived control are not always adaptive. For example, a review of the control literature by Burger (1989) suggests that perceived control can be maladaptive to the extent that encouraging individuals to accept more responsibility for their actions might result in increased anxiety and poorer adjustment. Along the same lines, AR may also be detrimental to the extent that it produces fluctuations in perceived control, a situation that has been associated with detrimental outcomes. For instance, Musher-Eizenman et al. (2002) found that among poor-performing school children, greater instability of perceived control resulted in a breakdown in the positive linkage between perceived control level (i.e., high/low) and academic performance. However, these findings are qualified by the fact that no research on the effects of the instability of college students' perceived control stability has been conducted.

In the same way that increases and changes to perceived control can sometimes be detrimental, Schmitz and Skinner (1993) found several detrimental effects of encouraging effort attributions among school children when they were examined intra-individually. Most relevant to AR, students who were anxious and attributed errors to effort felt less in control. Indeed, when examined intra-individually, the relation between effort and performance can vary – increased effort can even be negative, specifically for highly anxious children. Although this study was conducted among school children, it suggests that a closer look at AR effects from an intra-individual perspective may be warranted.

Thus, it is important to keep these potential limitations in mind when implementing AR in college classrooms. Despite these shortcomings, three decades of empirical research reviewed in this chapter suggests a place for AR treatments in higher education settings as a remedial educational intervention for vulnerable students. The remainder of this chapter outlines the implications of future AR use in college classrooms.

Implications of AR Treatments

The implications of AR treatments in higher education settings are manifest at several levels of the higher education system. Most apparent are the implications for students who stand to gain several academic-related benefits from exposure to AR. Less apparent, however, are the implications for both college instructors and college administrators. This final section of this chapter outlines the benefits of AR for individuals at each of these levels of the higher education system.

The Benefits of AR for College Students

Students can gain personal benefit from participating in an AR treatment in terms of significant performance increases. For a small investment of time, students who participate in AR outperform their no-AR counterparts on in-class tests (Perry and Struthers, 1994; Perry et al., 2009) and at year's end on final course grades (Hall et al., 2004, 2006, 2007; Haynes et al., 2006; Struthers and Perry, 1996). One study, for example, found that final course grades were 10% higher for students in the AR condition ($M = 77.56\%$) as compared to those in the no-AR condition ($M = 67.01\%$; Haynes et al., 2006). Translating these percentages into letter grades means that AR students attained an average letter grade of B, while their no-AR counterparts earned an average grade of C+ (Struthers and Perry, 1996).

In addition to performance in individual courses, AR affects broader indicators of academic performance and persistence such as cumulative GPAs and attrition. GPA represents an aggregate of students' academic achievement across all courses in one or more years of university. Students who receive AR typically obtain GPAs corresponding to a letter grade of B, while their no-AR counterparts average C to C+ (Haynes et al., 2006, in press; Ruthig et al., 2004; Perry et al., 2009). In addition to GPA, AR treatments are effective in reducing withdrawals from courses: students who receive AR successfully complete more courses in the first year of university than those who do not receive AR, and are less likely to drop out of college entirely (Ruthig et al., 2004; Wilson and Linville, 1982). Thus, students gain many academic benefits from exposure to AR, resulting in a significantly improved academic record.

The Role of College Instructors

In addition to benefiting students, AR also has positive implications for college instructors. As previously outlined, the impact of effective teaching behaviors on students' performance depends on student attributes. In any given classroom, an instructor is faced with a diverse mix of enthusiastic, determined, and motivated students sitting next to apathetic, bored, and de-motivated students. This diversity in student motivation represents a fundamental challenge for higher education instructors who strive to provide an enriched learning environment for all students through effective teaching strategies. Unfortunately, research demonstrates that those students who are most in need of an enriched learning environment actually are the least likely to benefit from effective instruction (Perry and Dickens, 1984, 1987; Perry and Magnusson, 1989).

AR treatments serve to maximize the benefits of effective teaching by first improving students' perceived control and motivation to learn. In this way, AR may help to reduce the number of students with motivational deficits in any given college classroom. College instructors may experience an increase in the effectiveness of their teaching as they encounter students with higher levels of motivation (Feldman, 1998; Perry et al., 1979; Perry and Smart, 2007). More highly motivated students may be more responsive to the instructor, thereby making the instructor feel more efficacious.

AR from an Institutional Perspective

Given the direct benefits of AR for students and instructors, college administrators may wish to consider the possibility of taking steps to implement AR in campus classrooms. Several important issues arise in an administrator's decision to implement AR in campus classrooms. First, college administrators are likely to question: "How can a one-time, 30–40 min intervention possibly have such a large effect on students' cognitions and achievement?" This reaction to AR stems, in part, from deficiencies of past empirical work in describing AR treatment procedures. When detailed information about AR procedures is omitted, it is easy to mistake AR as a brief superficial encounter, instead of a theoretically driven, carefully designed, and procedurally standardized treatment. Given this, it is important that AR researchers adequately outline the components that are required to make AR effective, in order to avoid underselling the power of this intervention.

A second question likely to be asked by college administrators is: "What are the costs associated with the administration of AR in college classrooms?" First, implementing an AR treatment would involve costs associated with the development of AR materials. The production of an AR videotape may involve financial costs such as renting equipment, hiring actors, consulting with professional video editing services, and so on. Alternatively, administrators may opt for an AR handout that would cost less to produce and has been shown to be an effective method of AR induction (see *A Protocol for Administering Attributional Retraining*). A second cost associated with implementing AR involves the training of individuals to administer the treatment. As outlined earlier, individuals who administer AR need a working knowledge of attribution theory, and an understanding of the expected effects of AR, the aptitude × treatment framework, and the potential limitations of AR.

Notwithstanding these costs, it still may be cheaper to implement AR than to do nothing. Indeed, it is in the best interests of higher education institutions that college students succeed. When academic failure leads to withdrawal from the institution, lost tuition revenues for as few as 50 students can add up to hundreds of thousands of dollars per year in tuition, government- sponsored tuition matching grants, and tarnished institutional reputation. AR treatments are brief, relatively inexpensive, and easily administered in college classrooms. College administrators who endorse the use of AR in the classroom could potentially see reductions in course attrition rates and lost tuition revenues as a result of more highly motivated students.

Some Unresolved Theoretical and Practical Issues

As discussed previously, recent AR research has focused on two issues: demonstrating the applicability of the ATI framework to AR in field settings, and documenting the process variables by which AR works. Within this focus, there remain

several unresolved issues. First, what other variables may be used to identify students who stand to gain from AR? Second, what other process variables underlie the effectiveness of AR treatments, and how do they mediate the well-established impact of AR on academic outcomes?

Other Student Risk Factors

Empirical studies have demonstrated that a range of aptitudes can make students vulnerable to low perceived control, thereby identifying these students as good candidates for AR. For example, academic-related emotions have been shown to either enhance or suppress perceptions of control. Specifically, students' reports of boredom and anxiety have been negatively associated with perceived control, whereas enjoyment has been positively associated (Ruthig et al., 2008). This suggests that in as much as emotions affect perceived control they may represent another category of individual differences that could be used to identify students who would be good candidates for AR. Akin to emotion, broader indicators of well-being such as stress and depression are also likely associated with compromised perceptions of control. As such, students suffering from high levels of stress or depression may benefit from AR in terms of regaining a sense of control (Evans, 1981) and improving academic functioning.

Some research has begun to consider how the Big Five personality factors may influence perceptions of control (Tong et al., 2006). Of the five, it seems that neuroticism has been associated with reduced perceptions of control, whereas conscientiousness has been positively associated with perceived control. These associations may be related to the tendency for people high in neuroticism to report difficulties coping with daily stressors (Gunthert et al., 1999), whereas individuals who report greater levels of conscientiousness appear to adjust to stressors without too much difficulty (Judge and Ilies, 2002). Based on these findings, it seems that students who score high on indicators of neuroticism may be excellent candidates for AR, whereas AR may not be as useful for conscientious students who are less likely to have low perceptions of control.

One student aptitude that has received little attention in relation to the effectiveness of AR treatments is the causal search process proposed by Weiner (1979, 1985). Recall that causal search refers to the process by which students select an attribution to explain an event. Causal search tends to occur after unexpected, negative, and/or important events (e.g., failing a test; Gendolla and Koller, 2001; Kanazawa, 1992; Wong and Weiner, 1981). Students can be either high or low in causal search and because causal search is an integral component of the attributional process, the effectiveness of AR may be contingent on the amount of causal search a student is engaged in at the time of the treatment. Students engaged in high levels of causal search may be performing poorly, and may be good candidates for AR (Stupnisky et al., 2006, 2008).

Other Potential Process Variables

Unresolved issues also remain regarding the examination of AR process variables. In particular, whereas empirical work has documented several cognitive and motivational process variables, few AR studies have investigated the impact of AR on actual *behaviors*. Academic performance and persistence outcomes such as GPA and number of courses completed have served as indicators of behavior change in most AR studies in higher education settings. However, use of these broad indicators does not provide details regarding the specific behaviors by which academic improvements occur. For example, does AR lead to such behaviors as improved class attendance, better note taking, or more time spent studying? Further, which of these academic behaviors, if any, mediate the relationship between AR and academic outcomes such as GPA and course completion? Future research may wish to examine the direct impact of AR on a range of specific academic behaviors in order to determine exactly how AR produces improvements to GPA and attrition outcomes.

Conclusion

The transition experience to a new achievement setting can contribute to dysfunctional explanatory thinking that ultimately undermines motivation and performance as seen in the high failure rates in the first year of university. This chapter reviewed the effectiveness of AR treatments to foster adaptive explanatory thinking and improve performance outcomes in higher education settings. In practical terms, AR represents an ecologically meaningful treatment that results in performance gains for vulnerable students. The benefits of AR are manifest at several levels of the higher education system: First, college students stand to gain from even a brief exposure to AR in terms of improvements in perceived control, motivation, and achievement. Further, college professors may observe an increase in the effectiveness of their teaching as they encounter students with higher levels of perceived control and motivation (Feldman, 1998; Perry et al., 1979; Perry and Smart, 2007). Finally, administrators at colleges who endorse the use of AR in the classroom may expect reductions in costly course attrition rates and lost tuition revenues as a result of more highly motivated students. In conclusion, to the extent that AR treatments are easy to administer, inexpensive, and effective, they appear to be a feasible option for widespread use in the college classroom.

Acknowledgments The research described here was supported by a Canada Graduate Scholarship (CGS-doctoral) from the Social Sciences and Humanities Research Council of Canada (SSHRC) and a Manitoba Graduate Scholarship (MGS) to the first author; grants from SSHRC (99-0435; 2003-0059; 2007-2225) and the Alexander von Humboldt Foundation (Germany) to the second author; a CGS-doctoral SSHRC and an MGS to the third author; and a SSHRC doctoral fellowship to the fourth author. The authors would like to thank Judy G. Chipperfield and Steve Hladkyj for

critical comments on an earlier draft of this chapter, as well as Allison Bate for valuable administrative assistance. Please address correspondence to Tara L. Haynes or Raymond P. Perry, Department of Psychology, University of Manitoba, Winnipeg, Manitoba, Canada, R3T 2N2. E-mail: umhaynes@cc.umanitoba.ca, rperry@cc.umanitoba.ca. The Motivation and Academic Achievement (MAACH) Research Group Web site can be found at the following address: http://www.umanitoba.ca/faculties/arts/psychology/maach

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Appendix A

Attributional Retraining Handout

Did not do as well on a test as you wanted?
Feeling frustrated, depressed, angry?

Here are some suggestions as to how you can change the way you think about negative experiences in your life.

Rather than thinking ...	Instead ...
• I am stupid.	• Everybody can succeed – you just have to work at it. Here are some examples as to how you can study more effectively: – Read chapters several times. – Review notes several times. – Use your study guide. – Study with someone. Note: Counseling Services offers various study skills courses
• The test was too difficult.	• Tests can appear difficult when you are not well enough prepared. Study more for the next text.
• My professor is lousy.	• If you are having problems with a professor, talk to him or her about your difficulties. If that does not help, you may have to work extra hard to do well in the course.
• I had a bad day.	• We all have bad days once in a while, but make sure that you study enough for the next text to improve your grade.
• I panicked.	• If you have a problem with text anxiety, try to relax under stress (see your psychology text for relaxation methods or check the Counseling Services for courses on stress management).

The next time do not do as well on a text or assignment as you wanted, remember that most reasons for doing poorly are under your control and can be changed.

AAHE, Jan.96 H.O.

Appendix B

AR Writing Assignment Items

Attribution Elaboration Writing Assignment

1. Discuss and summarize the main points of the video in your own words.
2. Discuss and describe several *important and controllable* reasons for why university students may not perform as well as they could in their courses, and provide an example of each.
3. Discuss and describe several examples of how *you* could apply the main points of the video to the way you currently approach your university courses.

Emotion Elaboration Writing Assignment

1. Try to recall a recent instance when you performed poorly, or did not perform as well as expected, on an important course exam or assignment. Discuss as openly and honestly as you can *how the event made you feel* (e.g., anxious, regretful, angry, ashamed, helpless, guilty, etc.). If possible, also explain how you were able to *learn* from this event, or how you were able to *reinterpret* the event in a positive way. All your writing is completely confidential.