Attributional Retraining: Facilitating Academic Adjustment for Failure-Prone Individuals in an Achievement Setting

by

Jeremy M. Hamm

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Department of Psychology

University of Manitoba

Winnipeg, Manitoba CANADA

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Abstract

Although some individuals excel during the transition from high school to university, many struggle to adjust and experience repeated failures. To facilitate academic adjustment in those most at-risk of failure, vulnerable students were identified based on their pre-existing levels of preoccupation with failure (PWF; low, high) and primary control (PC; low, high). These factors were combined to create four distinct psychosocial typologies (e.g., low PWF, low PC). Students were subsequently presented with Attributional Retraining (AR), a control-enhancing treatment intervention. An AR (no-AR, AR) by group (failure-acceptors, failure-ruminators, achievement-oriented, over-strivers) 2 x 4 pre-post, quasi-experimental treatment design examined longitudinal differences in causal attributions, achievement emotions, PC, and achievement outcomes. AR encouraged all students to de-emphasize two uncontrollable attributions for failure and emphasize a controllable attribution. Most interestingly, AR was particularly beneficial for at-risk students. Notably, only failure-acceptors (low PWF, low PC) and failure-ruminators (high PWF, low PC) receiving AR reported more adaptive activity emotions and higher PC than their no-AR peers. For only failure-ruminators, those in the AR condition exhibited more adaptive attribution-related emotions than their no-AR peers. Conversely, only failure-acceptors receiving AR had higher grade point averages and fewer voluntary withdrawals than their no-AR counterparts. Results suggest the efficacy of AR in facilitating functional causal thinking for all students, whereas they also underscore AR's value in promoting adaptive emotions, PC, and academic achievement for failure-prone students.

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Introduction

What are some effective remedies for university students most at-risk of academic failure? Perhaps better teaching from more competent professors would result in vulnerable students achieving higher grades; or, conceivably, if universities merely sought to enhance their students' self-esteem, improved achievement would ensue. Although these solutions are seen as the eternal panacea (Perry, 2003), neither effective teaching (Menec, Perry, Struthers, & Schoenwetter, 1994), nor high self-esteem (Stupnisky et al., 2007) contribute to enhanced academic performance in the absence of influential psychosocial factors. Instead, a simple control-enhancing intervention, Attributional Retraining (AR), has repeatedly demonstrated that one of the most effective ways of assisting at-risk students is to modify their causal attributions (explanations) for failure (see Haynes, Perry, Stupnisky, & Daniels, 2009 for a review).

The present study examines the longitudinal effects of AR on students' causal attributions, academic emotions, perceived primary control, and academic achievement outcomes. Of specific interest are the differential effects of AR for two psychosocially distinct groups of at-risk students: failure-ruminators and failure-acceptors (with respect to Covington, 1999). These groups are defined as at-risk due to their shared, but dysfunctional, perception that they have little personal influence (primary control) over their academic achievement. Notably, however, the groups differ in their degree of preoccupation with failure (PWF).

As the name implies, failure-ruminators are students who have high levels of

PWF. Kuhl (1992) proposes that those high in PWF tend to ruminate on previous failure, which is typically, and reasonably, considered maladaptive (Menec, Perry, & Struthers, 1995). However, when these individuals are provided with AR, their tendency to incessantly fixate on past failures may be transformed from a fatal flaw to a redeeming strength. This is because theoretically, AR should have changed their ruminative focus on previous failure from stable and uncontrollable causes (e.g., aptitude) to unstable and controllable causes (e.g., effort). An attributional change of this nature is postulated to result in increased motivation and achievement striving (Weiner, 1985a).

In contrast, failure-acceptors are individuals who have low levels of PWF. At a superficial level, failure-acceptors' tendency not to dwell on their failures (low PWF) may appear advantageous. However, their combination of low PWF and low primary control makes them equally at-risk. In essence, this combination should theoretically result in failure-acceptors neither searching for causes of their previous failures nor perceiving they have the capacity to influence their future achievement. Thus, failure-acceptors are individuals who are resigned to failure. As a consequence, AR may bolster motivation and achievement striving by promoting causal search, emphasizing controllable causes, and, ultimately enhancing motivation and achievement striving (Weiner, 1985a).

Review of the Literature

Attribution Theory

Attribution theorists argue that humans are inexorably driven to answer the ubiquitous question, "Why did this happen?" for important outcomes in their lives (Abramson, Garber, & Seligman, 1980; Weiner, 1974, 1979, 1985a). Although the

explanations the questioner provides may occur rapidly and spontaneously (Weiner, 1985b), the consequences on one's cognitions, emotions, and motivation can be substantial, affecting diverse behaviours, such as scholastic attainment (Menec et al., 1994), and even one's treatment of stigmatized persons (Weiner, Perry, & Magnusson, 1988; Weiner, 1995b). However, to fully appreciate the power of the causes we assign to events, a review of attribution theory is necessary.

Fritz Heider (1958) is widely regarded as the founder of attribution theory in having proposed its fundamental tenet: The objective realities of an event are less important in predicting the future behaviour of an individual than are the individual's subjective causal explanations for the event. Heider's analysis provided an excellent foundation on which to explore the power of attributions. Since Heider (1958), arguably no theorist has advanced our understanding of attribution theory further than Bernard Weiner (Fiske & Taylor, 1991).

In his attribution theory, Weiner (1972, 1985a, 1995a, 2006, in press) proposed that three causal dimensions underpin any attribution an individual identifies. The first dimension is the *locus of causality*. Weiner (1985a) argued that the perceived locus of a cause could be either internal (e.g., effort) or external (e.g., room temperature) to a person. Weiner's second dimension, *stability*, concerns the variability of the cause. Weiner (1985a) suggested that some causes (e.g., aptitude) are perceived as stable, whereas other causes (e.g., fatigue) are unstable. Finally, the third dimension in Weiner's theory regards the *controllability* of a cause. According to Weiner (1995a), a cause may be classified as either controllable (e.g., being late) or uncontrollable (e.g., exam difficulty). These three causal dimensions serve as the basis for Weiner's theory.

Of particular importance to Weiner's (1985a) theory are the cognitive, affective, and motivational consequences of each attributional dimension when considered individually and collectively. Importantly, the locus dimension drives the affects self-esteem and pride. For instance, attributing a failure to an internal cause should result in the lowering of self-esteem and pride, as it is something about the person (e.g., ability) that has caused an undesirable outcome. Conversely, if a failure is attributed to an external cause (e.g., professor quality), feelings of self-esteem and pride should be relatively unaffected. Following a success outcome, the converse of these two attribution sequences occurs (i.e., attributing success to an internal cause leads to increased self-esteem and pride, whereas attributing it to an external cause results in these two emotions being relatively unaffected).

Weiner (1985a) suggested that the stability of a cause is also significant, as it predicts an individual's expectancy of future success (cognitive outcome), which in turn triggers the individual's hopefulness/hopelessness (affective outcome) about future outcomes. Notably, if a failure is attributed to a stable factor (e.g., aptitude), one's expectancy of future success should be reduced; this lowered expectancy should result in an increased feeling of hopelessness. However, in the event that a failure is attributed to an unstable cause (e.g., effort), one's expectancy of future success should be increased, which should result in one feeling increased hopefulness.

Finally, Weiner (1995a) asserted that the controllability dimension is fundamental to the assignment of responsibility (cognitive outcome), in addition to driving the self-directed emotions of guilt and shame and the other-directed emotions of sympathy, anger, and gratitude (affective outcomes). The divergent effects of attributing a failure to a

controllable cause (e.g., effort) versus an uncontrollable cause (e.g., aptitude) are considerable. Attributing failure to effort should result in a feeling of responsibility in addition to experiencing guilt but not shame. In contrast, believing failure is due to aptitude is proposed to lead to feelings of non-responsibility, as well as experiencing shame, but not guilt (Weiner, 1995a).

When the consequences of each dimension are considered individually, as has been outlined above, it is evident that each dimension contributes uniquely to the cognitive and affective state of the individual. However, given that any attribution is described by each of the three dimensions, the collective effect paints a picture much richer in cognitive and affective complexity than could any individual dimension. For example, consider the student who attributes his failure to low aptitude. He considers this cause to be internal, stable, and uncontrollable. As a result, cognitively, he should have a low expectancy of future success in addition to feeling not responsible for the outcome. Affectively, his pride and self-esteem should suffer, and he may well be mired in hopelessness and shame. Given his emotional and cognitive state, his motivation will suffer, which should, in turn, lead to reduced goal striving.

This simple, but commonplace, example demonstrates the importance of attributions, and, more importantly, the causal dimensions that underpin them. Fundamentally, it is the combined cognitive and affective consequences that determine future motivation, and, ultimately, approach versus avoidance behaviour (Weiner, 1985a). It is worth noting that the attribution-cognition-emotion-action sequence described here is well supported empirically in areas as far ranging from the reward and punishment of others (Weiner & Kukla, 1970) to personal academic achievement (Perry,

Stupnisky, Daniels, & Haynes, 2008).

In the examples provided thus far, it is notable that the negative illustrations outnumber the positive ones by a sizeable margin; this is not coincidental. In his theory, Weiner (1985a) postulates that negative, important, and unexpected events should elicit the most intense causal search. Weiner's assertion holds an intuitive appeal, as an individual would likely be considerably more motivated to search for causes for failing a final exam worth 50 percent than for receiving an A+ on a quiz worth two percent. Furthermore, this common-sense claim (that it is negative, important, and unexpected events that result in the most causal search) has been supported empirically (e.g., Wong & Weiner, 1981; Stupnisky, Stewart, Daniels, & Perry, 2011).

Perceived Control

The desire for control is a fundamental human need (Burger, 1992, 1999; Schulz & Heckhausen, 1996; Skinner, 1996), and even infants possess an inherent preference for behaviour-event contingencies (Heckhausen & Schulz, 1995). Because the empirical literature has developed substantially since its inception, many definitions of perceived control exist (see Skinner, 1996 and Morling & Evered, 2006 for reviews). The present study endeavoured to conceptualize perceived control in a broad but theoretically sound manner. To circumvent the implications of the classical view of perceived control (i.e., that perceived control is solely encapsulated by beliefs about external influence), the term *sense of control* was used. Sense of control is defined as the psychological state of control that is embellished by a perceived capacity to predict or influence outcomes both internal and external to the self and to "go with the flow" (Chipperfield et al., 2011; Rothbaum, Weisz, & Snyder, 1982). This sense of control encompasses primary (PC) and secondary

(SC) control. *PC* is defined as the capacity to predict, influence, or manipulate external events (Perry, 1991). *SC* is defined as the capacity to predict, influence, or manipulate internal outcomes (i.e., cognitions, emotions, motivation), which is largely in accordance with the definitions found in Rothbaum et al.'s (1982) seminal article (cf. interpretive SC), Morling and Evered's (2006) review (adjustment only), and the Motivational Theory of Life-Span Development (Heckhausen, Wrosch, & Schulz, 2010). To avoid confusion, any further use of *perceived control* refers to the classical conceptualization of the construct. Although control has been considered and dismissed as a causal dimension in Weiner's (1985a) theory, a much more comprehensive account will follow given its importance and relevance to the present study.

One of the early theorists concerned with perceived control was Julian Rotter. Rotter (1966) was interested in an early variant of the first causal dimension in Weiner's (1985a) theory, *locus of control*. Rotter (1966) suggested that an enduring individual difference between people was whether they believed that the cause of events resided within or outside themselves. Essentially, for Rotter, having an internal locus of controllability meant that one had personal control, whereas having an external locus implied that one had uncontrollability. A large body of research suggests the positive impact of having an internal locus of control, as these individuals have been found to be less conforming, have more control, and have better health recovery outcomes (see Strickland, 1989 for a review).

Rotter's (1966) insights on the locus of control construct represent a significant contribution to the control literature. However, Weiner's (1985a, 1995a) focus on the *dimensions of a cause* separated Weiner's theory from Rotter's and resulted in a theory

that better reflects complex causal thinking and subsequent goal-striving behaviour. Notably, Rotter equated an internal locus with perceived control, whereas Weiner's theory separated the two by describing both locus (internal vs. external) and controllability (controllable vs. uncontrollable) as conceptually distinct characteristics of a cause—this permits a cause to be both external and controllable (e.g., attributing failure to one's selection of writing utensil). Moreover, according to Rotter, having an internal locus should have positive consequences. Yet Weiner's theory demonstrates that internal attributions can produce negative outcomes when they are also deemed uncontrollable by the attributer (e.g., attributing failure to low aptitude). However, despite Weiner's conceptualization being the more sophisticated of the two, the value of control remains evident in both theories.

Further elucidating the importance of perceived control was Seligman and colleagues' reformulated model of learned helplessness, which focused solely on the *absence* of perceived control (Abramson et al., 1980). Abramson et al. (1980) argued that learned helplessness results when individuals attribute events in their lives to internal, stable, and global causes (e.g., aptitude). Perceived non-contingency (i.e., perceived uncontrollability) is important to both the traditional and reformulated models of helplessness in that individuals displaying learned helplessness have developed a belief that no causal relationship between their behaviour and a desired outcome exists (Abramson et al., 1980). Unsurprisingly, learned helplessness typically produces motivational and cognitive deficits in addition to depressed affect (Abramson et al., 1980). Furthermore, an individual differences variant of learned helplessness, pessimistic explanatory style, has been found to predict poor health—as indicated by subpar immune

function, and increased passivity, depression, and morbidity—in middle and late adulthood (Peterson, Seligman, & Vaillant, 1988).

Although the reformulated learned helplessness paradigm was compelling and had a considerable influence in psychology, several researchers remained sceptical. Notably, Rothbaum et al. (1982) asserted that the need for control is so valued that the quest for it is rarely abandoned. In an historic innovation, they divided perceived control into two separate processes, which they termed primary and secondary control. Primary control (PC), which they argued had been the sole focus of control research and theory prior to their article, involved attempts to alter the world to fit the self. Conversely, secondary control (SC), neglected until their paper, was concerned with fitting in with the world or flowing with the current. Thus, Rothbaum et al. (1982) claimed that helplessness researchers had overestimated the number of people who relinquished personal control, as individuals failing to exert PC were not invariably helpless. Rather, individuals not employing PC strategies may be engaging in SC strategies, which target the self rather than the external environment. Given the dire consequences of a lack of control (i.e., helplessness) outlined above, this assertion had a monumental impact on the field. Indeed, Rothbaum et al.'s (1980) article laid the groundwork for future research on control. Predictably, researchers' understanding and conceptualization of SC have developed substantially since Rothbaum et al.'s (1980) seminal article. For a review of the contentious, but ever-evolving, SC construct, see Morling and Evered (2006).

Although research on SC following Rothbaum et al.'s (1982) article was initially sparse, a considerable number of studies have since been conducted on the construct. The results of these studies have been rather encouraging. For instance, using SC strategies

has been associated with better overall health and fewer illness symptoms for university students (Hall, Chipperfield, Perry, Ruthig, & Goetz, 2006) and better adjustment for children undergoing medical procedures (Weisz, McCabe, & Dennig, 1994).

Moreover, SC also contributes to successful aging, as elderly persons utilizing SC strategies exhibit greater goal flexibility, higher life-satisfaction, are more likely to identify with younger groups, and view the prime of life as older than their non-SC using peers (Heckhausen, 1997). Further, for older adults (particularly women), SC is beneficial in that it predicts fewer hospital admissions, shorter hospital stays, and better perceived- and physical-health (Chipperfield & Perry, 2006; Chipperfield, Perry, & Menec, 1999). It is worth noting that, although SC is undeniably beneficial in the health domain, its effects are not limited to it. A fascinating study by Hall, Perry, Ruthig, Hladkyj, and Chipperfield (2006) suggested SC's positive effects (when combined with PC) on university students' motivation, affect, and even final grades. Knowledge of SC's utility will undoubtedly expand as research on the construct continues to grow.

Finally, since Rothbaum et al.'s (1982) distinction between PC and SC, studies investigating the efficacy of PC have abounded. Like SC, PC has been found to promote physical health in older, and particularly male, individuals (Chipperfield et al., 1999; Chipperfield & Perry, 2006). However, most important to the present study are PC's effects in achievement settings. University classrooms represent a particularly salient environment in which PC has been found to influence a variety of positive outcomes. Emotionally, students who have high levels of PC report more pride and less shame, boredom, and anxiety (Perry, Hladkyj, Pekrun, & Pelletier, 2001; Schönwetter, Perry, & Struthers, 1993). In terms of motivation and cognitions, high PC students exert more

effort, report higher motivation, and believe they are more successful than their low control counterparts (Perry et al., 2001). Finally, representing the gold standard, students high in PC achieve higher grades (Hall, Perry, Ruthig, et al., 2006; Perry et al., 2001; Stupnisky et al., 2007). When one considers the previously mentioned findings regarding internal locus of control (analogous to PC) in addition to the deleterious state of no control (i.e., learned helplessness), the extraordinary value of PC becomes manifest.

Attributional Retraining

Although the earliest research focusing on Attributional Retraining (AR) in achievement settings began with elementary school children (e.g., Dweck, 1975; Chapin & Dyck, 1973), AR has since been developed into an effective treatment intervention tailored to young adults, notably incoming college students. AR in higher education settings has been designed to counter a paradox of failure in which able, freshman university students fail courses and prematurely withdraw from their institutions (Perry, 1991, 2003). AR has its origins in Weiner's attribution theory (1974, 1985a, 1995a, 2006, in press); consequently, it is unsurprising that the earliest AR interventions transpired as attribution theory began to exert considerable influence in psychology. In one of the early studies with college students (and a follow-up to it), Wilson and Linville (1982, 1985) recruited first-year university students concerned about their academic performance. Subsequently, they exposed some of these students to videotaped testimonials that suggested students' grades increase over time. Their intent was to affect the stability of students' attributions for failure (i.e., change their attributions from stable to unstable). The effects were clear in this groundbreaking study: Students in the AR condition performed better on sample Graduate Record Exam (GRE) items, had improved grade

point averages (GPAs), and were less likely to drop out of university than their no-AR counterparts. AR has afforded optimism since its inception.

Van Overwalle and colleagues (Van Overwalle & de Metsenaere, 1990; Van Overwalle, Segebarth, & Goldchstein, 1989) were responsible for the next notable advance in the development of AR. In contrast to Wilson and Linville's (1982, 1985) focus on the stability of attributions, Van Overwalle and colleagues sought to alter the perceived controllability of students' academic performance. Like Wilson and Linville, Van Overwalle and colleagues administered their AR intervention using videotaped testimonials from students. They reported similar results, in that students in the AR condition had higher exam scores and GPAs (Van Overwalle et al., 1989) and were more likely to pass a final exam (Van Overwalle & Metsenaere, 1990) than their no-AR peers.

Although both sets of studies (Van Overwalle et al., 1989; Van Overwalle & de Metsenaere, 1990; Wilson & Linville, 1982, 1985) suggested the ecological validity of AR in addition to its long-term effects, neither was able to establish the internal validity of the intervention. In an effort to rectify this shortcoming, Perry and Penner (1990) examined the effects of AR on subsequent achievement within the confines of the laboratory. Students in the experimental group were first exposed to AR. All students then viewed a videotaped lecture and were provided with a take-home reading assignment. Although Perry and Penner's (1990) method was in contrast to the aforementioned studies, their findings were not. Indeed, they also discovered results demonstrating controllability's pivotal role in improving student achievement, as those in their control-enhancing AR group scored higher on a subsequent lecture- and homework-test than those in the no-treatment group.

Most notably, Perry and Penner's (1990) study demonstrated AR's internal validity. However, their study also served to solidify the ecological validity of AR, as the content of the video-taped lecture was based on material from students' psychology course, the test content was taken from an actual psychology exam, and the take-home reading resembled commonly assigned home-work tasks. Finally, Perry and Penner's (1990) results suggested that AR also affects short-term achievement.

The early studies discussed above demonstrate AR's impressive end products. In essence, AR improves achievement outcomes. Although the administration of AR takes little time, it is powerful. To ensure that AR produces its intended effect, an empirically validated, five-stage treatment sequence should occur (Haynes et al., 2009). First, a *pre-AR diagnostic assessment* is carried out. Occurring after roughly the first month of university, this stage involves participants completing a questionnaire assessing a variety of psychosocial variables (e.g., perceived control), which allows for the identification of vulnerable students. Second, the diagnostic assessment is either preceded by, or occurs concurrently with, *causal search activation*. Causal search requires that students reflect upon the causal explanations they assign to important academic outcomes, which primes them for the subsequent AR information; it can be initiated by questions asking about their perceived academic success to date and their attributions for their performance. Following the completion of the questionnaire, students in the no-AR group are dismissed, whereas students in the AR group remain for the final two stages.

Third, the critical element of AR, termed the *AR induction* phase, occurs directly following causal search (Haynes et al., 2009). During the induction, students in the experimental group are presented with information—via videotape (Menec et al., 1994),

handout (Hall, Perry, Chipperfield, Clifton, & Haynes, 2006), or Internet presentation (Hall, Perry, Ruthig, Haynes, & Stupnisky, 2005)—that suggests the efficacy of a functional attributional mindset. Typically, this involves encouraging students to endorse controllable attributions (e.g., strategy) while simultaneously downplaying uncontrollable attributions (e.g., poor teaching).

Fourth, the *consolidation activity*, which immediately follows the AR induction, is also imperative to AR's success. In effect, the consolidation component encourages students to deeply process the information presented to them, thus ensuring that the content is fully appreciated and absorbed (Haynes et al., 2009). The four empirically supported strategies for achieving consolidation are group discussions, aptitude tests, writing assignments, and take-home handouts (Haynes et al., 2009).

Finally, the *post-AR assessment* if the fifth stage in the AR sequence (Haynes et al., 2009). After several months, participants from both the AR and no-AR groups complete a follow-up questionnaire assessing psychosocial variables. This allows for the assessment of AR's longitudinal effects (pre- to post-AR). In addition, students' objective achievement data (e.g., test scores, final grades, and GPAs) are collected as part of the assessment.

As has been reiterated, AR is an effective, grade-enhancing intervention. However, a multitude of studies have demonstrated that AR is especially effective for certain groups of students, commonly defined as at-risk. Since its genesis, studies examining AR have routinely examined and found interaction effects between AR and psychological variables. For instance, in an early laboratory study, Perry and Penner (1990) found that students with an external locus of control benefitted most from AR.

Confirming externals as a vulnerable group, Menec et al. (1994) also reported results indicating that externals were particularly affected by AR, as they outperformed their no-AR counterparts in their introductory psychology course. Interestingly, a growing literature suggests that many other at-risk groups are especially amenable to AR. These groups include individuals who are low in perceived success (Perry & Struthers, 1994), have an objective failure experience (Menec et al., 1994), are overly optimistic (Haynes, Ruthig, Perry, Stupnisky, & Hall, 2006), are high in elaborative learning (Hall, Hladkyj, Perry, & Ruthig, 2004), are high in failure-avoidance (Boese, Stewart, Perry, & Hamm, in press), or are initially unsuccessful and have low levels of secondary control (Hall, Perry, Chipperfield, et al., 2006). Thus, AR is better conceptualized as an aptitude by treatment interaction than as a main effect remedy (Haynes et al., 2009; Perry, Hall, & Ruthig, 2005).

Understanding which students profit most from AR is vital to its effectual administration. Yet understanding the underlying processes AR affects is also important. Because attributions underpin AR, the causal explanations students provide for their academic performance are hypothesized to represent these processes, and are thus of theoretical and practical significance. Notably, none of the aforementioned studies shed any light on AR's impact on the attributions it is theorized to transform. Furthermore, Weiner and Kukla (1970) suggested that, in reality, human beings are likely to consider multiple attributions in their quest to understand important outcomes in their lives. In an attempt to better reflect this attributional complexity, Perry et al. (2008) investigated the prevalence of six attributions (effort, test difficulty, strategy, professor quality, ability, and luck) used in response to achievement outcomes. They discovered a striking pattern

in which students consistently rated each attribution's importance in the order listed above. Thus, although students' attributional mindsets are indeed complex, commonality between students exists in that the majority of students believe that certain causal factors are of greater consequence than others in a university setting.

Perry et al.'s (2008) examination of the attributional complexity inherent in achievement settings laid the foundation for further investigations designed to examine the effects of AR on multiple attributions. To the extent that AR is intended to fundamentally alter its recipients' causal thinking, AR is expected to affect the predominant attributions in achievement settings. Hence, AR should reduce the use of attributions for failure that are stable and uncontrollable (e.g., professor quality), instead encouraging the attributor to adopt unstable and controllable attributions (e.g., strategy). Consequently, Perry, Stupnisky, Hall, Chipperfield, and Weiner (2010) tested this supposition. Consistent with previous research, Perry et al.'s (2010) results indicated that AR resulted in increased performance on a subsequent test, final grades, and even GPAs for vulnerable students, thus demonstrating the short-term and long-term effects of AR. AR's effect sizes for these achievement measures were especially impressive for individuals who scored either poorly or moderately on their first test; the respective magnitudes were d = .96 and .92 (subsequent test), d = .37 and .43 (final grades), and d = .39 and .51 (GPA). However, of greater importance to illuminating the mediating effects of altered cognitions on academic achievement was the finding that several months after AR's administration, students who received the treatment intervention emphasized the importance of a controllable attribution (strategy) while they simultaneously downplayed the influence of an uncontrollable attribution (professor quality). Thus, this preliminary

study suggests that it is the change in attributional thinking that underpins AR's effects on achievement.

Action Control

Like Rothbaum et al. (1982) and Baltes and Skinner (1983), Kuhl (1981) remained unconvinced by Abramson et al.'s (1980) reformulated model of helplessness. In his action control theory, Kuhl (1985, 1986, 1992) suggested that individuals do not become helpless because of a deflated desire for control; instead, he proposed that helplessness results from an inability to suppress intrusive, debilitating cognitions. Thus, Kuhl (1981) asserted that helplessness was a consequence of a *functional* deficiency rather than the *motivational* deficiency argued for by Abramson et al. (1980).

Ultimately, Kuhl's theory of action control is concerned with the overarching goal of self-regulation. According to Kuhl (1992), a state of self-regulation represents goal-pursuit that is characterized by a "flexible, context-sensitive balance between planning, implementation, and maintenance on the one hand, and disengagement, on the other" (p. 105). Contributing to successful self-regulation are a number of self-regulatory mechanisms subsumed under a construct termed *action control*. These mechanisms are posited to maintain, shield, and strengthen intentions or goals (Kuhl, 1986). Kuhl (1985, 1986) suggested that six predominant self-regulatory strategies exist—activated when a goal is threatened (e.g., lack of motivation)—that mediate action control's positive influence on goal striving. The fist strategy, *active attentional selectivity*, refers to the ability to focus on information relevant to one's current intention while simultaneously inhibiting competing information. Second, *encoding control* ensures that only the features of a stimulus associated with one's current goal are attended to, thus protecting one's

volition. Third, *emotion control* is concerned with altering one's emotional state to enable goal attainment. Fourth, the aim of *motivational control* is to increase the appeal of one's present goal, which enhances one's drive. Fifth, *environment control* refers to influencing one's surroundings to facilitate emotional and motivational control. Finally, the sixth strategy, *parsimony of information processing*, ensures that the duration of the decisional process is completed at an optimal time, resulting in the individual actually carrying out the intended action. Thus, through its ability to invoke the six strategies and enable goal striving, an action orientation is considered to be adaptive (Kuhl, 1985).

Recent theoretical advances, as outlined in the Personality Systems Interaction (PSI) theory (Kuhl, 2000; Kuhl & Koole, 2004), have seen Koole and colleagues (Koole & Jostmann, 2004; Koole & Kuhl, 2008) focus on action control's relationship with affect regulation (cf. emotion control). PSI theory is underpinned by the contention that humans intuitively influence their affective state (intuitive affect regulation) in accordance with current task demands (Koole & Kuhl, 2008). Affect regulation is imperative in everyday functioning because it influences cognitive and behavioural systems. According to Koole and Kuhl (2008), intuitive affect regulation should be efficient and flexible. Intuitive affect regulation is efficient to the extent that it functions rapidly with minimal conscious awareness, whereas it is flexible to the extent that it remains context sensitive and non-repressive. Predictably, PSI theory postulates that an action orientation should be strongly associated with intuitive affect regulation. In line with this hypothesis and further supporting the utility of an action orientation, preliminary research has suggested that action-oriented individuals' intuitive affect regulation is more efficient and flexible than their state-oriented peers (Koole &

Jostmann, 2004).

Representing the antithesis to action orientation is what Kuhl (1985) referred to as *state orientation*. Kuhl (1992) argued that a state orientation typically impairs self-regulatory functions, in that it is characterized by invasive, incapacitating cognitions that interfere with one's current intentions. Notably, state orientation overlaps with constructs such as test anxiety and rumination (Kuhl, 1992). According to Kuhl (1992), state-oriented individuals are those that have high levels of hesitation, volatility, and preoccupation. Kuhl (1992) depicts *hesitation* as the incapacity to carry out planned actions. *Volatility* refers to the inability to engage in desirable activities without being distracted by unwanted intrusions (Kuhl, 1992). Finally, *preoccupation* (with failure) is typified by an inability to terminate intrusive thoughts about past events that are usually negative (Kuhl, 1992). Because of its particular relevance to achievement contexts (i.e., monitoring failure feedback, as suggested by Perry et al., 2001), discussion of state orientation will refer solely to preoccupation with failure herein. Based on the preceding theoretical claims, it is logical to conclude that a state orientation is maladaptive.

In an effort to examine the supposition that a state orientation (i.e., PWF) is detrimental to achievement striving, Menec et al. (1995) investigated its effects when considered in tandem with a failure or success outcome and viewing an instructor either low or high in expressiveness. Their results indicated that those who experienced initial failure and were state oriented were the most at-risk, as they exhibited the most negative emotional profile and were most adversely affected by the instructor low in expressiveness. Therefore, these results support the maladaptive nature of state orientation. Interestingly, however, Menec et al. (1995) also discovered that state oriented

students who were initially successful experienced an outcome in direct contrast. Although the difference was not statistically significant, these individuals outperformed the initially successful *action oriented* subjects on a subsequent achievement test. Menec et al.'s (1995) study demonstrated the bipolar nature of state orientation: Although it often results in the least desirable outcomes, under certain conditions it may actually beget the most beneficial results.

In a subsequent study intended to further elucidate the paradoxical nature of state orientation (i.e., PWF) in achievement settings, Struthers, Menec, Schönwetter, and Perry (1996) examined it within the context of attributions (stable vs. unstable) and student creativity (low vs. high). Like Menec et al. (1995), Struthers et al. (1996) found mixed results: A state orientation was maladaptive for students who were low in creativity and made stable attributions for failure, in that these individuals had had a lower expectancy of future success than their peers who were action oriented, highly creative, and made stable failure attributions. Furthermore, those who were action oriented and made unstable attributions had higher final grades in their psychology course than their state oriented peers. Yet, action oriented individuals low in creativity who made stable attributions had the lowest final psychology grades of any of the eight groups, further highlighting the importance of examining state orientation within the context of other influential variables.

Finally, in two enlightening studies, Perry and colleagues (Perry et al., 2001; Perry, Hladkyj, Pekrun, Clifton, & Chipperfield, 2005) conducted experiments in which they examined PWF (low, high) in combination with perhaps the most academically influential psychological variable, PC (low, high). Predictably, Perry et al. (2001) found a

control main effect, in that students high in PC had higher final grades, made more adaptive attributions, and had better emotional profiles than their low PC counterparts. However, individuals who had high levels of PWF but who were also high in PC achieved the highest final grades in their psychology course when compared to the other groups. Even more impressive were the results from the longitudinal follow-up study (Perry et al., 2005), which suggested that these same individuals (high PWF, high PC) had higher GPAs, fewer voluntary withdrawals, and were less likely to quit university when compared to the other three groups over a three-year period. These findings underscore the paradox that is PWF.

In attempting to account for these results, Perry et al. (2001) suggested that students high in PWF may engage in a more intense causal search (as described by Weiner, 1985a). When combined with high perceptions of PC, this vigorous search may actually be conducive to future goal striving (Perry et al., 2001). This is because, theoretically, these students dwell on their failures but determine that the cause of the failure was subject to their own volition. As noted, ascribing a failure to a controllable cause is posited to result in a feeling of responsibility in addition to the emotion guilt; this should in turn intensify motivation and subsequent achievement striving (Weiner, 1985a). Because of their ruminative tendencies, those high in PWF and PC may be especially likely to make multiple, controllable attributions, resulting in motivation inflamed by their resulting cognitive and emotional state (Perry et al., 2005). Thus, Perry and colleagues' (2001, 2005) findings provide the backdrop for the present study.

Attributional Retraining, Preoccupation with Failure, and Primary Control: An Interactive Examination

To further advance the AR literature, the present study examines the efficacy of AR for students with different combinations and varying levels of PWF and PC (see Table 1). Although differences between all groups are tested, two of the four groups of students are of special interest to the present study: (1) those low in PWF and low in PC, labelled *failure-acceptors*; and (2) those high in PWF and low in PC, referred to as *failure-ruminators* (with respect to Covington, 1999). The research questions of foremost concern to the present study are, *Will these at-risk groups both benefit from AR when compared to their no-AR peers?* And, *How will AR differentially impact these psychosocially distinct at-risk groups?*

Notably, failure-acceptors and failure-ruminators share a maladaptive belief that the causes of their failures are uncontrollable (low PC). According to Weiner (1985a), attributing failure to uncontrollable causes results in decreased motivation and goal striving. Of consequence, AR should encourage a more functional attributional mindset and enhance PC for both at-risk groups due to its emphasis on ascribing failure to controllable causes.

However, AR is expected to impact the at-risk groups in distinct ways as a function of their unique combinations of PWF and PC. As described earlier, failure-acceptors are individuals who neither adequately consider the source of their failures (low PWF) nor perceive that they have the ability to rectify them (low PC). In essence, students with this combination of dysfunctional characteristics are likely to be resigned to failure. Thus, AR should encourage failure-acceptors to address both of these

Table 1

Group Composition

	Preoccupation with Failure	
Primary Control	Low	High
Low	Failure-Acceptors (n = 191)	Failure-Ruminators (n = 247)
High	Achievement-Oriented (n = 252)	Over-Strivers (n = 254)

maladaptive tendencies by having them examine causes for their failures while simultaneously prompting them to adopt controllable attributions. As a consequence, AR is expected to benefit failure-acceptors' attributions, activity emotions, perceived control, and academic achievement.

AR should also provide a unique advantage for failure-ruminators. These individuals perseverate (high PWF) following their failures and theoretically fixate on deleterious attributions (low PC). According to Weiner (1985a), making maladaptive attributions for failure will result in negative attribution-related emotions for ordinary individuals. Hence, failure-ruminators' incessant focus on dysfunctional attributions should intensify this negative emotional state. In line with this logic and in accordance with recent research on affect regulation (Koole & Jostmann, 2004), failure-ruminators in the no-AR condition are expected to report high levels of detrimental, attribution-related emotions. Accordingly, failure-ruminators receiving AR should be advantaged in terms of their attribution-related emotions, whereas they are also expected to benefit in terms of their attributions, activity emotions, and perceived control.

No prediction was made regarding AR's effects on failure-ruminators' achievement outcomes because these individuals are expected to remain highly extrinsically motivated (performance motivation) due to their aversion to failure. Performance motivation has been linked to goal-pursuit and achievement (Elliot & McGregor, 1999; Grant & Dweck, 2003; Liem, Lau, & Nie, 2008). Hence, despite a maladaptive mindset, failure-ruminators in the no-AR condition are expected to attain similar achievement outcomes to their AR peers as a consequence of their goal-pursuit and academic attainment being sustained by high performance motivation.

In accordance with the reasoning provided above, two novel hypotheses were proposed:

Hypothesis 1

The first hypothesis was that failure-acceptors receiving AR would endorse more adaptive attributions, exhibit a more positive emotional profile (activity emotions only), report higher levels of PC, and have better academic achievement outcomes than their no-AR (control-group) counterparts.

Hypothesis 2

The second hypothesis was that failure-ruminators receiving AR would endorse more adaptive attributions, exhibit a more positive emotional profile (activity and attribution-related emotions), and report higher levels of PC than their no-AR (control-group) counterparts. Because the other two groups (i.e., low PWF, high PC; high PWF, high PC) had high pre-existing levels of PC, it was not expected that AR would significantly benefit these groups when compared to their no-AR peers.

Method

Participants and Procedure

The Manitoba Motivation and Academic Achievement Project. The sample for this study was drawn from the Manitoba Motivation and Academic Achievement (MAACH) project. The MAACH project presently contains a vast amount of psychosocial data for 16 separate cohorts (1992 to 2009, with no data for 2002) of introductory psychology students. Each cohort includes data collected from students in the first and second semesters. The primary goal of the MAACH study is to assess the longitudinal effects of various psychological variables (e.g., perceived control) and

treatment interventions (e.g., AR) on students' cognitions, emotions, motivation, and achievement. Students in this sample are approximately 60% female and 40% male, with the majority being 17-20 years of age. Because a large set of core variables are assessed during each collection, data from separate cohorts have been combined for these overlapping variables for each of the 16 years. Based on the merged database's exceptional number of participants, the MAACH database provides a powerful base from which to examine the efficacy of the aforementioned predictive variables.

Student tracking system. Augmenting the comprehensive history of psychosocial variables collected by the MAACH lab is long-term student data (collected with ethical approval) available through an institutional record network at the University of Manitoba, the Student Tracking System (STS). The STS contains a wide range of data on each student, including demographics, high school grades, university admission data, grade point averages, and voluntary course withdrawals. Data from the STS has been merged with the MAACH data, enhancing the already rich student profiles.

Sample. For the present study, the 2001 MAACH-STS cohort was used (n = 1,256). This is because all the variables of interest were assessed in this cohort.

Procedure: MAACH data collection. Data collection for all MAACH data, including the cohort utilized, involved five phases. In Phase 1, students were recruited early in the first semester (October). Students selected a session to complete the first questionnaire, which contained a battery of self-report questions. Each session ran approximately one hour, and the typical number of participants per session was between 20 and 60. In Phase 2, which occurred immediately following Phase 1, participants in the randomly assigned experimental sections received AR, whereas those in the control

condition were free to leave after completing the questionnaire. In Phase 3 (March), participants returned to complete a second self-report questionnaire that was very similar to the first questionnaire. In Phase 4 (May), consenting students' Introductory Psychology test scores were collected. Finally, in Phase 5 (June), the STS data was collected (for consenting students only) from institutional records and merged with the existing MAACH data.

Independent Measures

Primary control (PC). PC was assessed at Phase 1 using Perry et al.'s (2001) Perceived Academic Control (PAC) scale (see Appendix A). The PAC scale is a domain specific (academic) measure of PC. It assessed students' agreement with eight statements, with an example being "I have a great deal of control over my academic performance in my introductory psychology course." Participants were asked to indicate their agreement on a five-point Likert scale (1 = *strongly disagree*; 5 = *strongly agree*). The scale has been found to be internally consistent (α = .78-.80; Perry et al., 2001; Perry et al., 2005; Hall, Perry, Ruthig, et al., 2006). In addition, it has acceptable test-retest reliability (α = .53-.59; Perry et al., 2005; Hall, Perry Ruthig, et al., 2006). Furthermore, the PAC scale is positively related to intrinsic motivation (r = .18), test grades in Introductory Psychology (r = .34), and final grades in Introductory Psychology (r = .27), thus supporting its construct validity (Perry et al., 2001). Table 2 provides a summary of the main study variables.

Preoccupation with failure (PWF). PWF was assessed at Phase 1 using a slightly modified version of the PWF subscale (see Appendix B) from Kuhl's (1994) action control scale. Consistent with previous research (Perry et al., 2001; Perry et al.,

Table 2

Summary of the Main Variables

Measures	No. of Items	Anchors	α	*M*	*SD*	Actual Range
Primary control[a]	8	1 = strongly disagree 5 = strongly agree	.72	33.81	3.95	10-40
Primary control[c]	4	1 = strongly disagree 5 = strongly agree	.62	16.74	2.29	6-20
Preoccupation with failure[a]	12	Forced choice	.70	16.91	2.73	12-24
Attributional retraining[b]	2	1 = no-AR 2 = AR	–	1.41	.49	1-2
Age[a]	1	1 = 17-18 10 = older than 45	–	1.93	1.50	1-10
Gender[a]	1	1 = female 2 = male	–	1.37	.48	1-2
Strategy attribution[c]	1	1 = not at all 10 = very much so	–	6.43	2.10	1-10
Effort attribution[c]	1	Same	–	7.70	2.25	1-10
Professor quality attribution[c]	1	Same	–	5.26	2.72	1-10
Test difficulty attribution[c]	1	Same	–	6.23	2.39	1-10
Pride[c]	1	Same	–	5.61	2.38	1-10
Hope[c]	1	Same	–	6.99	2.03	1-10
Enjoyment[c]	6	1 = not at all true 5 = completely true	.75	19.87	4.10	6-30
Boredom[c]	6	Same	.90	14.41	5.48	6-30
Helplessness[c]	1	1 = not at all 10 = very much so	–	2.96	2.02	1-10
High school grade[a]	1	Percent	–	77.17	8.94	52-98
GPA[d]	1	0-4.5	–	2.65	.94	0-4.50
Voluntary withdrawals[d]	1	0-30	–	2.94	4.34	0-27

[a]Phase 1 measure. [b]Phase 2 measure. [c]Phase 3 measure. [d]Phase 5 measure.

2005), the modifications were minor and simply served to place greater emphasis on academic outcomes. This scale consists of 12 forced-choice items. A high score on this scale represents an action orientation, whereas a low score represents a state orientation. Past research has found the scale to be internally reliable (α = .75-.77; Menec, 1995; Perry et al, 2001; Perry et al., 2005; Kuhl, 1994).

Groups. For the conceptual reasons provided earlier, four distinct groups were of special interest to the present study and were created based on students' Phase 1 PWF and PC scores. *Failure-acceptors* were individuals low in both PWF and PC, whereas *failure-ruminators* were individuals high in PWF and low in PC. The final two groups, the first consisting of students low in PWF and high in PC and the second composed of individuals high in both PWF and PC, were labelled *achievement-oriented* and *over-strivers*, respectively (with respect to Covington, 1999). See Table 1 for the composition of each group.

An extreme split procedure, which retained only those students scoring one quarter of a standard deviation above or below the median for each independent variable, was used to assign participants to their respective groups. Thus, for example, participants in the over-strivers group had PWF and PC scores at least one quarter of a standard deviation above the measures' respective medians. See Table 3 for group means and standard deviations on PWF and PC.

Attributional Retraining (AR). AR was administered in Phase 2. As outlined earlier, the AR treatment consists of five stages. In essence, only the *induction* and *consolidation* stages vary from cohort to cohort; thus, only these two stages will be outlined here. To accomplish attributional induction, the participants in the present study

Table 3

Group Means and Standard Deviations

Measure	Failure-Acceptors	Failure-Ruminators	Achievement-Oriented	Over-Strivers
Primary control[a]				
M (*SD*)	30.51 (3.00)	30.16 (3.11)	37.05 (1.64)	36.83 (1.57)
n	191	247	252	254
Preoccupation with failure[a]				
M (*SD*)	19.54 (1.57)	14.46 (1.35)	19.57 (1.59)	14.56 (1.29)
n	191	247	252	254

Note. High preoccupation with failure scores indicate an action orientation (i.e., a high score = low preoccupation with failure).
[a]Phase 1 measure.

viewed a short videotape of two students discussing potential ways in which academic performance can improve (e.g., Perry & Struthers, 1994; Perry et al., 2010). Their conversation focused on the grade-enhancing impact of making controllable attributions. After the student dialogue concluded, the scene shifted to a male professor who subsequently summarized the content of the video and reiterated the utility of controllable causal explanations.

During the consolidation stage, students were encouraged to deeply process the information using an effective writing activity. The focus of the writing activity was on attribution elaboration: Students were asked to summarize the videotape, provide their own reasons why students may perform poorly in their courses, and finally, to write about how they could apply the main points of the videotape in their own lives (Haynes et al., 2009).

Covariates

High school grades. Students' overall high school grades were collected from the STS data in Phase 5. High school grades were an average of students' achievement in English, math, physics, and chemistry.

Age. Participants indicated their age using a 10-point scale (1 = *17-18*; 10 = *older than 45*) in Phase 1.

Gender. Gender was self-reported in Phase 1 and treated as a dummy-coded variable (1 = *female*; 2 = *male*).

Longitudinal Dependent Measures

Causal attributions. Participants were asked to respond to a Phase 3 question asking, "When you do poorly in your Introductory Psychology course, to what extent

does each of the following explain your performance?" The response scale ranged from 1 (*not at all*) to 10 (*very much so*). Participants rated the importance of strategy, effort, professor quality, and test difficulty. As indicated earlier, these are the most commonly endorsed attributions in achievement settings (Perry et al., 2008). Strategy and effort attributions represent those that are controllable by students, whereas professor quality and test difficulty attributions are uncontrollable by students. Although phenomenological differences exist between individuals regarding the perceived controllability of these attributions, the majority of students are postulated to classify them as has been done above (Weiner, 1985a, 2006).

Academic emotions. In the present study, emotions underpinned by two theoretical frameworks were examined: Weiner's (1985a, 2006) attribution theory (attribution-related emotions) and Pekrun's (2006) control-value theory of achievement emotions (activity emotions).

***Attribution-related emotions*.** Participants were asked to rate their Phase 3 attribution-related emotions after reading the following stem: "Please indicate the extent to which each of the following emotions describe how you feel about your performance in your Introductory Psychology course to date." Three emotions were listed: Proud, hopeful, and helpless. In line with previous theory and research (Perry et al., 2010; Weiner & Litman-Adizes, 1980), helplessness was conceptualized as a less severe form of hopelessness stemming from the stability dimension in Weiner's (1985) theory. Students were asked to rate their responses on a 10-point scale (1 = *not at all*; 10 = *very much so*).

***Activity emotions*.** The activity emotions boredom and enjoyment were assessed

using an early version of Pekrun, Goetz, Titz, and Perry's (2002) five-point Academic Emotions Questionnaire (AEQ; 1 = *not at all true*; 5 = *completely true*) in Phase 3. The boredom and enjoyment subscales scale are provided in Appendices C and D, respectively. Respective sample items from the boredom and enjoyment subscales are, "When studying for this course, I feel bored;" and "I enjoy learning new things." Each subscale is internally consistent, with reported Cronbach's alphas of .89 and .71 for boredom and enjoyment, respectively (Ruthig et al., 2008). The scales' respective five-month test-retest reliabilities are .68 and .66 (Ruthig et al., 2008).

Primary control. Participants responded to four items from the PAC scale to indicate their second semester levels of PC (see Appendix E). A sample item is, "I see myself as largely responsible for my performance throughout my college career."

Achievement. Achievement measures represent the gold standard outcome in academic research. Consequently, the present study utilizes two such indicators: Grade point average and voluntary withdrawals.

Grade point average (GPA). Students' cumulative, first-year GPAs were collected in Phase 5 and calculated by averaging course grades from all completed classes; thus, GPAs represent a broad measure of academic achievement. GPAs are recorded as numerical values according to the following logic: 0 = F, 1 = D, 2 = C, 2.5 = C+, 3 = B, 3.5 = B+, 4 = A, 4.5 = A+.

Voluntary withdrawals (VWs). Course withdrawal data were collected in Phase 5 and represent the cumulative number of credit hours a student drops during the year. Three credit hours constitute a one-semester course, and six credit hours are equivalent to a two-semester course.

Manipulation Check Measures

Test 1. Initial achievement was assessed using students' grades (percentage) on their first test in Introductory Psychology (collected in Phase 4). See Table 4 for a summary of the manipulation check measures.

Causal attributions. Participants Phase 1 attributions for failure were assessed using the same question as outlined in the dependent measures section (same 10-point scale). Participants rated the extent to which strategy, effort, and ability influenced their performance in Introductory Psychology.

Emotions. Several pertinent emotions were assessed at Phase 1: optimism, stress, and anxiety. Optimism was assessed using Scheier and Carver's (1985) eight-item Life Orientation Test (e.g., "In uncertain times, I usually expect the best"). Based on Cohen, Karmarck, and Mermelstein (1983), stress was measured using a seven-item scale (e.g., "How often have you found that you could not cope with all the things that you had to do?"). Finally, anxiety was measured using six items from an early version of Pekrun et al.'s (2002) AEQ (e.g., "Before I start studying material in this course, I feel tense and anxious").

Achievement motivation. Participants Phase 1 achievement motivation was assessed using the Motivated Strategies for Learning Questionnaire (MSLQ; Pintrich, Smith, Garcia, & McKeachie, 1993). Four items measured mastery motivation (e.g., "I prefer course material that really challenges me so I can learn new things") and four measured performance motivation (e.g., "Getting good grades in my classes is the most satisfying thing for me right now").

Table 4

Summary of the Manipulation Check Variables

Measures	No. of Items	Anchors	α	*M*	*SD*	Actual Range
Test 1[b]	1	Percent	–	69.36	14.08	31.70-100.00
Effort attribution[a]	1	1 = not at all 10 = very much so	–	7.35	2.43	1-10
Strategy attribution[a]	1	Same	–	6.07	2.22	1-10
Ability attribution[a]	1	Same	–	4.22	2.32	1-10
Optimism[a]	8	1 = strongly disagree 5 = strongly agree	.79	27.14	5.09	10-40
Stress[a]	7	1 = never 5 = very often	.84	22.58	5.09	7-35
Anxiety[a]	6	1 = not at all true 5 = completely true	.79	14.91	4.71	6-30
Mastery motivation[a]	4	1 = not at all true of me 10 = very true of me	.70	17.98	4.25	4-28
Performance motivation[a]	4	Same	.75	20.99	4.51	4-28

[a]Phase 1 measure. [b]Phase 4 measure.

Results

Preliminary Analyses

Manipulation checks. A series of manipulation checks served to test the validity of the four groups (failure-acceptors, failure-ruminators, achievement-oriented, over-strivers) by examining differences in initial test scores, failure attributions, emotions, and achievement motivation. Notably, all measures used in the manipulation checks were collected prior to the administration of AR, which allowed for an unbiased examination of pre-existing differences between the groups. Using two-tailed tests, one-way Analyses of Variance (ANOVAs) were conducted to test for differences among the four groups. The ANOVAs were followed with a priori *t*-tests that contrasted the at-risk groups with the not-at-risk groups. These *t*-tests combined the means of the at-risk groups (failure-acceptors and failure-ruminators) and contrasted them with the composite means of the not-at-risk groups (achievement-oriented and over-strivers). All *t*-test analyses employed one-tailed tests of significance because the hypotheses were directional in nature: The at-risk students were expected to have lower test grades, a more maladaptive attributional mindset, a more negative emotional profile, and lower achievement motivation than their not-at-risk peers.

A one-way ANOVA indicated that the four groups differed on their first class test in Introductory Psychology, $F(3, 862) = 21.55$, $p < .001$. As expected, the at-risk groups had lower test scores than their not-at-risk peers (Ms = 65.46 vs. 72.71), $t(864) = -7.76$, $p < .001$. Thus, initial achievement scores provided support for the separation of groups based on students' levels of PWF and PC.

Additional one-way ANOVAs examined differences in the attributions students

made for failure (effort, strategy, ability). The ANOVAs indicated significant group differences for effort, $F(3, 927) = 22.67$, $p < .001$; strategy, $F(3, 925) = 4.81$, $p = .002$; and ability, $F(3, 923) = 10.79$, $p < .001$. Students in the at-risk group were less likely than their not-at-risk peers to attribute failure to controllable attributions such as effort (*M*s = 6.74 vs. 7.98), $t(929) = -7.98$, $p < .001$ and strategy (*M*s = 5.87 vs. 6.32), $t(927) = -3.20$, $p < .001$; whereas they were more likely to attribute failure to an uncontrollable attribution, ability (*M*s = 4.62 vs. 3.86), $t(925) = 4.97$, $p < .001$.

Differences in emotions (optimism, stress, anxiety) and achievement motivation (mastery, performance) were also examined using one-way ANOVAs. The ANOVAs revealed significant group differences in optimism, $F(3, 921) = 50.54$, $p < .001$; stress, $F(3, 921) = 70.66$, $p < .001$; anxiety, $F(3, 928) = 45.01$, $p < .001$; mastery motivation, $F(3, 925) = 18.87$, $p < .001$; and performance motivation, $F(3, 936) = 25.78$, $p < .001$. At-risk students reported lower optimism (*M*s = 25.44 vs. 28.41), $t(923) = -9.06$, $p < .001$; higher stress (*M*s = 23.49 vs. 21.78), $t(923) = 5.06$, $p < .001$; higher anxiety (*M*s = 16.11 vs. 13.75), $t(930) = 7.85$, $p < .001$; lower mastery motivation (*M*s = 16.91 vs. 18.96), $t(927) = -7.46$, $p < .001$; and lower performance motivation (*M*s = 20.54 vs. 21.44), $t(927) = -3.03$, $p = .003$ than their not-at-risk peers.

To further distinguish the at-risk groups, a series of a priori *t*-tests examined similarities/differences between failure-acceptors and failure-ruminators on the same measures. As argued earlier, both at-risk groups were expected to experience poor pre-AR academic performance due to maladaptive thinking and low intrinsic (mastery) motivation. Because the groups were expected to be equivalent on these measures, two-tailed *t*-tests were used to examine these non-directional predictions. In line with this

reasoning, failure-acceptors and failure-ruminators did not statistically differ on their first test (*M*s = 64.87 vs. 65.89), $t(396) = -.73$, $p = .465$. In terms of attributions for failure, the two groups did not differ in their endorsement of strategy (*M*s = 6.06 vs. 5.72), $t(429) = 1.68$, $p = .093$; or ability (*M*s = 4.62 vs. 4.61), $t(427) = .04$, $p = .967$; and, although statistically significant, the difference between failure-acceptors' and failure-ruminators' endorsement of effort was minor (*M*s = 7.01 vs. 6.54), $t(431) = 1.98$, $p = .045$. Moreover, failure-acceptors and failure-ruminators had similar levels of mastery motivation (*M*s = 17.14 vs. 16.74), $t(427) = .98$, $p = .327$.

More interestingly, supplementary a priori, directional (one-tailed) *t*-tests examined predicted differences between the two at-risk groups in terms of their emotions and performance motivation. Because failure-ruminators fixate on uncontrollable causes of their previous failures, they were expected to exhibit more maladaptive emotional profiles than their failure-acceptor peers. Accordingly, in comparison to failure-acceptors, failure-ruminators reported lower optimism (*M*s = 24.46 vs. 26.72), $t(426) = -4.86$, $p < .001$; higher stress (*M*s = 25.23 vs. 21.18), $t(426) = 8.92$, $p < .001$; and higher anxiety (*M*s = 17.30 vs. 14.57), $t(431) = 6.44$, $p < .001$.

Despite their negative emotional state, failure-ruminators were expected to remain extrinsically motivated (i.e., high performance motivation) due to their strong aversion to, and preoccupation with, failure outcomes. In line with this prediction, failure-ruminators reported higher levels of performance motivation, (*M*s = 21.80 vs. 18.92), $t(434) = 6.55$, $p < .001$ than their failure-acceptor peers.

These preliminary analyses provide a compelling rationale for labelling failure-acceptors and failure-ruminators as at-risk: In comparison to the not-at-risk groups, the

at-risk groups achieved lower grades, ascribed failure to maladaptive causes, experienced debilitating emotions, and reported low levels of achievement motivation. Further, the results also strongly support the necessity of distinguishing between the at-risk groups due to their divergent emotional profiles and levels of performance motivation.

Correlations. Table 5 presents the zero-order correlations between the main study variables. Because a low score on the action control scale was indicative of a high level of PWF, the signs of the correlations (i.e., positive vs. negative) were reversed for PWF. This was done to facilitate interpretation of correlations involving PWF. Consequently, positive PWF correlations indicate that individuals with high levels of PWF also have high levels of the other variable.

The correlations were generally as expected. For instance, all variables except age, the professor quality attribution, and enjoyment were related to GPA. Although high school grades exhibited the strongest relationship with GPA, AR, PC, and PWF were also positively correlated, which was in line with the predictions specified earlier. Interestingly, VWs had a negative relationship with the test difficulty attribution, pride, hope, high school grade, and GPA, whereas they were positively related to helplessness. The attributions displayed an expected pattern of relationships wherein the controllable attributions (effort, strategy) were positively related to each other, PC, hope, pride, and GPA. Conversely, the uncontrollable attributions (professor quality, test difficulty) were negatively related to AR, but positively related to each other, the strategy attribution, boredom, and helplessness. Predictably, the positive emotions (pride, hope, enjoyment) were positively related to each other, PC, the controllable attributions, but negatively related to the negative emotions (boredom, helplessness). The negative emotions were

Table 5

Zero-Order Correlations

Measure	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1. Primary control[a]	–																	
2. Primary control[c]	.49*	–																
3. Preoccupation with failure[a]	-.08*	-.03	–															
4. AR[b]	.10*	.11*	.04	–														
5. Age[a]	.01	.07†	-.16*	-.06	–													
6. Gender[a]	.02	-.04	-.16*	-.06	.04	–												
7. Strategy attribution[c]	.10*	.19*	.06	.01	-.03	-.06	–											
8. Effort attribution[c]	.26*	.34*	-.01	.05	-.07†	-.01	.49*	–										
9. Professor attribution[c]	-.10*	-.07†	.07*	-.29*	-.06	-.07†	.17*	.09*	–									
10. Test difficulty attribution[c]	-.09*	-.12*	.09*	-.17*	-.01	-.10*	.18*	.02	.49*	–								
11. Pride[c]	.15*	.16*	.01	.09†	.13*	-.03	.12*	.14*	-.04	.01	–							
12. Hope[c]	.16*	.19*	.03	.07	.09*	-.10*	.18*	.19*	.01	.11*	.42*	–						
13. Enjoyment[c]	.15*	.18*	.01	.09†	.09*	-.03	.09*	.07†	-.06	-.05	.31*	.27*	–					
14. Boredom[c]	-.18*	-.24*	.04	-.17*	-.21*	.14*	-.09*	-.07†	.20*	.10*	-.32*	-.28*	-.43*	–				
15. Helplessness[c]	-.32*	-.33*	.11*	-.03	-.16*	-.01	-.04	-.18*	.12*	.15*	-.34*	-.19*	-.20*	.34*	–			
16. High school grade[a]	.07†	.05	.16*	.10*	-.23*	-.15*	.07†	.10*	-.02	.11*	.21*	.11*	-.04	-.07†	-.17*	–		
17. GPA[d]	.11*	.12*	.13*	.10*	.03	-.12*	.11*	.14*	-.02	.08†	.34*	.19*	.02	-.15*	-.23*	.63*	–	
18. VW[d]	-.06*	-.01	-.04	-.07†	.00	.01	-.02	-.02	.01	-.11*	-.16*	-.16*	.00	.07†	.13*	-.23*	-.36*	–

Note. Correlations were calculated using pairwise deletion (*n* range = 724-1,187).

[a]Phase 1 measure. [b]Phase 2 measure. [c]Phase 3 measure. [d]Phase 5 measure.

†$p < .05$. *$p < .01$ (two-tailed tests).

positively related to each other and the uncontrollable attributions, whereas they were negatively related to PC, age, the positive emotions, and GPA.

Finally, the independent measures displayed an expected pattern of relationships with the dependent measures. PC was positively related to PC (Phase 3 measure), the controllable attributions, the positive emotions, and GPA, whereas it was negatively related to the uncontrollable attributions and the negative emotions. PWF was positively related to helplessness, high school grades, and GPA, whereas it was negatively correlated with age and gender. Finally, AR was positively correlated with PC (Phase 3 measure) and GPA, but negatively correlated with the uncontrollable attributions and boredom. These predicted associations provide preliminary support for the hypotheses.

Design and Covariates for the Main Analyses

An AR (no-AR, AR) by Group (failure-acceptors, failure-ruminators, achievement-oriented, over-strivers) 2 x 4 factorial design was utilized to test the main hypotheses. Table 6 displays means and standard deviations on the dependent measures for each cell in the AR x Group design. Students' overall high school grades were used to control for pre-existing differences in aptitude in the achievement analyses because other measures (e.g., SATs) are not used in the application process to Canadian universities. Furthermore, high school grades are moderately correlated with final course grades, r = .40 (Perry et al., 2010), and GPAs, r = .52 to .54 (Perry, Hladkyj, et al., 2005; Perry et al., 2010). Gender and age were controlled for in all analyses.

Univariate Analyses

Rationale for analyses. Analyses of Covariance (ANCOVAs) were used to examine the hypotheses involving cumulative GPA, VWs, and PC. ANCOVAs were

Table 6

Means and Standard Deviations by AR Condition and Group

	Failure-Acceptors		Failure-Ruminators		Achievement-Oriented		Over-Strivers	
Measure	No-AR	AR	No-AR	AR	No-AR	AR	No-AR	AR
Primary control[a]								
M (*SD*)	15.28 (2.19)	16.30 (2.11)	15.27 (2.03)	16.03 (2.36)	17.43 (1.84)	17.57 (2.36)	17.82 (1.84)	18.09 (1.55)
Adj. *M* (*SE*)	15.27 (.27)	16.30 (.33)	15.24 (.21)	16.06 (.26)	17.46 (.22)	17.58 (.28)	17.83 (.21)	18.07 (.23)
n	57	37	89	60	84	53	89	76
Strategy[a]								
M (*SD*)	6.17 (1.91)	6.18 (2.06)	6.57 (2.06)	6.50 (2.20)	6.65 (2.25)	6.56 (1.92)	6.69 (1.88)	7.30 (1.90)
Adj. *M* (*SE*)	6.20 (.27)	6.17 (.33)	6.57 (.22)	6.48 (.26)	6.69 (.22)	6.55 (.28)	6.69 (.21)	7.27 (.23)
n	58	39	87	60	85	52	90	76
Effort[a]								
M (*SD*)	6.95 (2.01)	7.13 (2.12)	7.03 (2.12)	7.55 (2.51)	8.06 (2.15)	8.67 (1.90)	8.23 (1.91)	8.08 (2.50)
Adj. *M* (*SE*)	7.01 (.35)	7.11 (.35)	7.03 (.23)	7.50 (.28)	8.13 (.24)	8.65 (.30)	8.25 (.23)	8.02 (.25)
n	58	39	87	60	85	52	90	76
Professor quality[a]								
M (*SD*)	6.24 (2.37)	4.36 (2.41)	6.02 (2.64)	4.58 (2.90)	5.51 (2.65)	4.29 (2.73)	6.10 (2.39)	4.45 (2.95)
Adj. *M* (*SE*)	6.28 (.35)	4.35 (.42)	6.01 (.28)	4.56 (.34)	5.57 (.29)	4.28 (.37)	6.10 (.28)	4.40 (.31)
n	58	39	87	60	85	52	90	76
Test difficulty[a]								
M (*SD*)	6.28 (2.31)	5.77 (1.80)	6.78 (2.25)	6.10 (2.45)	6.48 (2.24)	5.65 (2.61)	6.78 (2.35)	6.20 (2.43)
Adj. *M* (*SE*)	6.31 (.31)	5.76 (.37)	6.76 (.25)	6.08 (.30)	6.55 (.26)	5.65 (.32)	6.78 (.25)	6.14 (.27)
n	58	39	87	60	85	52	90	76
Pride[a]								
M (*SD*)	5.34 (1.97)	5.13 (2.12)	4.71 (2.31)	5.82 (2.33)	5.88 (2.55)	6.08 (2.41)	5.88 (2.40)	5.80 (2.32)
Adj. *M* (*SE*)	5.25 (.31)	5.16 (.38)	4.67 (.25)	5.91 (.30)	5.56 (.26)	5.92 (.32)	5.88 (.25)	6.12 (.27)
n	58	38	89	60	84	53	88	73

	Failure-Acceptors		Failure-Ruminators		Achievement-Oriented		Over-Strivers	
Measure	No-AR	AR	No-AR	AR	No-AR	AR	No-AR	AR
Hope[a]								
M (*SD*)	6.40 (1.83)	6.76 (2.29)	6.06 (2.25)	6.65 (2.14)	7.11 (2.08)	7.25 (1.95)	7.40 (1.97)	7.51 (2.06)
Adj. *M (SE*)	6.34 (.27)	6.78 (.32)	6.00 (.22)	6.72 (.26)	7.13 (.22)	7.29 (.28)	7.40 (.22)	7.49 (.239)
n	58	38	89	60	84	53	88	73
Helplessness[a]								
M (*SD*)	3.59 (2.04)	3.21 (1.73)	4.21 (2.47)	3.42 (2.10)	2.32 (1.56)	2.26 (1.68)	2.41 (1.74)	3.01 (2.50)
Adj. *M (SE*)	3.66 (.26)	3.19 (.33)	4.25 (.21)	3.34 (.26)	2.36 (.22)	2.22 (.28)	2.40 (.21)	2.99 (.24)
n	58	38	89	60	84	53	88	73
Boredom[a]								
M (*SD*)	16.13 (5.71)	13.69 (5.17)	16.88 (5.89)	13.71 (5.68)	14.49 (5.73)	13.33 (4.70)	14.57 (5.06)	13.08 (5.56)
Adj. *M (SE*)	16.26 (.71)	13.63 (.84)	17.08 (.56)	13.47 (.69)	14.49 (.58)	13.21 (.73)	14.52 (.56)	13.10 (.62)
n	56	39	89	58	84	52	88	74
Enjoyment[a]								
M (*SD*)	18.64 (3.92)	19.82 (4.19)	17.92 (3.98)	20.71 (4.05)	20.11 (4.23)	19.67 (3.63)	20.42 (3.77)	20.34 (4.57)
Adj. *M (SE*)	18.65 (.54)	19.83 (.64)	17.84 (.43)	20.75 (.53)	20.19 (.44)	19.70 (.56)	20.44 (.43)	20.26 (.47)
n	56	39	89	58	84	52	88	74
GPA[b]								
M (*SD*)	2.34 (.76)	2.57 (.90)	2.58 (.78)	2.72 (.81)	2.51 (.96)	2.78 (.97)	2.66 (1.02)	2.92 (.97)
Adj. *M (SE*)	2.51 (.09)	2.75 (.11)	2.65 (.07)	2.63 (.09)	2.59 (.07)	2.68 (.09)	2.59 (.07)	2.75 (.08)
n	67	40	105	65	93	62	103	85
VW[b]								
M (*SD*)	4.17 (5.46)	2.93 (5.51)	2.95 (3.76)	2.27 (3.16)	2.42 (3.75)	2.38 (4.07)	2.39 (3.62)	1.78 (3.05)
Adj. *M (SE*)	4.03 (.46)	2.58 (.59)	2.80 (.38)	2.35 (.48)	2.46 (.40)	2.50 (.49)	2.49 (.38)	1.95 (.42)
n	72	44	109	66	98	63	107	90

Note. *Adj*. *M* = covariate adjusted mean.
[a]Phase 3 measure. [b]Phase 5 measure.

preferred to MANCOVAs because these dependent variables are distinct and lack the necessary theoretical integrity to be analysed using a composite measure. Therefore, the use of ANCOVAs arguably represents the design best suited to examining these hypotheses.

Although ANCOVAs indicate whether the omnibus interaction is significant, they do not specify which groups differ. Thus, simple main effect *t*-tests were employed to examine these differences. Simple main effect *t*-tests examine the main effect of Factor A (e.g., no-AR vs. AR) across the levels of Factor B (e.g., group) and indicate whether or not the effect is significant at each level. In the present study, failure-acceptors and failure-ruminators in the AR condition were compared to their respective no-AR counterparts. One-tailed tests were employed for all analyses involving AR main effects and AR simple main effects because the AR groups were expected to have higher GPAs, fewer VWs, and higher PC than their no-AR counterparts. The group main effects and AR x Group interactions utilized two-tailed tests because no predictions were made regarding their effects.

GPA. A 2 x 4 ANCOVA revealed an AR main effect, $F(1, 609) = 4.11$, $p = .022$; but no group main effect or AR x Group interaction (see Table 7 for omnibus effects from the univariate analyses). Students in the AR condition outperformed their no-AR peers (*M*s = 2.70 vs. 2.58). More importantly, simple main effect *t*-tests indicated that, for only students in the failure-acceptor group, those receiving AR had higher GPAs than those not receiving AR (*M*s = 2.75 vs. 2.51), $t(105) = 1.77$, $p = .040$. See Figure 1 for the AR x Group interaction.

VWs. A 2 x 4 ANCOVA revealed a main effect of AR, $F(1, 638) = 3.47$,

Table 7

F-Table of Omnibus Effects for the Univariate Analyses

	Error		High school grade		Age		Gender		AR		Group		AR x Group	
Variable	*MSE*	*df*	*MS*	*F*	*MS*	*F*	*MS*	*F*	*MS*	*F*	*MS*	*F*	*MS*	*F*
GPA	48.62	609	20,567.70	423.04*	934.33	19.22*	15.52	.32	200.00	4.11†	4.82	.10	44.02	.91
VW	15.28	638	397.04	25.99*	51.84	3.39	82.89	5.43†	53.04	3.47	27.22	1.78	12.07	.79
Primary control	4.00	535	—	—	7.88	1.97	20.64	5.17†	37.32	9.34*	188.21	47.10*	28.88	2.33

Note. Numerator *df* = 1 for high school grade, age, gender, and AR. Numerator *df* = 3 for Group and AR x Group.
†$p < .05$. *$p < .01$ (two-tailed tests).

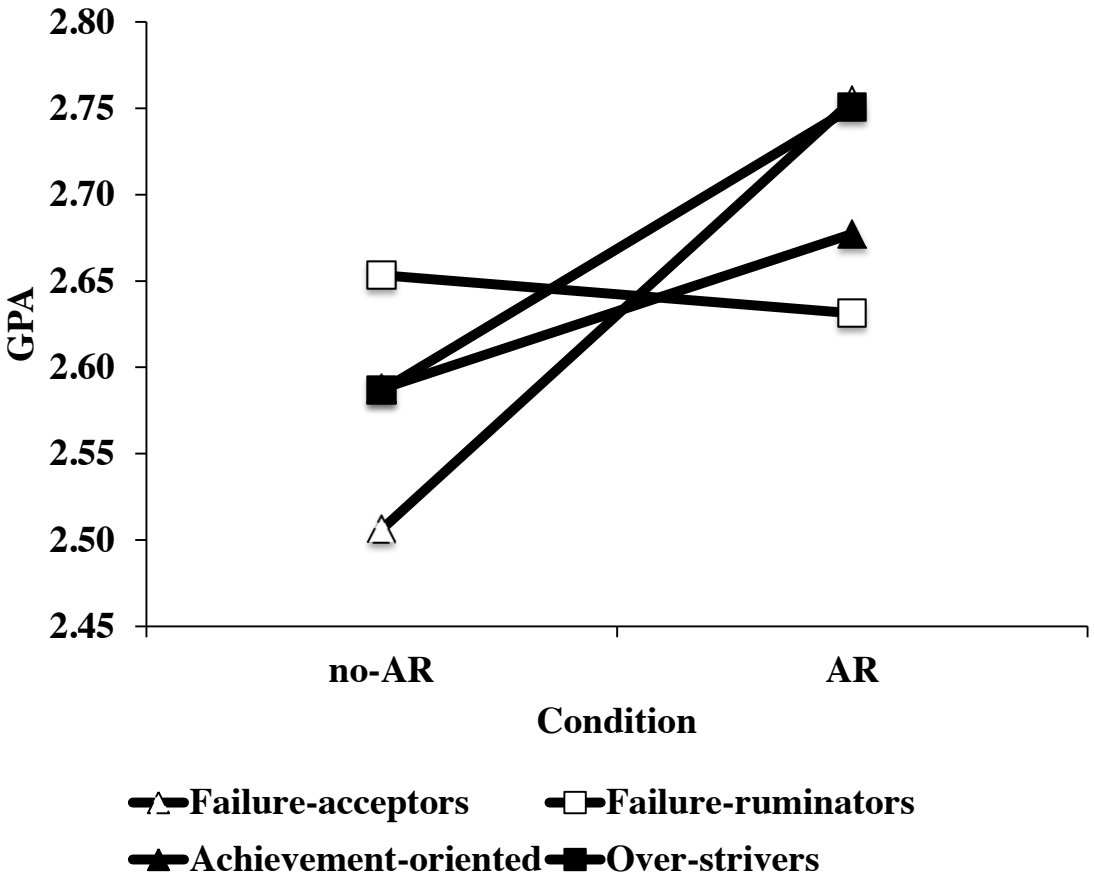

Figure 1. The interaction of AR (no-AR vs. AR) and group (failure-acceptors, failure-ruminators, achievement-oriented, over-strivers) on grade point average (GPA).

p = .032; but no group main effect or AR x Group interaction. As expected, students in the AR group withdrew from fewer classes than their no-AR peers (*M*s = 2.34 vs. 2.94). Once again, however, simple main effect *t*-tests suggested that only failure-acceptors benefitted from AR when compared to their no-AR counterparts (*M*s = 2.58 vs. 4.03), $t(114) = -1.93$, $p = .028$. See Figure 2 for the AR x Group interaction.

Primary control. A 2 x 4 ANCOVA revealed an AR main effect, $F(1, 535) = 9.34$, $p = .002$; a group main effect, $F(3, 535) = 47.10$, $p < .001$; but no AR x Group interaction. Students receiving AR were higher in PC than those not receiving AR (*M*s = 17.00 vs. 16.45). The group main effect was not of interest but served to reinforce the validity of the classification of students into at-risk versus not-at-risk groups: Students in the low PC groups (failure-acceptors, failure-ruminators; *M*s = 15.78, 15.65) had lower PC levels than those in the high PC groups (achievement-oriented, over-strivers; *M*s = 17.52, 17.95). More interestingly, simple main effect *t*-tests indicated that only failure-acceptors (*M*s = 16.30 vs. 15.27) and failure-ruminators (16.06 vs. 15.24) receiving AR had higher PC than their no-AR peers, $t(92) = 2.42$, $p = .017$; and $t(147) = 2.45$, $p = .016$, respectively. See Figure 3 for the AR x Group interaction.

Multivariate Analyses

Rationale for analyses. Multivariate Analyses of Covariance (MANCOVAs) were used to examine the hypotheses involving the attributions and emotions. Based on theoretical considerations (Pekrun, 2006; Weiner, 1985a) and past research (Perry et al., 2010), separate MANCOVAs were conducted for the attributions, attribution-related emotions, and activity emotions. MANCOVAs were chosen over ANCOVAs because the dependent measures in each MANCOVA analysis were deemed to have sufficient

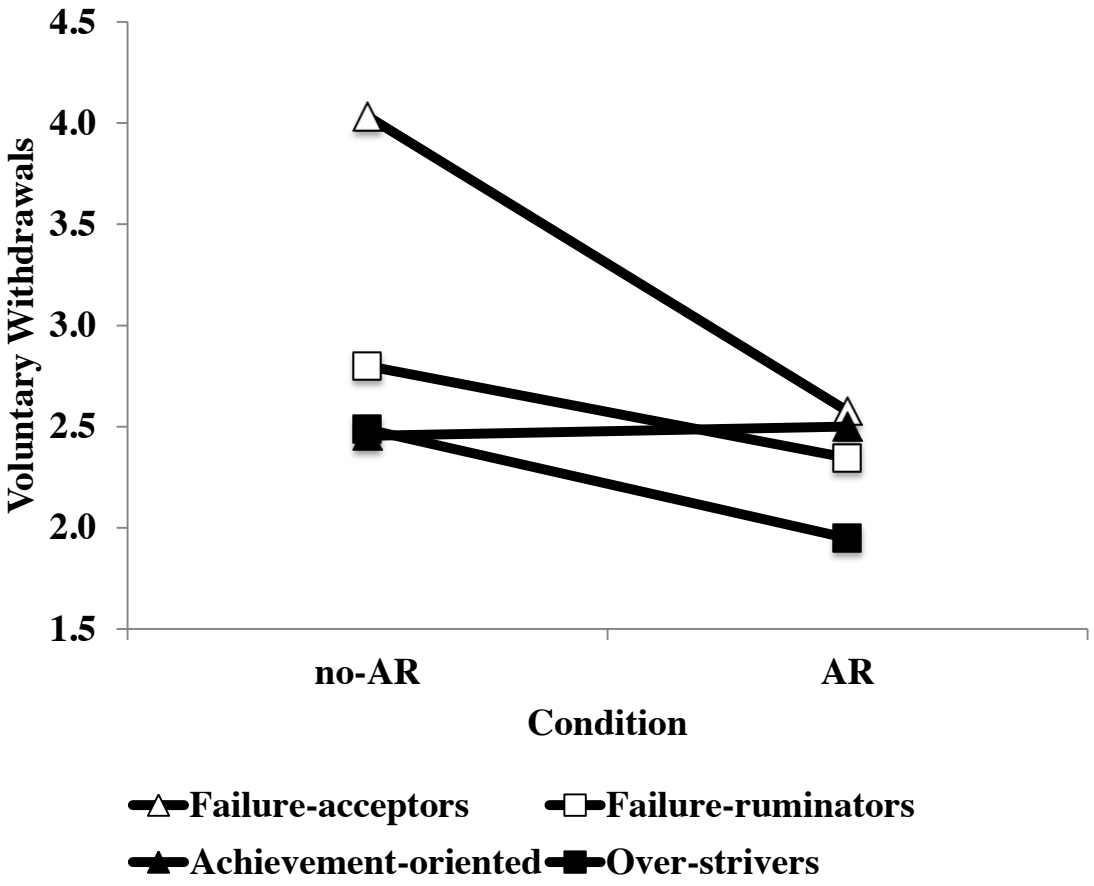

Figure 2. The interaction of AR (no-AR vs. AR) and group (failure-acceptors, failure-ruminators, achievement-oriented, over-strivers) on voluntary withdrawals (VWs).

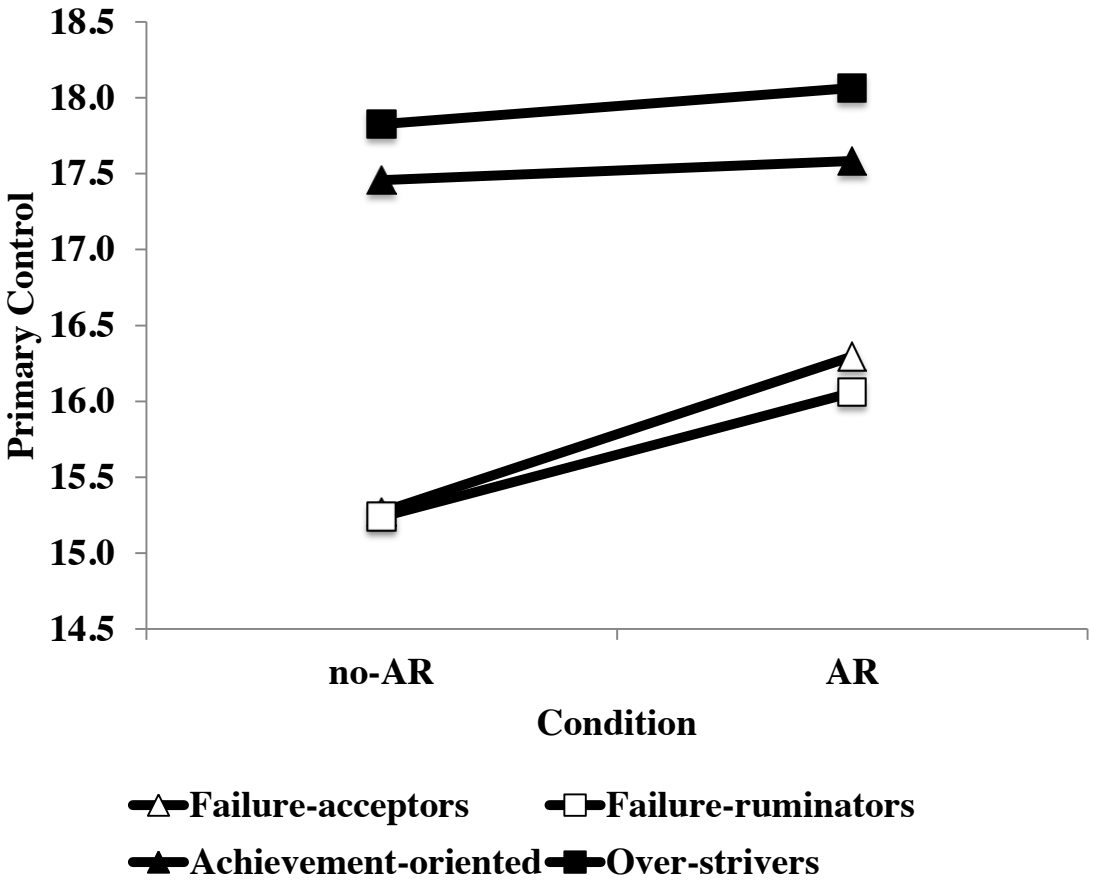

Figure 3. The interaction of AR (no-AR vs. AR) and group (failure-acceptors, failure-ruminators, achievement-oriented, over-strivers) on primary control.

theoretical integrity to be assessed together. Further, because MANCOVA assesses multiple dependent measures simultaneously, it represents an excellent data analytic strategy for assessing theoretically related measures such as attributions and emotions (Perry et al., 2010). Thus, the effort, strategy, test difficulty, and professor quality attributions were examined in the first MANCOVA. Attribution-related emotions (pride, hopefulness, and helplessness) were tested in a second MANCOVA. Finally, activity emotions (enjoyment and boredom) were examined in a third MANCOVA.

In line with previous research (e.g., Perry & Dickens, 1984; Perry et al., 2010), significant MANCOVA effects were followed up with Discriminant Function Analysis (DFA). DFA facilitates the examination of the structure of the dependent measures comprising each effect (Tabachnick & Fidell, 2007). DFA analyses provide two types of unit loadings (weightings) that range between +1 and -1: structure coefficients and structure weights. Structure coefficients represent the zero-order correlation between each measure and the function, which may be interpreted in a similar fashion as factor loadings in factor analysis. Structure weights indicate the distinct partial contribution of each measure to the discriminant function; these weights may be interpreted much like regression coefficients (Perry et al., 2010).

Because PASW Statistics 18.0 (also known as SPSS 18.0) permits the user to enter only one grouping variable in the DFA analyses, the following procedure was used to follow up interaction effects, which necessarily involve two or more grouping variables. First, a new variable was created that separated students into eight groups on the basis of AR (no-AR, AR) and group (failure-ruminators, failure-acceptors, achievement-oriented, over-strivers). This procedure resulted in a variable with eight

levels that corresponded to the cells of the 2 x 4 design. Consequently, for significant interaction effects, the eight-level variable was subjected to DFA. This procedure permitted the examination of the structure of AR x Group interactions.

As with the univariate analyses, differences between the no-AR and AR groups for the failure-acceptors and failure-ruminators (simple main effects) were of fundamental importance to the present study. Thus, if the AR x Group interaction was significant, the no-AR versus AR centroids were contrasted for each at-risk group using *t*-tests designed to accommodate centroid contrasts (see Perry & Dickens, 1984). The procedure involved calculating a centroid difference score and dividing the difference by a pooled estimate of the standard error of the centroids. AR main effects were not probed using this procedure because there were only two centroids. Hence, if the AR main effect was significant, the centroids must statistically differ from one another. One-tailed tests were employed for all analyses involving AR main effects and AR simple main effects because the AR groups were expected to endorse more adaptive attributions and display a more positive emotional profile than their no-AR counterparts. The group main effects and AR x Group interactions utilized two-tailed tests because no predictions were made regarding their effects.

Attributions. A 2 x 4 MANCOVA revealed an AR main effect, $F(4, 534) = 12.21$, $p < .001$ (Wilk's Lamda = .92); a group main effect, $F(12, 1413) = 3.74$, $p < .001$ (Wilk's Lamda = .92); but no AR x Group interaction (see Table 8 for the omnibus effects from the multivariate analyses). The AR main effect was subjected to DFA to reveal the structure of the attributions composing the effect (see Table 9, Panel A). The structure correlations indicated that the discriminant function exhibited a strong and

Table 8

F-Table of Omnibus Effects for the Multivariate Analyses

	Age			Gender			AR			Group			AR x Group		
Multivariate Variable	*df*	Λ	*F*	*df*	Λ	*F*	*df*	Λ	*F*	*df*	Λ	*F*	*df*	Λ	*F*
Attributions	4, 534	.99	1.22	4, 534	.99	1.36	4, 534	.92	12.21*	12, 1413	.92	3.74*	12, 1413	.98	1.13
Attribution emotions	3, 531	.95	8.70*	3, 531	.98	4.48*	3, 531	.99	1.99	9, 1292	.88	7.48*	9, 1292	.97	1.81
Activity emotions	2, 529	.95	14.32*	2, 529	.96	10.81*	2, 529	.96	11.07*	6, 1058	.98	1.89	6, 1058	.97	2.62†

Note. Attribution emotions = attribution-related emotions.

†$p < .05$. *$p < .01$ (two-tailed tests).

Table 9

Discriminant Function Analysis of the AR Main Effect for Attributions (Panel A) and the AR x Group Interactions for Attribution-Related Emotions (Panel B) and Activity Emotions (Panel C)

Panel A: Attributions		
Variable	Structure *r*	*z* weights
Strategy	-.04	-.13
Effort	-.20	-.24
Test difficulty	.53	.16
Professor quality	.95	.94
Panel B: Attribution-Related Emotions		
Variable	Structure *r*	*z* weights
Pride	-.40	.14
Hope	-.59	-.52
Helplessness	.89	.85
Panel C: Activity Emotions		
Variable	Structure *r*	*z* weights
Boredom	.88	.64
Enjoyment	-.82	-.54

positive relationship to the two uncontrollable attributions (test difficulty, professor quality), whereas it was unrelated to strategy and negatively related to effort. The structure weights demonstrated the extraordinary influence of the professor quality attribution on the discriminant function (z = .94). Test difficulty also contributed positively to the discriminant function, but to a much lesser extent. Strategy and effort both had minor and negative contributions to the function.

Most interestingly, the discriminant function served to separate the treatment groups well as evidenced by their divergent group centroids (no-AR = .26; AR = -.37). In essence, group centroids are multivariate means derived from the function's structure. Functions are composed of item loadings from all the dependent measures entered in the DFA (attributions in this case). Thus, the group centroids are multivariate means based on multiple dependent measures. The positive centroid for the no-AR group indicates that these students possessed a maladaptive attributional mindset, in which they emphasized the two uncontrollable attributions, professor quality and test difficulty. Moreover, the no-AR group also slightly de-emphasized a controllable attribution, effort. In stark contrast, the AR group's negative centroid suggests that these students downplayed the influence of the uncontrollable attributions, whereas they placed a slight emphasis on effort. See Figure 4 for the AR main effect.

Attribution-related emotions. A 2 x 4 MANCOVA indicated that there was a marginal AR main effect, $F(3, 531) = 1.99$, $p = .056$ (Wilk's Lamda = .99); a group main effect, $F(9, 1292) = 7.48$, $p < .001$ (Wilk's Lamda = .88); and a marginal AR x Group interaction, $F(9, 1292) = 1.81$, $p = .062$ (Wilk's Lamda = .97). Because the interaction was marginally significant and of greatest interest, it was followed up with DFA

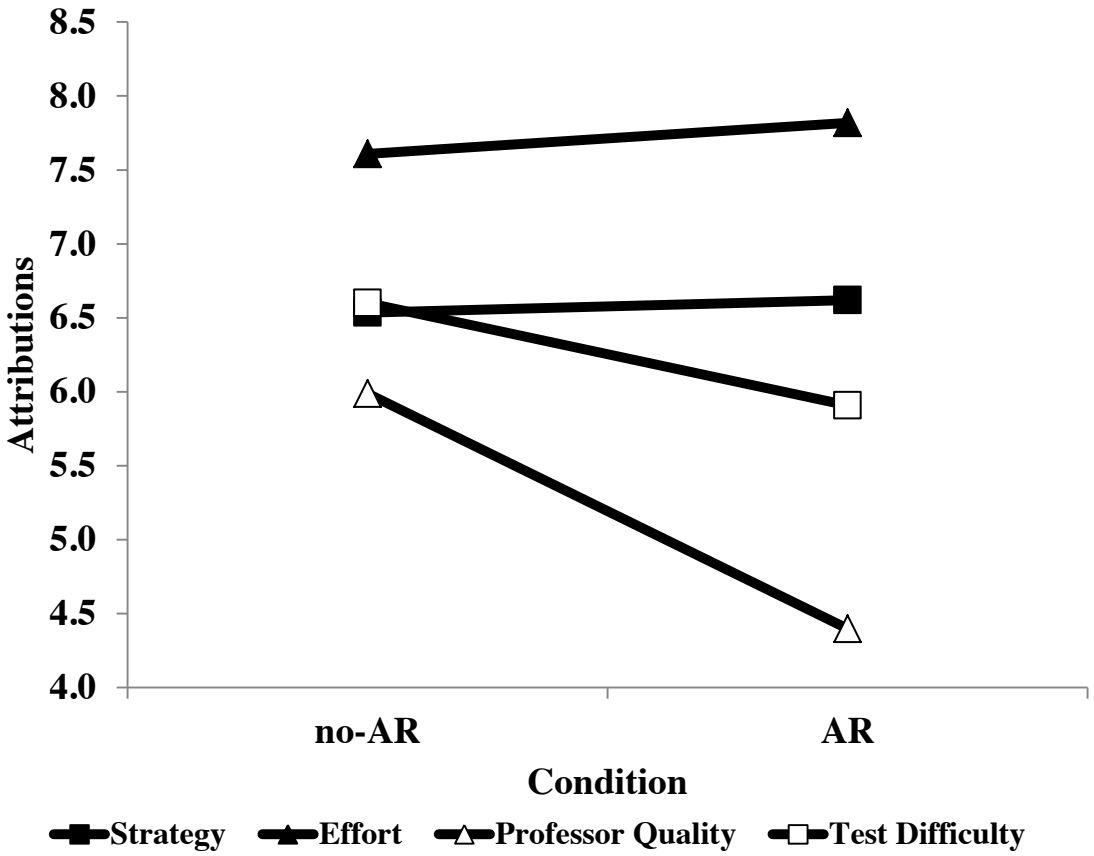

Figure 4. The main effect of AR (no-AR vs. AR) on attributions.

(see Table 9, Panel B). Structure correlations revealed that the discriminant function was strongly related to helplessness, whereas it was moderately and negatively related to pride and hope. The structure weights suggested that the discriminant function was largely influenced by helplessness. Hope contributed negatively to the function, whereas pride contributed relatively little.

Group centroids based on the 2 x 4 DFA revealed an intriguing pattern of results (see Table 10, Panel A). The discrepancy between the no-AR and AR centroids for failure-ruminators was impressive (no-AR = .65; AR = .24). For only failure ruminators, AR positively affected attribution-related emotions, $t(148) = 2.25$, $p = .013$. Notably, the high positive centroid suggests that failure-ruminators in the no-AR condition had elevated levels of helplessness paired with low levels of hope and pride. Although the centroid for failure-ruminators in the AR condition was still positive, it was significantly lower, which demonstrates AR's utility in ameliorating negative attribution-dependent academic emotions. See Figure 5 for the AR x Group interaction.

Activity emotions. A 2 x 4 MANCOVA revealed an AR main effect, $F(2, 529) = 11.07$, $p < .001$ (Wilk's Lamda = .96); an AR x Group interaction, $F(6, 1058) = 2.62$, $p = .016$ (Wilk's Lamda = .97); but no group main effect. The interaction was subjected to DFA (see Table 9, Panel C). Structure correlations suggested the function was strongly and positively related to boredom, whereas it was strongly and negatively related to enjoyment. Structure weights lent themselves to a similar interpretation, as boredom and enjoyment contributed significantly to the discriminant function and in the same direction as the correlations.

Group centroids stemming from the 2 x 4 DFA were of greatest interest

Table 10

Group Centroids from the AR x Group Interactions for Attribution-Related Emotions (Panel A) and Activity Emotions (Panel B)

Panel A: Attribution-Related Emotions		
	Condition	
Group	No-AR	AR
Failure-acceptors	.37	.06
Failure-ruminators	.65	.24
Achievement-oriented	-.37	-.39
Overstrivers	-.38	-.15
Panel B: Activity Emotions		
	Condition	
Group	No-AR	AR
Failure-acceptors	.31	-.10
Failure-ruminators	.50	-.24
Achievement-oriented	-.08	-.15
Overstrivers	-.10	-.28

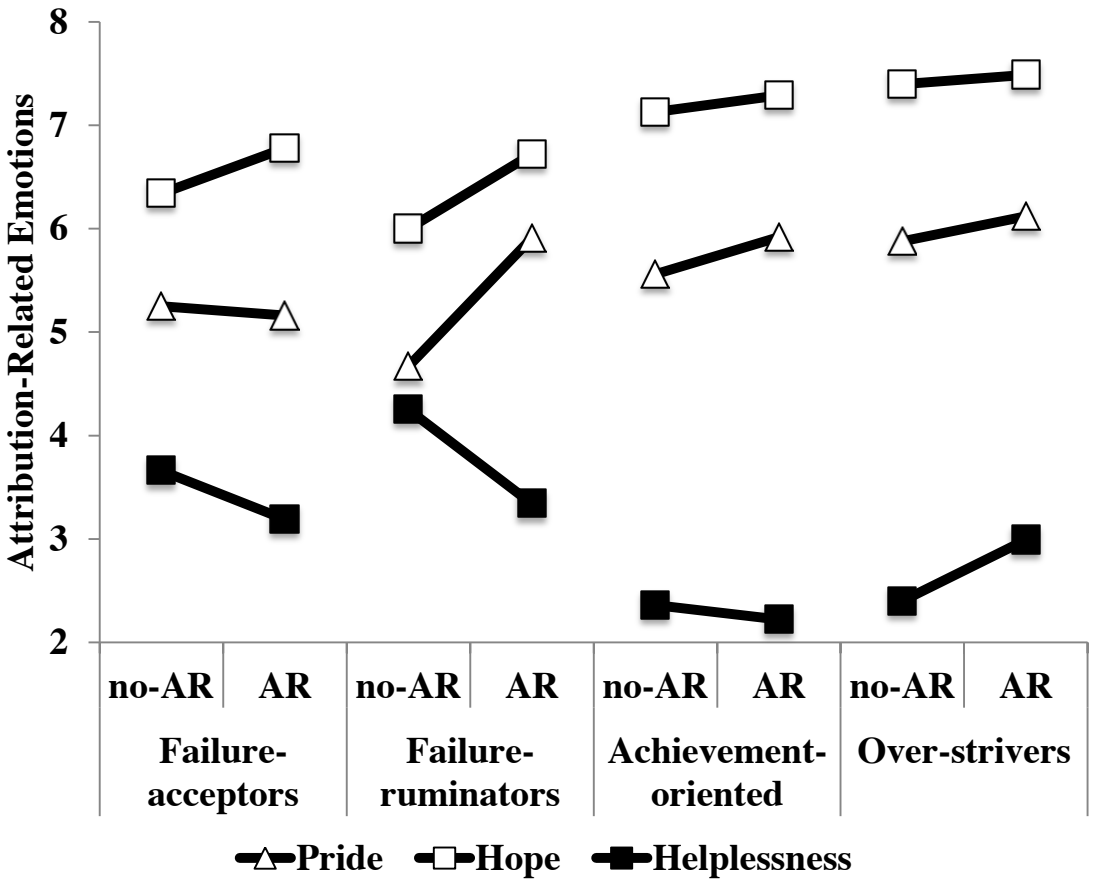

Figure 5. The interaction of AR (no-AR vs. AR) and group (failure-acceptors, failure-ruminators, achievement-oriented, over-strivers) on attribution-related emotions.

(see Table 10, Panel B). Failure-acceptors in the no-AR condition emphasized boredom and de-emphasized enjoyment, whereas their AR peers stemmed this trend (no-AR = .31; AR = -.10), $t(97) = 2.08$, $p = .020$. Yet again, failure-ruminators were most advantaged by AR emotionally: Failure-ruminators in the no-AR condition were characterized by their emphasis of boredom and de-emphasis of enjoyment, whereas their peers receiving AR managed to reverse this negative emotional state (no-AR = .50; AR = -.24), $t(146) = 4.40$, $p < .001$. Remarkably, whereas failure-ruminators in the no-AR condition had the highest centroid of any group (no-AR and AR), their peers who received AR had the second lowest centroid (no-AR and no-AR). See Figure 6 for the AR x Group interaction.

Discussion

One of the foremost issues faced by post-secondary institutions concerns retaining and facilitating achievement in new students struggling to adapt during the perilous transition from high school to university (Perry et al., 2001). Although many remedies have been proposed, few have been empirically validated. With these concerns in mind, the present study sought to examine the effects of AR, a control-enhancing intervention with much research to support its practical utility. However, because AR's effects vary largely based on students' psychosocial dispositions, two pertinent variables (PWF and PC) were used to create distinct typologies that served to identify at-risk students. Consequently, the common and distinct effects of AR on pertinent psychosocial and achievement outcomes for the two at-risk groups (failure-acceptors and failure-ruminators) were of primary interest.

AR: Beneficial for All?

Although not hypothesized, there were a number of AR main effects. Notably,

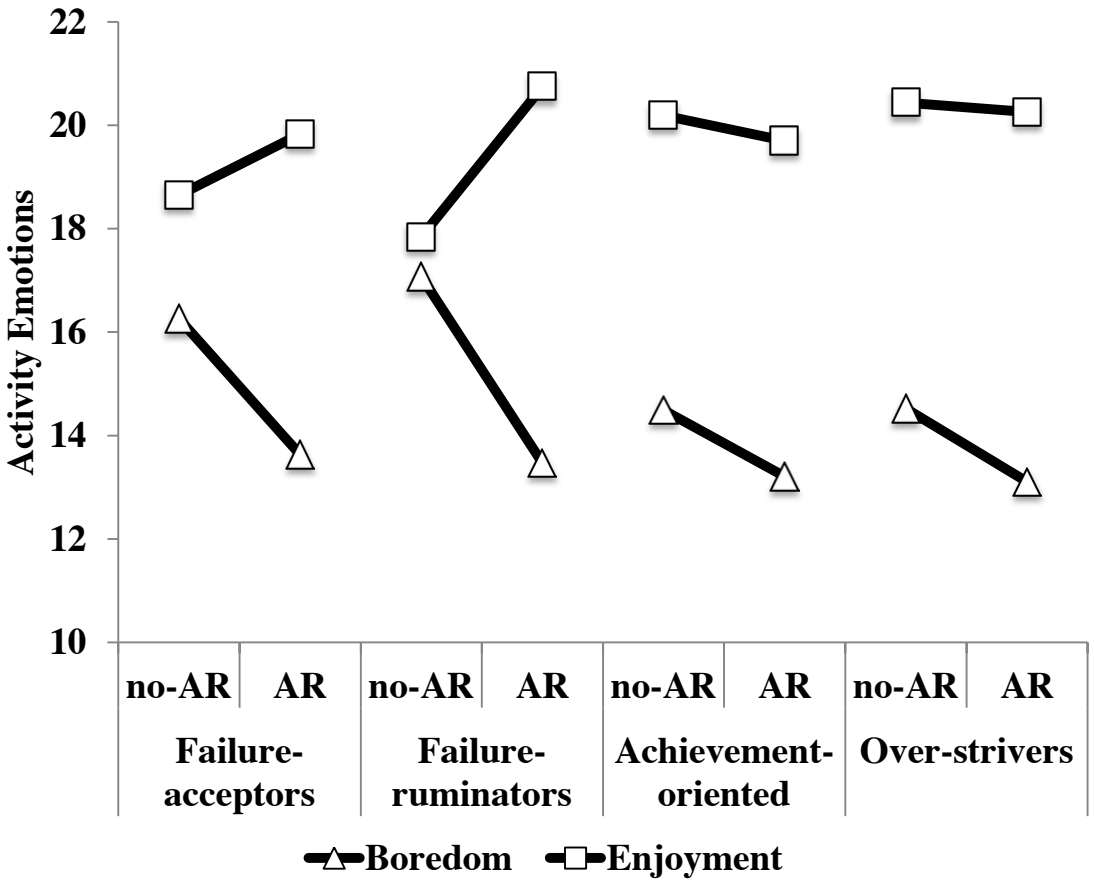

Figure 6. The interaction of AR (no-AR vs. AR) and group (failure-acceptors, failure-ruminators, achievement-oriented, over-strivers) on activity emotions.

students receiving AR had higher GPAs, fewer VWs, higher PC, and a more adaptive attributional mindset. However, with the exception of the attributions, significant simple main effects qualified each of AR's main effects. Hence, to avoid over interpretation, the discussion of AR's omnibus effects will be limited to its influence on attributions.

Because the content of the AR video focuses explicitly on the causes individuals ascribe to failure (attributions), it may be logical that all students' attributions are affected. In fact, these results are consonant with recent research by Perry et al. (2010), who reported that all students in the AR condition accentuated a controllable attribution (strategy) and de-emphasized an uncontrollable attribution (professor quality). Similarly, in the present study, students' receiving AR downplayed two maladaptive and uncontrollable attributions (test difficulty, professor quality), whereas they placed a slight emphasis on a controllable attribution (effort). These findings suggest that although AR is especially beneficial for students most at-risk of academic failure, its effects are not limited to them. AR alters the way all students interpret their academic failures.

The Effects of AR for Failure-Accepting Students

As discussed in the introduction, failure-acceptors were one of the at-risk groups identified. Due to their low levels of PC and PWF, these students neither adequately consider the causes of their failure nor believe they have the ability to rectify them. Accordingly, the first hypothesis examined whether AR benefited failure-acceptors.

Emotions. AR conferred an emotional advantage on students in the failure-acceptor group. Indeed, failure-acceptors who received AR reported more adaptive activity emotions (higher enjoyment, lower boredom) than their no-AR peers. Failure-acceptors in the no-AR condition tended to report low levels of enjoyment paired with

high levels of boredom. In essence, this finding suggests AR's ability to ameliorate a negative emotional state experienced by this at-risk group. For failure-acceptors, this is no small feat. Notably, these students have low PC and low PWF. Because they believe they have little influence over their achievement and fail to search for the causes of their failures, failure-acceptors in the no-AR condition are resigned to failure. Such a bleak outlook presumably gives rise to the development of negative activity emotions (increased boredom and decreased enjoyment). Indeed, it is logical that no-AR students experience boredom but not enjoyment when studying for a course they expect to fail. AR allowed failure-acceptors respite in the face of the demotivating emotional state experienced by their no-AR peers.

Primary control. AR significantly influenced the longitudinal levels of PC reported by failure-acceptors. This result is intuitive to the extent that failure-acceptors reported low initial levels of PC in comparison to their not-at-risk peers (see Table 3) and AR is designed to enhance PC as a consequence of its focus on controllable attributions. Thus, AR bolstered the PC of this group of vulnerable students. AR's capacity to affect the longitudinal PC of at-risk students is most in-line with Hall et al. (2004) and Haynes et al. (2006).

GPA. Only failure-acceptors in the AR condition had higher GPAs than their no-AR peers. Notably, no-AR failure-acceptors had the lowest GPAs of any of the eight possible combinations of AR and group, whereas their AR peers had the highest GPAs (equivalent to over-strivers). For failure-acceptors, it appears as though AR's capacity to redress two fundamental issues underlies its achievement effects: failure-acceptors' tendency to disregard the causes of their failure and their perceived incapacity to effect

change in their environment (low PC). AR provides the control-enhancing, motivational boost needed by these otherwise failure-resigned students. By asking the right question ("Why did I do poorly?") and coming to an adaptive conclusion ("Because I didn't try hard enough/have a good study strategy/etc."), failure-acceptors were able to reap the achievement benefits of AR.

VWs. A similar pattern emerged for VWs: Only failure-acceptors receiving AR had fewer VWs than their no-AR peers. Once again, students in the failure-acceptor group who did not receive AR were at highest risk, as they withdrew from the most classes of any of the eight groups. However, AR provided these students with a resilience that permitted them to persist in their courses. This resilience may be a function of failure-acceptors' more adaptive attributional mindset, their reduction in negative activity emotions, their newfound PC, or, most likely, a combination of these factors. With the adaptive psychosocial disposition promoted by AR, this group of failure-prone students appear to have found a sustained drive and hardiness necessary to complete the classes in which they register.

The Effects of AR for Failure-Ruminating Students

The second hypothesis examined AR's remedial effects for at-risk students in the failure-ruminator group. As described earlier, these students are considered at-risk due to their tendency to ruminate on uncontrollable causes of failure.

Emotions. As expected, failure-ruminators in the AR condition exhibited a more adaptive emotional profile than their no-AR peers. Like their failure-acceptor peers, failure-ruminators receiving AR experienced more positive activity emotions (more enjoyment and less boredom) than their no-AR peers. However, as hypothesized, AR

advantaged only failure-ruminators in terms of the attribution-related emotions (pride, hope, helplessness). In comparison to their no-AR peers, failure-ruminators receiving AR displayed an adaptive emotional pattern in which they reported higher pride and hope but lower helplessness. The emotional turmoil experienced by failure-ruminators in the no-AR condition was notable. These students had the highest levels of boredom and helplessness paired with the lowest levels of pride, hope, and enjoyment (see Table 6). AR provided an emotionally stable haven for failure-ruminators who would otherwise have exhibited an unhealthy and dysfunctional emotional profile.

Primary control. As hypothesized, failure-ruminators in the AR condition reported higher levels of PC than their no-AR peers. Similar to their failure-accepting peers, failure-ruminators had low initial levels of PC (see Table 3). Given that AR is a control-enhancing intervention, this result is logical and in line with previous research (Hall et al., 2004; Haynes et al., 2006). As discussed earlier, PC has been linked to many adaptive achievement outcomes. Hence, AR may also promote achievement indirectly through its capacity to enhance PC.

Implications

The present study suggests that AR has notable benefits for at-risk students, but it also affects the causal thinking of all students. Although not predicted, AR's effect on all students' attributions is unsurprising. This finding is significant because attributional changes are postulated to have far-reaching effects. According to Weiner's (1985a) attribution theory, humans are subject to an attribution-cognition-emotion-motivation-behaviour sequence. Hence, the attributions we make for important outcomes in our lives (e.g., exam performance) affect our cognitions, which subsequently affect our emotions,

motivation, and behaviour. More specifically, students receiving AR in the present study actively de-emphasized two common, but dysfunctional, attributions (test difficulty, professor quality). Although attributing failure to these uncontrollable causes may protect one's self-esteem and self-worth by avoiding personal responsibility—for example, "I couldn't have done any better on my exam because the questions were too difficult!"—they also have the capacity to precipitate a downward spiral in which students believe they have little control over their academic achievement. By downplaying these two uncontrollable attributions while simultaneously emphasizing a controllable attribution (effort), students in the AR condition should experience positive long-term outcomes in terms of their cognitions (increased expectancy of success; increased perception of responsibility), emotions (increased pride, self-esteem, hopefulness; decreased hopelessness, shame), motivation, and achievement striving.

More importantly, the benefits of AR for failure-prone students (failure-acceptors, failure-ruminators) are numerous, consequential, and have theoretical and practical implications. Notably, AR conferred a similar advantage on both at-risk groups in terms of its effects on PC and the activity emotions. Despite the contention that AR influences PC (Haynes et al., 2009), few studies have examined this relationship (Hall et al., 2004; Haynes et al., 2006). Thus, the present study contributes to the limited literature testing post-AR effects on PC in vulnerable students. Importantly, the effects of PC on achievement-outcomes, such as final grades, GPAs, and VWs, are well documented (e.g., Perry et al., 2001; Perry et al., 2005). PC is also an established predictor of psychological health outcomes as outlined in the introduction. Consequently, the effects of AR on psychological health and achievement for at-risk students may be more impressive than

reported, as it may also be influencing these outcomes via its relationship with PC.

AR positively affected the activity emotions of both vulnerable groups. Through its ability to reduce the negative emotional state (high boredom, low enjoyment) experienced by failure-acceptors and failure-ruminators, AR may facilitate engagement and achievement. Research by Pekrun et al. (2002) has suggested that the activating emotion enjoyment is positively related to motivation, effort, cognitive elaboration, self-regulated learning, and achievement, whereas the deactivating emotion boredom is negatively related to the same outcomes. As a consequence, AR presumably further affects the achievement of the at-risk groups via its ability to influence these emotions.

As expected, AR also had unique effects for each at-risk group. For instance, only failure-ruminators receiving AR reported more adaptive attribution-related emotions (higher pride, hope; lower helplessness) than their no-AR counterparts. When the debilitating emotional state experienced by no-AR failure-ruminators is considered in tandem with the results of the manipulation check (pre-AR) analyses, AR's extraordinary influence on failure-ruminators' emotions is manifest. Failure-ruminators' perseveration on uncontrollable causes of failure resulted in a maladaptive pre-AR state in which they reported the lowest levels of optimism and the highest levels of stress and anxiety at Phase 1. It is equally concerning that no-AR failure-ruminators reported the lowest levels of pride and hope and the highest levels of helplessness at Phase 3. Hence, the effects of AR on failure-ruminators' emotions are impressive and consequential, as it assuaged the dismal emotional state reported by their no-AR peers.

AR's effects on failure-ruminators' emotions are also consequential in terms of long-term achievement, as attribution-related emotions are implicated in subsequent

motivation and goal striving in Weiner's (1985) attribution theory. Weiner (1985) postulates that emotions such as pride and hope facilitate subsequent motivation, whereas helplessness (construed as a less severe variant of hopelessness) undermines motivation. Motivation, in turn, is a major determinant of future behaviour. Further, research by Pekrun and colleagues (Pekrun, Elliot, & Maier, 2009) has linked attribution-related emotions, such as pride, hope, and hopelessness to academic achievement. As a consequence, AR presumably affects the achievement of failure-ruminators via its ability to influence these emotions.

The emotional benefits realized by the at-risk groups may also have significant effects on their psychological well-being. During the benchmark transition from high school to university, young adults are at increased risk of poor psychological health (Adlaf, Gliksman, Demers, & Newton-Taylor, 2001), which is manifested in elevated levels of depression (Vázquez & Blanco, 2008) and even attempted suicides (Westefeld et al., 2005). Consequently, AR's capacity to promote adaptive emotions in vulnerable students (particularly failure-ruminators) may have profound long-term consequences.

AR's effects on activity and attribution-related emotions also have theoretical ramifications. Notwithstanding the fact that AR is postulated to affect achievement emotions (Haynes et al., 2009), few studies have empirically examined this supposition (e.g., Hall et al., 2004). As outlined, AR is based on an attribution-cognition-emotion-motivation-behaviour sequence afforded by Weiner's (1985a) attribution theory. Given this framework, AR should certainly affect achievement emotions. Hence, the present study also serves to supplement the sparse literature documenting AR's effects on achievement emotions.

Finally, AR affected only failure-acceptors' GPAs and VWs. These achievement findings are consonant with previous research and theory suggesting that AR positively affects the achievement of at-risk students (Boese et al., in press; Haynes et al., 2009). There are also practical implications to the achievement results. As noted earlier, failure-acceptors in the no-AR condition had the lowest GPAs of any group ($M = 2.51$). Their peers in the AR condition experienced an outcome in direct contrast, as their GPAs were the highest of any of the groups ($M = 2.75$). Even more impressive was AR's effects on VWs. Failure-acceptors in the no-AR condition withdrew from considerably more classes than any of the other groups ($M = 4.03$). Their mean indicates that, on average, these students dropped more than one course per academic year. However, their peers in the AR condition withdrew from less than one course per year ($M = 2.58$). There are financial implications to these findings. Because tuition is based on the number of courses students enrol in, not the number of courses they complete, students receiving AR saved money by actually completing their courses rather than retaking them and being assessed the full course fee for a second time. When one considers the GPA and VW results collectively, it becomes apparent that failure-acceptors in the AR condition were not only more likely to persist in their courses, they were also more likely to succeed in them.

Strengths, Limitations, and Future Directions

One of the primary strengths of this study was its reliance on the strong theoretical frameworks afforded by attribution theory (Weiner, 1985a), perceived control theory (Perry, 1991), and action control theory (Kuhl, 1985). These theories are supported by decades of empirical research, which attests to their longevity and validity.

Further, a pre-post, quasi-experimental randomized treatment design was employed. As a consequence, causal inferences, while never fully warranted, are more acceptable than in research that fails to manipulate the independent variables. Moreover, the study design was longitudinal, as measures were collected at four separate points during the year (October, March, May, June). Finally, the statistical covariates and the breadth and sophistication of the analyses add weight to the reported results. Overall high school grade was covaried for in the achievement analyses, thus ruling out the confounding influence of past achievement on GPA and VWs. Further, the MANCOVAs were probed with follow-up DFAs, which permitted the examination of attributional and emotional profiles rich in complexity—a feat that could not have been achieved using a univariate approach.

One of the study's limitations regards its 2 x 4, eight-cell design. As a consequence, the simple main effect *t*-tests did not have the statistical power a simpler design would have. Another limitation concerns the dichotomization of two continuous independent variables, PWF and PC. A regression approach would have retained more subjects and additional variance on both measures. Although dichotomizing necessarily reduces the variability of the measure, it enables a better separation between students low and high in PWF and PC. Given that distinct student typologies were of greatest interest in the present study, an ANOVA approach was employed. In addition, the correlation between PWF and PC was very low, $r = -.08$, which should allay concerns related to independent variable covariance.

The present study has begun to answer some important questions about AR's effects in relation to two important psychosocial variables, PWF and PC. Future research

would do well to examine PWF's relationship to performance avoidance goals. Given their common relationship with test anxiety and fear of failure, they may be closely related. If this were the case, achievement goal theory and action control theory would benefit from researching the mechanisms by which the two constructs are related. An additional avenue for future research is to examine AR's effects in terms of a mediator model, such as that afforded by latent variable structural equation modelling. Such an approach would allow researchers to test whether AR's effects on achievement are mediated by psychosocial variables such as attributions, achievement emotions, and PC.

Conclusion

In conclusion, the present study was largely in accordance with previous research on AR (see Haynes et al., 2009): AR benefits all students (attributions), but it especially benefits students who are at-risk of academic failure (emotions, PC, achievement). Consequently, although AR could be administered to all first-year students, it is most effective when provided to vulnerable students struggling with the transition from high school to university. Moreover, this study suggests that AR has differential effects for vulnerable students who have diverse psychosocial dispositions. For students resigned to failure (failure-acceptors), AR modified causal thinking, activity emotions, and PC, which theoretically enabled them to persevere in their courses and achieve higher grades than their no-AR peers. Conversely, students who ruminate on their failures and feel out of control (failure-ruminators) are not advantaged in terms of their achievement; yet, these students benefit from AR to the extent that their dysfunctional emotion profile is altered. These ruminating students also profit from increased PC and a more adaptive way of construing their failures.

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Appendix A

Primary Control (Phase 1)

See Table A1 for inter-item correlations.

Strongly disagree				**Strongly agree**
1	**2**	**3**	**4**	**5**

1. I have a great deal of control over my academic performance in my psychology course.
2. The more effort I put into my courses the better I do in them.
3. No matter what I do I can't seem to do well in my courses.
4. I see myself as largely responsible for my performance throughout my college career.
5. How well I do in my courses is often the "luck of the draw."
6. There is little I can do about my performance in university.
7. When I do poorly in a course, it is usually because I haven't given it my best effort.
8. My grades are basically determined by things beyond my control and there is little I can do to change that.

Table A1

Inter-Item Correlation Matrix for Primary Control

Item	1	2	3	4	5	6	7	8
1	–							
2	.23	–						
3	.29	.20	–					
4	.30	.34	.20	–				
5	.20	.22	.32	.24	–			
6	.21	.27	.27	.28	.29	–		
7	.26	.29	.18	.24	.15	.16	–	
8	.23	.20	.27	.25	.27	.34	.24	–

Appendix B

Preoccupation with Failure (Phase 1)

1. When I have lost something that is very valuable to me and I can't find it anywhere:

   (1) I have a hard time concentrating on something else.

   (2) I put it out of my mind for a little while.

2. When I have to solve a difficult problem:

   (1) It takes me a long time to adjust myself to it.

   (2) It bothers me for a while, but then I don't think about it anymore.

3. When I'm in a competition and have lost every time:

   (1) I can soon put losing out of my mind.

   (2) The thought that I lost it keeps running through my mind.

4. If I had bought a new piece of equipment (for example, a CD player) and it accidentally fell on the floor and was damaged beyond repair:

   (1) I would manage to get over it quickly.

   (2) It would take me a long time to get over it.

5. If I have to talk to someone about something important and, repeatedly, can't find her or him at home:

   (1) I can't stop thinking about it, even while I'm doing something else.

   (2) I easily forget about it until I can see the person again.

6. When I've bought a lot of stuff at a store and realize when I get home that I paid too much – but I can't get my money back:

   (1) I can't concentrate on anything else.

   (2) I easily forget about it.

7. When I am told that my work has been completely unsatisfactory:

    (1) I don't let it bother me for long.

    (2) I feel paralyzed.

8. If I'm stuck in traffic and miss an important appointment:

    (1) At first, it's difficult for me to start doing anything else at all.

    (2) I quickly forget about it and do something else.

9. When something is very important to me, but I can't seem to get it right:

    (1) I gradually lose heart.

    (2) I just forget about it and go do something else.

10. When something really gets me down:

    (1) I have trouble doing anything at all.

    (2) I find it easy to distract myself by doing other things.

11. When several things go wrong on the same day:

    (1) I usually don't know how to deal with it.

    (2) I just keep on going as though nothing has happened.

12. When I have put all my effort into doing a really good job on something and the whole thing doesn't work out:

    (1) I don't have much difficulty starting something else.

    (2) I have trouble doing anything else at all.

Appendix C

Boredom (Phase 3)

See Table C1 for inter-item correlations.

Not at all true	A little true	Moderately true	Largely true	Completely true
1	**2**	**3**	**4**	**5**

1. When studying for this course, I feel bored.
2. The things I have to do for this course are often boring.
3. The content is so boring that I often find myself daydreaming.
4. When studying, my thoughts are everywhere else, except on the course material.
5. The material in this subject area is so boring that it makes me exhausted even to think about it.
6. Often I am not motivated to invest effort in this boring course.

Table C1

Inter-Item Correlation Matrix for Boredom

Item	1	2	3	4	5	6
1	–					
2	.69	–				
3	.66	.73	–			
4	.51	.50	.57	–		
5	.56	.63	.64	.56	–	
6	.53	.56	.58	.51	.63	–

Appendix D

Enjoyment (Phase 3)

See Table D1 for inter-item correlations.

Not at all true	A little true	Moderately true	Largely true	Completely true
1	**2**	**3**	**4**	**5**

1. I enjoy learning new things.
2. Some topics are so enjoyable that I look forward to studying them.
3. After I finish studying, I am gratified that I know more than before.
4. After studying for this course, I feel relaxed and worry-free.
5. Some topics are so fascinating that I am very motivated to continue studying them.
6. Because this course is fun for me, I study the material more extensively than is necessary.

Table D1

Inter-Item Correlation Matrix for Enjoyment

Item	1	2	3	4	5	6
1	–					
2	.34	–				
3	.34	.36	–			
4	.25	.23	.38	–		
5	.37	.64	.35	.29	–	
6	.21	.32	.22	.31	.39	–

Appendix E

Primary Control (Phase 3)

See Table E1 for inter-item correlations.

Strongly disagree				**Strongly agree**
1	**2**	**3**	**4**	**5**

1. I see myself as largely responsible for my performance throughout my college career.
2. How well I do in my courses is often the "luck of the draw."
3. There is little I can do about my performance in university.
4. When I do poorly in a course, it is usually because I haven't given it my best effort.

Table E1

Inter-Item Correlation Matrix for Primary Control

Item	1	2	3	4
1	–			
2	.37	–		
3	.44	.46	–	
4	.24	.19	.17	–