# Attributional Retraining and Student Health:

## A Latent Growth Analysis of Mediating and Moderating Variables


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## Introduction

During the transition to higher education, students are faced with critical educational and personal challenges ranging from poor performance, career decisions, and heightened competition to changes in relationships, finances, and autonomy that can negatively impact their motivation, performance, and physical health (Damush et al., 1997; Hudd et al., 2000; Lumley & Provenzano, 2003; Perry, 1991, 2003). In the achievement motivation domain, Weiner's attribution theory suggests that the causes to which evaluative outcomes are attributed can influence subsequent achievement striving and performance (Weiner, 1985, 2006). According to Weiner's theory, attributions to uncontrollable factors (e.g., lack of ability) lead to demotivation and poorer performance, whereas attributions to controllable causes (e.g., lack of effort) foster increased motivation and performance. Attributional retraining (AR) is a remedial intervention based on this premise that attempts to assist students at risk of academic failure by encouraging controllable attributions for poor academic performance (i.e., perceived control; Perry & Penner, 1990; Wilson & Linville, 1985). Extensive reviews of AR studies consistently show first-year college students who receive AR to experience improvements in academic motivation and achievement (e.g., Forsterling, 1985; Haynes et al., 2009; Perry et al., 1993, 2005; Wilson et al., 2002), and more recently, positive emotions and depression (Hall et al., 2007; Stewart et al., 2011).

However, an unfortunate reality is that many students are unprepared for higher education and perform poorly due to factors beyond their control such as limited domain aptitude, high course loads, or employment obligations. Following from research on learned helplessness (Seligman, 1975) and goal theories (Baltes & Baltes, 1990; Dweck & Leggett, 1988), Heckhausen's motivational theory of life-span development (Heckhausen & Schulz, 1995; Heckhausen et al., 2010) offers a life-span developmental perspective on how individuals adapt to low-control settings. The main premise is that people are intrinsically motivated to maintain control over their environment, and use two types of control strategies. Primary-control strategies are enacted first and involve directly changing one's environment (e.g., effort). Secondary-control strategies involve psychologically adapting to low-control settings to preserve motivation and well-being, with the most effective strategies involving self-protection (e.g., positive reappraisal of negative events). This model thus entails a balanced approach to goal-striving: primary control is best when success is possible, and secondary control acts as an effective "back-up plan" for failure experiences.

Health research has consistently demonstrated the beneficial nature of primary and secondary control for individuals facing health challenges such as recurrent pain (Thomsen et al., 2002), cancer (Carver et al., 1993; Thompson et al., 1993; Weisz et al., 1994), HIV (Thompson et al., 1994), heart disease (Affleck et al., 1987; Taylor et al., 1991), heart attacks (Hall et al., 2010), and diabetes (Band & Weisz, 1990). Developmental studies also support the utility of these strategies during critical transition phases in childhood (e.g., Thurber & Weisz, 1997), adolescence (e.g., Connor-Smith & Compas, 2002; Wadsworth & Compas, 2002), mid-life (e.g., Heckhausen et al., 2001), and later life (e.g., Wrosch & Heckhausen, 1999). Educational research has further demonstrated the benefits of both primary and secondary control on students' career-related aspirations, competence, and anxiety (Daniels et al., 2006; Haase et al., 2008; Heckhausen & Tomasik, 2002) as well as academic motivation, emotions, achievement, and physical health in first-year university students (Hall, Chipperfield, et al., 2006; Hall, Perry, Ruthig, et al., 2006). Concerning the limited published research on interventions fostering both primary control (e.g., AR) and secondary control, studies suggest that such programs may be effective for reducing depression in children (Weisz et al., 1997) and stress in older adults (Wrosch et al., 2007), as well as improving motivation and achievement in at-risk first-year college students (Hall, Perry, Chipperfield, et al., 2006).

Following from recent findings showing primary and secondary control *strategies* to promote physical health in first-year college students (Hall, Chipperfield, et al., 2006), and AR methods to promote *psychological* health in this population (Stewart et al., 2011), the present study evaluated the effectiveness of an AR program, modified to promote both control strategies, for improving a developmental outcome not yet addressed in AR research, namely physical health in college freshmen. *Hypothesis 1*: AR should predict greater health as *mediated* by increases in both control strategies and decreased stress. *Hypothesis 2*: AR should strengthen (*moderate*) adaptive relations between these control strategies, stress, and health. *Hypothesis 3*: Given the greater health benefits of primary control for males, and secondary control for females (Hall, Chipperfield, et al., 2006), AR should predict greater levels of the less effective control strategy, and/or strengthen adaptive relations between that strategy, stress, and health, for male vs. female students.

## Method

### Participants & Procedure

The study sample included 781 students from 7 sections of an introductory psychology course at a mid-western university who volunteered for a two-phase study in exchange for experimental credit. The Phase 1 sample consisted of 477 females and 289 males (15 unknown), most between the ages of 17 and 22 (92%). The Phase 2 sample was reduced by 25% ($n$ = 583) due to students having completed their experimental credit requirements or withdrawing from the course. Phase 1 (October) included a questionnaire containing the control and stress measures. Participants were then assigned to a control (No AR) or AR condition consisting of an AR videotape and writing exercise. Phase 2 (March) included a second questionnaire containing the control, stress, and health measures. Course exam scores were obtained upon the completion of the course (May) for consenting students.

### Attributional Retraining

The 8-minute AR videotape presented a scripted discussion between two graduate students about how adopting controllable failure attributions helped improve their expectations and course performance. The 15-minute writing exercise, intended to encourage greater personal reflection and elaboration, asked students to summarize the videotape presentation, suggest additional reasons why students perform poorly, and provide examples as to the personal applicability of the attributional information (cf., elaborative processing; Entwistle, 2000). The fourth writing task required students to describe the circumstances and emotional impact of a recent failure experience (Pennebaker, 1997), and further, to explain in detail how they were able to learn from or reinterpret the event in a positive manner if possible (Weisz et al., 1997). Whereas AR methods typically presents only content concerning controllable attributions (i.e., primary control) in the videotape and writing exercises (Hall et al., 2004), the present AR intervention were modified to explicitly encourage positive reappraisal (i.e., secondary control) in the concluding question of the reflective writing assignment.

### Study Measures

#### Mediator Variables

A 10-item, 5-pt Likert scale (Phase 1/2 α = .72/.81) based on Perry et al.'s (2001) *Primary Academic Control* Scale included items such as "I have a great deal of control over my academic performance in my psychology course." The 4-item, 5-pt Likert self-protection subscale (α = .60/.70) of the larger *Secondary Academic Control* Scale from Hall, Perry, Ruthig, et al. (2006) consisted of items such as "Whenever I have a bad experience at university, I try to see how I can 'turn it around' and benefit from it." A 6-item measure based on Cohen et al. (1983) was used to assess general perceptions of *stress* (α = .84/.87), for example, how often the students had "felt nervous and 'stressed'" or were unable to cope with events in their daily lives.

#### Health Outcomes

*Global health status* was assessed using a 5-point, Likert measure including two items asking students to rate their physical and psychological health at that moment ($M$ = 7.25, $SD$ = 1.58). An 8-item, 5-point *illness symptom* checklist (Cohen & Hoberman, 1983) asked students to rate how often they were bothered by headaches, sleep problems, low energy, fatigue, muscle tension, stomach pain, heart pounding, and poor appetite each month over the past 3 months ($M$ = 22.50, $SD$ = 6.84). *Illness-related behaviors* were assessed using two 5-point items that asked students to rate how frequently they had missed classes or visited a physician due to illness per month over the past 3 months ($M$ = 2.75, $SD$ = 1.13).

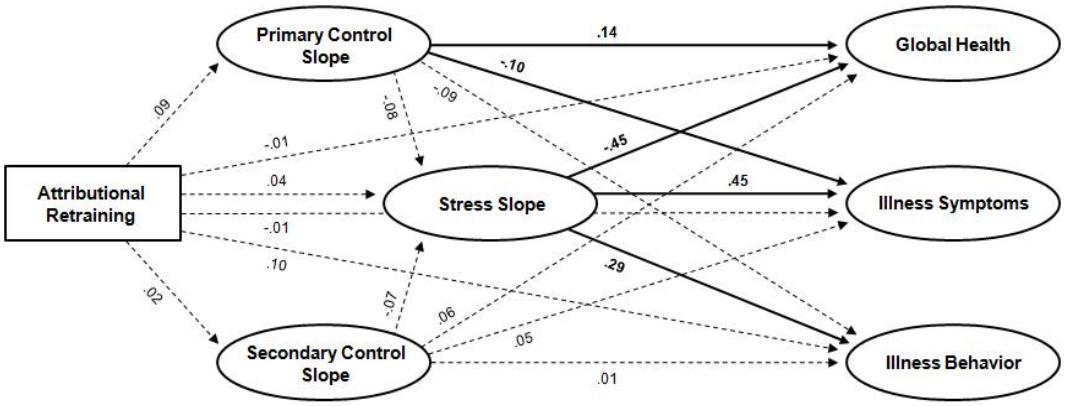
## Analyses

Three latent growth analyses were conducted to evaluate the study hypotheses. In *Model 1,* AR predicted the proposed mediational model controlling for first-semester grades (sum of course tests 1-3) and gender (male = 0, female = 1; additional covariates including age, course load, English as first language, and high-school grades were not significant and excluded). The mediational model was then assessed in two multiple-group analyses to evaluate the moderating effects of AR (*Model 2*) and gender (*Model 3*).

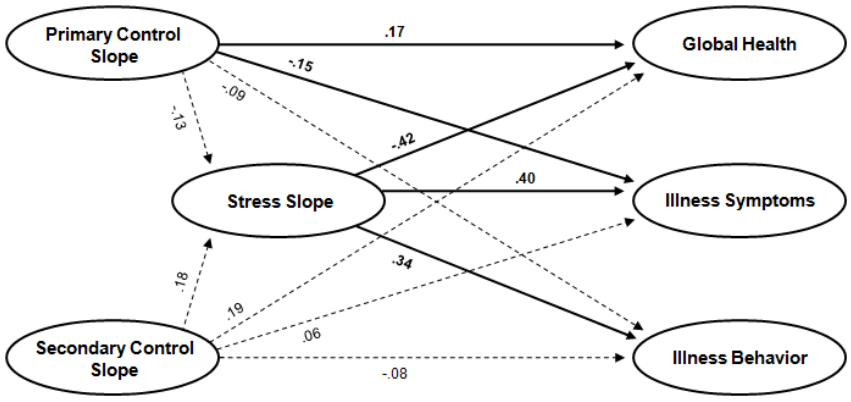
Each model included (a) latent intercepts and slopes for primary control, secondary control, and stress, (b) paths from AR to each slope and health outcome, (c) paths from primary/secondary control and AR to the stress slope, (d) paths from all intercepts and slopes to the health outcomes, (e) paths from each control intercept to the others' slope (lower PC should predict increased SC; Heckhausen et al., 2010), (f) paths from the gender covariate to all latent and manifest variables, (g) paths from the grades covariate to all slopes and health outcomes (grades were correlated with remaining study variables), (h) two parcels each for the primary/secondary control, stress, and symptoms variables (to improve model parsimony; CFI/TLI), and (i) correlations between same parcels in phases 1 and 2. Correlations, covariates, errors, indicators, intercepts, and related relations are not displayed in figures to highlight the proposed mediational model (bolded values/paths significant at $p \leq .05$). Initial AR differences found on primary/secondary control, stress, gender, and grades were addressed by modeled relations with AR and by evaluating AR effects on change scores controlling for intercepts.

## Results

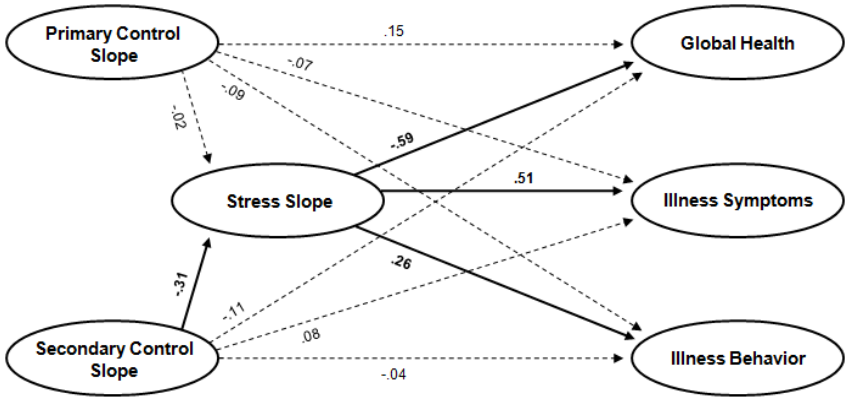
**Model 1.** The model fit well (CFI = .96, TLI = .93, RMSEA = .04). Increased primary control predicted better global health and lower symptoms, and increased stress predicted poorer health outcomes. The primary control intercept positively predicted symptoms (.14), and gender positively predicted the stress intercept (.20) and symptoms (.16; females higher).



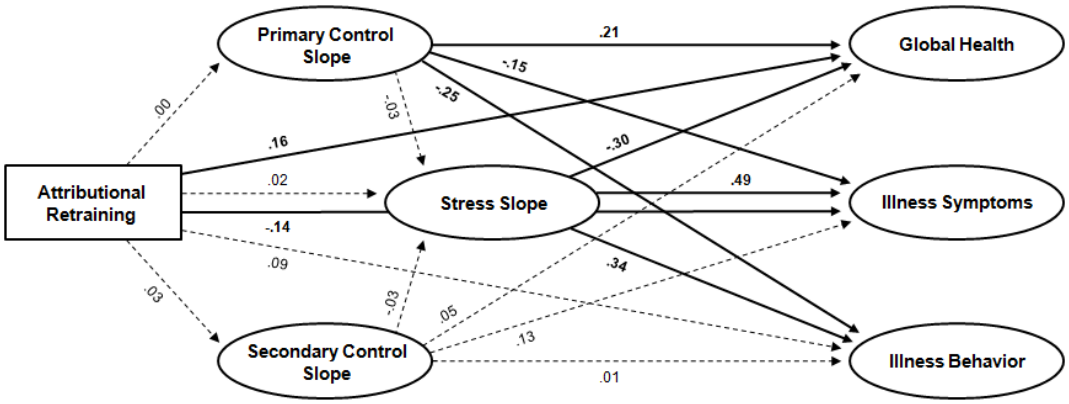

**Model 2.** The model fit well (CFI = .96, TLI = .94, RMSEA = .028) with the AR multiple-group comparison significant for structural weights ($\chi^2(58) = 90.31$, $p < .01$). For **control participants**, increased primary control predicted better global health and lower symptoms ($p = .057$), increased stress predicted all health outcomes, and gender positively predicted the stress intercept (.24).



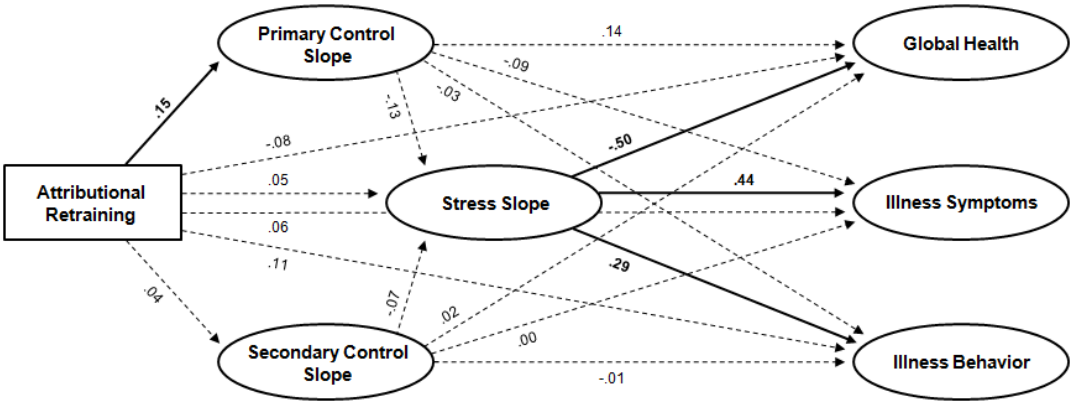

For **AR participants**, increased secondary control predicted decreased stress, which in turn, predicted all health outcomes. Gender positively predicted the stress intercept (.14; lower than for controls), the primary control intercept (.15) and slope (.15), and symptoms (.22).



**Model 3.** The model fit well (CFI = .96, TLI = .92, RMSEA = .03) with the gender multiple-group comparison significant for structural weights ($\chi^2(54) = 120.06$, $p < .001$). For **males**, AR predicted better global health and fewer symptoms, increased primary control and stress predicted all health outcomes as expected, and the primary control intercept predicted better global health (.27).




For **females**, AR predicted increased primary control, the secondary control intercept predicted better global health (.16), and stress predicted all health outcomes.




## Discussion

Although no overall treatment effects were observed on control, stress, or health (Hypothesis 1), moderation analyses revealed that AR, when modified to promote both primary and secondary control, may strengthen the link between increased secondary control and decreased stress that, in turn, predicted better health (Hypothesis 2; fully mediated model). AR was also found to predict increased primary control for females (Hypothesis 3), yet directly predict better health for males. Taken together, these findings suggest that AR can indeed be beneficial for students' physical health, either by reminding them of the stress-reducing nature of secondary-control strategies, or for males, by directly impacting health outcomes. Additional research with larger samples is warranted to better evaluate the proposed mediators for females (increased primary control → decreased stress approached significance) and for males, for whom other mediating variables may be more relevant (e.g., attributions, emotions, expectations).

Word Count: 1963

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