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ENHANCING PRIMARY AND SECONDARY CONTROL IN ACHIEVEMENT SETTINGS THROUGH WRITING–BASED ATTRIBUTIONAL RETRAINING

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Attributional retraining (AR) is a psychotherapeutic motivational intervention which consistently produces modest improvements in motivation and performance by encouraging controllable attributions for failure experiences. Research suggests that unsuccessful individuals high in primary control (PC) and low in secondary control (SC) are at risk of failure and may especially benefit from AR techniques. College students' ($N = 255$) primary and secondary academic control was assessed at the beginning of the first academic semester, after which half of the students received a writing–based AR intervention. Final grades and performance–related perceived success, affect, and attributions were assessed at the end of the academic year. Attributional retraining (No AR, AR) by secondary control (low/high) 2×2 ANCOVA analyses for high–primary–control students revealed significant improvements in performance, coupled with decreased perceived success and increased negative affect for unsuccessful, high–PC/low–SC students. The importance of primary and secondary control for development in achievement settings, and the underlying mechanisms of writing–based AR techniques (i.e., attributions, primary/secondary control) are discussed.

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At the start of important life transition phases, individuals contend with a number of factors threatening their sense of mastery and predisposing them to failure experiences. In an academic setting, for example, first–year college students must assume much greater responsibility for their academic performance in contrast to their high school experiences, and increased independence in terms of studying and completing course requirements on a largely individual basis. As such, some intelligent and enthusiastic high school students may perform poorly during their first year of college, apparently unable to make this transition to increased self–reliance and autonomy. Consequently, a paradox of failure arises in which otherwise capable students experience unanticipated academic failure or leave the university setting (Perry, Hladkyj, Pekrun, & Pelletier, 2001), with U.S. statistics showing over 40% of students leaving before obtaining a degree and 75% of dropouts withdrawing during their first year (Elkins, Braxton, & James, 2000; Tinto, 1987).

Numerous studies have demonstrated that high quality college instruction positively influences important academic outcomes such as performance, emotions, and motivation (see Perry & Smart, 1997). However, this research also indicates that a pattern of low perceived control, negative affect, and poor performance characteristic of failure–prone, at–risk students can persist despite the presence of high quality teaching (see Perry, 1991, 2003, for reviews). Research in achievement motivation suggests that this pattern can be explained, in part, by maladaptive motivational approaches to academic performance adopted by these individuals during their first year of university. Specifically, Weiner's attribution theory of emotion and motivation (1985, 1995) suggests that the causes to which important outcomes are attributed can significantly influence subsequent emotions, motivation, as well as performance outcomes.

Attributional retraining (AR) is a remedial motivational intervention based directly on Weiner's attribution theory which encourages controllable attributions for poor performance and consistently results in modest increases in motivation and performance in an academic achievement setting (Forsterling, 1985; Perry, Hechter, Menec, & Weinberg, 1993). In an ongoing effort to match specific at–risk groups with appropriate AR intervention techniques, Perry and his colleagues have assessed the utility of various AR treatment methods for students at risk of failure due to dispositional and situational factors such as poor performance (Menec, Perry, Struthers, Schonwetter, Hechter, & Eicholz, 1994),

maladaptive attributions (Struthers & Perry, 1996), external locus (Menec et al., 1994; Perry & Penner, 1990), and overly optimistic beliefs (Ruthig, Perry, Hall, & Hladkyj, 2004). The present study continues this focus by examining the effectiveness of a writing–based AR treatment for students at risk of academic failure based on recent research in achievement motivation employing Rothbaum, Weisz, and Snyder's (1982) dual–process model of perceived control.

ATTRIBUTIONAL RETRAINING

In view of the periodic ineffectual nature of enriched learning environments for students predisposed to poor academic performance (Perry, 1991), motivational researchers have attempted to develop therapeutic interventions which foster academic motivation and achievement (Van Overwalle & De Metsenaere, 1990; Wilson & Linville, 1985). Attributional retraining (AR) is a psychotherapeutic intervention based on Weiner's theory of motivation which attempts to redress maladaptive attributions for poor performance. According to attribution theory, attributions for failure which are stable and uncontrollable are especially detrimental to one's motivation. Attributing poor test performance to an immutable lack of ability, for example, will likely result in feelings of hopelessness, potentially resulting in decreased motivation, achievement striving, future test performance, and class attendance. In response, attributional retraining techniques encourage individuals to adopt controllable and unstable explanations for failure experiences such as a lack of effort, thus providing greater motivation to succeed resulting in increased effort and, in turn, improved performance.

Researchers utilizing attributional retraining techniques have shown modest yet consistent improvements in motivation and performance in achievement settings (Forsterling, 1985), particularly for college students at risk of academic failure (see Perry et al., 1993, for review). From early research conducted by Wilson and Linville (1985) and Van Overwalle and De Metsenaere (1990), significant improvements in academic achievement have been demonstrated among college freshmen following attributional retraining treatments encouraging students to attribute failure experiences to either controllable or unstable factors (i.e., lack of effort). Furthermore, our research has found that AR can be particularly effective for certain students, namely those who are academically at risk. Specifically, students experiencing poor performance, or having low perceptions of success, an external locus of control, a performance orientation, or overly optimistic beliefs are more likely to benefit from the AR treatment than those who have been successful, perceive themselves as successful, or have an internal locus of control,

mastery orientation, or realistic academic expectations (Menec et al., 1994; Pelletier, Hladkyj, Moszynski, & Perry, 1999; Perry & Penner, 1990; Perry & Struthers, 1994; Ruthig et al., 2004).

WRITING–BASED TREATMENTS

Research efforts aimed at improving the academic experiences of college freshmen have also illustrated how written emotional expression concerning stressful experiences can result in significant improvements in psychological well–being (Smyth, 1998) and GPA (Pennebaker & Francis, 1996). With respect to the mechanisms involved, this research suggests that writing techniques allow the emotions surrounding a stressful event to be translated into an organized linguistic structure that facilitates a greater understanding of the event. Pennebaker and Seagal (1999) posit that it is through this integration of thoughts and feelings that the individual can more easily construct a coherent narrative of the experience, allowing the memory of the event to be understood and forgotten more efficiently (see also Pennebaker, 1997). Research by Park and Blumberg (2002) further suggests that writing–based therapies encourage individuals to reinterpret the meaning of an aversive event, particularly the perceived controllability of the experience. As such, although AR techniques that incorporate non–emotive writing exercises have proven effective in improving college student development (Hall, Hladkyj, Perry, & Ruthig, 2004; Jesse & Gregory, 1986–87), this research highlights the potential effectiveness of writing–based AR treatments in which the emotions surrounding failure experiences are also addressed. (For more information on academic emotions, see Pekrun, Titz, Perry, & Spangler, 2000; Weiner, 1985, 1995.)

PRIMARY AND SECONDARY CONTROL IN ACHIEVEMENT SETTINGS

Research in achievement motivation has repeatedly confirmed the importance of perceived control in academic development (e.g., Perry & Dickens, 1984; Perry, Schonwetter, Magnusson, & Struthers, 1994; Perry et al., 2001), a construct which, until recently, was based primarily on the premise of one's perceived ability to influence the environment (see Perry, 1991, for review). However, Rothbaum et al. (1982) theorize that some behaviors ordinarily understood as reflecting a loss of control or helplessness may in fact serve to maintain perceptions of personal control. Likewise, these authors have proposed a dual–process model in which perceived control is fostered by attempts to change either the environment (primary control), or psychologically adjust to one's environment (secondary control). In contrast to primary–control strategies such

as persistence, exertion of effort, and attributions to effort, secondary–control strategies may include the downgrading of expectations or task importance, accepting limitations, or perceiving benefits from an otherwise adverse experience (Chipperfield, Perry, & Menec, 1999).

Recent research by Hall, Perry, Ruthig, Hladkyj, and Chipperfield (in press) found that for college students experiencing failure early in the academic year, both primary and secondary control corresponded with higher cumulative GPAs, greater motivation, lower perceived stress, and more positive learning–related emotions. However, this study also found that although successful students high in primary control were the highest achievers, unsuccessful students favoring primary over secondary control had poorer cumulative GPAs and dropped more courses than their counterparts relying on secondary control alone, both types of control, or neither. According to Rothbaum et al. (1982), these results are to be expected in that, "perceived uncontrollability, ironically, is especially likely to occur in persons who typically rely on primary control" (p. 28) because these individuals overexert themselves and have little energy for attempts at secondary control. In fact, research on secondary control suggests that the psychological benefits of relying mainly on primary control may be limited to those experiencing successful outcomes (Thompson et al., 1998), with overinflated primary–control beliefs corresponding to increased anxiety, depression, loneliness, perceived uncontrollability, and poor health in low–control populations (Chipperfield et al., 1999; Lackovic–Grgin, Grgin, Penezic, & Soric, 2001; Shapiro & Shapiro, 1979; Weisz, Rothbaum, & Blackburn, 1984). Although high primary–control beliefs are generally indicative of mental health in young adults (Heckhausen & Schulz, 1995; Shapiro, Schwartz, & Astin, 1996), primary control in the absence of secondary control may be especially detrimental to unsuccessful students.

Thus, consistent with previous research, the findings of Hall et al. (in press) indicate that *unsuccessful* students high in primary control (PC) *and* low in secondary control (SC) are at risk of serious long–term deficits in academic performance and persistence. Based on recent research on attributional retraining and written disclosure, it follows that these individuals may benefit from an AR intervention which also includes a writing exercise that fosters deeper reflection on the perceived controllability of academic failure experiences.[1] The present eight–month field study seeks to demonstrate the effectiveness of a writing–based AR treatment that encourages not only increased effort (primary control) but also a reinterpretation of failure as a control–enhancing experience (secondary control) for improving academic development in unsuccessful students favouring primary over secondary control.

1. Intervention techniques fostering both primary and secondary control in at–risk individuals have long been encouraged in perceived control research (Thompson, Sobolew–Shubin, Galbraith, Schwankovsky, & Cruzen, 1993; Weisz et al., 1984), and were originally suggested by Rothbaum et al. (1982) who noted the importance of matching treatments to individuals "along the dimensions suggested by the two–process model" (p. 31). More specifically, treatments facilitating primary control as well as interpretive secondary–control strategies, such as finding benefit in an adverse experience, have been endorsed (Connor–Smith & Compas, 2002; Langrock, Compas, Keller, Merchant, & Copeland, 2002; Thompson et al., 1994; Weisz, Thurber, Sweeney, Proffitt, & LeGagnoux, 1997).

STUDY HYPOTHESES

Because only high–primary–control individuals were included in the present analyses, our hypotheses concerning low–SC and high–SC students refer only to those also high in primary control. For ease of explication, the high–PC/high–SC combination is referred to as the *high–SC* group and the high–PC/low–SC combination as the *low–SC* group. For unsuccessful students who did not receive AR, the low–SC group was expected to perform more poorly than their high–SC counterparts. Low–SC students were also expected to show poorer levels of perceived success, learning–related emotions (i.e., enjoyment, anxiety), and attribution–dependent emotions (i.e., hope, guilt) than high–SC students because although these individuals are high in primary control, they do not possess the secondary–control resources required to buffer the negative motivational and affective impact of failure experiences. Significant differences were not hypothesized between the unsuccessful low–SC and high–SC groups in the No AR condition on causal attributions as all unsuccessful individuals in this study were expected to feel in control concerning their performance because of having high primary control.

A main effect of attributional retraining on uncontrollable failure attributions was anticipated for all participants, because decreased reliance on such attributions is explicitly encouraged in AR techniques. Most importantly, however, significant improvements in performance were expected for unsuccessful, low–SC students following the AR treatment, whereas no treatment effects were expected for their high–SC counterparts. A third hypothesis with respect to the AR treatment addressed the potential drawbacks of providing an intervention encouraging primary control to poor–performing individuals lacking in secondary control. Specifically, unsuccessful students low in secondary control who received AR were expected to report lower perceived success and poorer academic emotions than the control group because these individuals, who were also high in primary control, were expected to try to improve their failing grades. In the absence of secondary control, this should be a particularly challenging and stressful experience. Finally, increased secondary control

was expected for unsuccessful, low–SC students following the AR treatment which was modified to enhance both primary and secondary control in these individuals. For successful students, no effects were predicted on any dependent measures as these individuals were expected to be performing well and feel in control, and as such, not in need of failure–oriented secondary control or attributional retraining techniques.

METHOD

PARTICIPANTS

The participants ($N = 225$) were recruited from a two–semester introductory psychology course at a Midwestern, research–1 university and were selected from a larger longitudinal study assessing students' attitudes toward their university experience ($N = 1093$). All participants completed a battery of questionnaires at the beginning (Time 1) and near the end (Time 2) of the academic year concerning their university experiences (see Procedure). At Time 1, the sample consisted of 172 females and 79 males (four students did not indicate their gender), most between the ages of 17 and 24 (93%). At Time 2, the sample was reduced by 17% ($n = 211$) due to several factors including students having already completed their experimental credit requirements, having withdrawn from the course, illness, etc.

Only participants from the larger study who had an unambiguous success or failure experience early in the academic year, prior to the Time 1 questionnaire, were included in the present study (see Rationale for Analyses). More specifically, students scoring in the bottom 25% (below 60%; $n = 234$) and top 25% (above 80%; $n = 256$) of the distribution based on the first exam in introductory psychology were assessed. Furthermore, because individuals high in primary control (PC) and either low or high in secondary control (SC) were of specific theoretical relevance (Rothbaum et al., 1982), *only high–primary–control individuals were included in this study* (see Independent Measures). As a result of these two important participant restrictions, the present sample assessed in the ANCOVA analyses consisted of 255 college students (unsuccessful, $n = 78$; successful, $n = 177$).

INDEPENDENT MEASURES

Success/Failure Classification (test performance). Students' grades on their first introductory psychology course exam were obtained from the instructors upon completion of the course ($n = 998$, $M = 69.83\%$, $SD = 14.23$, Range = 24% to 100%). Only those categorized as having had either an academic failure, the bottom 25% of the sample who scored below 60% ($n = 234$, $M = 50.44\%$, $SD = 7.02$), or success experience, the top 25% of students who scored above 80% ($n = 256$, $M = 87.24\%$, $SD = 4.99$), based on their performance on this exam were included. This performance–based classification is consistent with subjective perceptions of success in introductory psychology early in the academic year, with participants classified as unsuccessful reporting significantly lower scores than their successful counterparts on a single–item, 10–point measure of perceived success in the course (1 = very unsuccessful, 10 = very successful) administered at Time 1: unsuccessful, $M = 2.94$, $SD = 1.93$; successful, $M = 7.95$, $SD = 1.83$; $t(479) = 29.15$, $p < .001$.

Primary Academic Control (PC). A 10–item measure assessing primary academic control beliefs was used for the Time 1 questionnaire (Cronbach's $\alpha = .78$) based on Perry et al.'s (2001) Academic Control Scale. Participants indicated on a 5–point Likert scale (1 = strongly disagree, 5 = strongly agree) the extent to which they agreed with statements such as "I have a great deal of control over my academic performance in my psychology course," and "The more effort I put into my courses, the better I do in them." A 5–month test–retest reliability estimate revealed acceptable stability between Times 1 and 3, $r(821) = .58$, $p < .001$. Participants were defined as either low or high in primary control using a median split: Low PC: $M = 38.42$, $SD = 3.66$, Range = 15 to 42; High PC: $M = 45.73$, $SD = 2.08$, Range = 43 to 50; $t(1058) = 40.64$, $p < .001$.

2. This measure was constructed to assess both secondary–control *beliefs* (e.g., Affleck, Tennen, Croog, & Levine, 1987; Heckhausen, 1997; Lang & Heckhausen, 2001, Studies 1 and 2; Petito & Cummins, 2000; Thompson et al., 1998), and *strategies* (e.g., Chipperfield et al., 1999; Thompson et al., 1994, 1996; Weisz et al., 1994; Wrosch et al., 2000; Wrosch, Schultz, & Heckhausen, 2002). Self–reported control *beliefs* are defined as the endorsement of general control–striving behaviors, and have been examined using measures assessing participants' agreement with general statements involving primary control, such as "I believe I can influence my development" (p. 511, Lang & Heckhausen, 2001), and secondary (interpretive) control, including "I tend to focus on what's good about getting older" (p. 592, Thompson et al., 1998), and "Even in great misfortune I often find meaning" (p. 179, Heckhausen, 1997). In contrast, measures assessing control *strategies* are defined as the endorsement of statements concerning the personal use of specific, goal–oriented, control–enhancing techniques involving primary control: persistence and effort (e.g., Chipperfield et al., 1999; Perry et al., 2001); and secondary control: acceptance (Halliday & Graham, 2000), positive reappraisal (Band & Weisz, 1990; Wrosch, Heckhausen, & Lachman, 2000), lowering aspirations (Chipperfield et al., 1999; Wrosch et al., 2000), disengagement (Heckhausen, Wrosch, & Fleeson, 2001, Study 2; Wrosch & Heckhausen, 1999), and various others (e.g., Connor–Smith & Compas, 2002; Langrock, Compas, Keller, Merchant, & Copeland, 2002; Wadsworth & Compas, 2002; Wrosch, Schulz, & Heckhausen, 2002). For more information on the conceptual distinction between control beliefs and strategies, see Chipperfield, Campbell, and Perry (2004).

Secondary Academic Control (SC). A 7–item measure assessing interpretive secondary academic control beliefs and strategies was administered at Time 1 (Cronbach's $\alpha = .67$) and Time 2 (Cronbach's $\alpha = .74$).[2] This scale included four 5–point interpretive control items from the Secondary Academic Control Scale found in Hladkyj, Pelletier, Drewniak, and Perry (1998) such as "No matter how well I do on a test or in a course, I try to 'see beyond' my grades to how my experience at university helps me to learn about myself," and "Regardless of what my grades are, I try to appreciate how my university experience can make me a 'stronger person' overall" (1 = strongly disagree, 5 = strongly agree). In an effort to incorporate emerging research on "life–oriented" interpretive secondary control, three additional items based on a recently developed 7–point measure (Hladkyj, Perry, Hall, Ruthig, & Pekrun, 2003) were also included, consisting of items such as "When bad things happen to me, I make an intentional effort to understand how they fit into the rest of my life" (1 = not at all true of me, 7 = very true of me). As such, the present interpretive secondary control scale is unique in examining both the academic–specific and domain–general components of interpretive control by addressing how individuals positively reinterpret not only negative academic experiences, but also life events in general.[3] A 5–month test–retest reliability estimate indicated acceptable stability between Times 1 and 3, $r(821) = .62$, $p < .001$. Participants were defined as either low or high in secondary control using a median split: Low SC: $M = 21.88$, $SD = 3.42$, Range = 9 to 26; High SC: $M = 30.47$, $SD = 2.96$, Range = 27 to 41; $t(1060) = 43.45$, $p < .001$.

Writing Assignment AR treatment. AR was presented to students in one of two formats, namely via either an oral/handout or videotape presentation of attributional information followed by a writing assignment. The *one–page handout* discussed by the experimenter and read by the participants (see Procedure) summarized the benefits of changing dysfunctional causal attributions (e.g., ability) to functional attributions (e.g., effort) and offered suggestions as to more adaptive ways of thinking about negative academic experiences. For instance, it advocated that "Rather than thinking a test was too difficult, try thinking in terms of tests appearing difficult when one is not well enough prepared," implying that increased studying may improve future performance.

3. The interpretive form of secondary control was selected based on previous research showing this factor to be highly associated with good psychological adjustment (Affleck et al., 1987; Croog & Levine, 1982; Hall et al., in press; Wrosch et al., 2000). Recent research also suggests that engaged (e.g., interpretive) rather than more passive secondary–control beliefs and strategies (e.g., acceptance, disengagement) are also of greater benefit to adolescents and young adults (Halliday & Graham, 2000; Petito & Cummins, 2000; Wadsworth & Compas, 2002). Heckhausen and Schultz (1995) further suggest that compensatory secondary–control strategies, such as positive reappraisal (similar to interpretive secondary control as outlined by Rothbaum et al., 1982), allow for sustained motivation in situations affording opportunities for future success (e.g., achievement settings), and represent an effective form of secondary control following an unexpected failure of primary control efforts (e.g., poor performance).

The *videotape* presentation (8 minutes) was identical to that previously used in this laboratory (Menec et al., 1994; Struthers & Perry, 1996), depicting two graduate students in psychology discussing how adopting controllable explanations (causal attributions) for poor performance on an exam in introductory psychology contributed to a subsequent increase in motivation and academic achievement. The main points of the videotaped conversation are reiterated by a male professor who both introduces and summarizes the discussion presented, emphasizing that by perceiving failure as unstable students can take control over how they respond to these events and that this is how successful academic outcomes are ultimately achieved.

The *writing assignment* included as part of the AR intervention consisted of a one–page handout addressing four discussion topics. Three topics were based explicitly upon the three tenets of elaborative processing described by Entwistle (2000), consisting of depth (i.e., interconnections fostering summarization), breadth (i.e., considering a variety of related information), and personal structure (i.e., personally relevant examples). Thus, participants were first requested to summarize the main points of the videotape, and then to list a number of important reasons for why first–year students may not perform as well as they could in their courses. In accordance with Weiner's attribution theory (1985), the second topic encouraged participants to focus mainly on controllable factors when brainstorming for possible failure attributions. The third topic required participants to construct personally relevant examples of how the main points of the videotape could be applied to the way they currently approach their own college courses.

The fourth discussion topic of the writing assignment was derived from written emotional expression research (Pennebaker, 1997; Pennebaker & Seagal, 1999; Smyth, 1998). Specifically, participants were asked to describe in detail a recent instance in which they performed poorly on an academic exam or assignment, and to elaborate on the emotional impact of this event. In addition, as encouraging further consideration of secondary control was expected to contribute to the effectiveness of the writing AR treatment for low–SC individuals, participants were also requested to explain how they were able to *learn from or reinterpret the event in a positive manner* if possible. This is consistent with the secondary–control enhancement training described in Weisz, Thurber, Sweeney, Proffitt, and Le Gagnoux (1997) and recent research suggest-

ing that writing–based treatments realize their effectiveness by fostering a cognitive reinterpretation of the perceived controllability of stressful events (Park & Blumberg, 2002). Furthermore, consistent with the Pennebaker paradigm, this discussion question also explicitly informed participants as to the confidential nature of their written responses. As such, the writing assignment was based not only on research concerning cognitive elaboration, but also attribution theory and recent research on secondary control and written discourse.[4]

DEPENDENT MEASURES

Academic Achievement. To assess the impact of AR on achievement for at–risk students, final course grades in introductory psychology and performance on course–related tests and assignments were obtained from professors for students who consented. Final grade percentages are comprised of grades received on exams, assignments, essays, etc., administered throughout the academic year (M = 70.56%, SD = 13.23, Range = 16.28% to 99.50%). In keeping with Perry et al. (2001), self–reported *high school grades* were used as a covariate when analysing final grades, $r(964) = .39$, $p < .001$, and were obtained at Time 1 by asking participants to indicate their overall average percentage in their last year of high school (M = 7.28, SD = 1.75; 1 = 50% or less, 10 = 92% to 100%).

Perceived Academic Success. A 2–item, 10–point Likert measure was used to assess perceptions of their *current and future academic success* at Time 1 (M = 12.41, SD = 3.65) and Time 2 (M = 12.71, SD = 3.68) by asking participants how successful they felt they were in introductory psychology to date (1 = very unsuccessful, 10 = very successful) and what percentage they expected to obtain in their psychology course (1 = 50% or less, 10 = 91% to 100%). The Time 1 measure was included as a covariate in analyses of the Time 2 measure.

4. Although the present AR treatment included components not directly related to attribution theory, the bulk of the intervention specifically encouraged students to adopt controllable attributions for academic failure, and as such, was referred to as Attributional Retraining. Specifically, the treatment consisted of four attribution–related components including (1) the videotape/handout presentation, (2) the first writing task encouraging students to summarize the attributional presentation, (3) the second writing task asking students to brainstorm possible attributions for academic failure (with a specific focus on controllable attributions), and (4) the third writing task encouraging students to elaborate on the personal applicability of attributional presentation. Although the present AR treatment also included a fifth component asking students to write about the emotional impact of a failure experience and if they were able to reinterpret it in a positive manner (secondary control), the entire treatment is referred to as Attributional Retraining because most components of the treatment specifically encouraged attributional change.

Negative Academic Emotions. Learning–related *anxiety* was measured at Time 2 using a 6–item, 5–point Likert scale developed by Pekrun et al. (2000) on which participants indicated the extent to which each statement reflected their experience in introductory psychology (1 = not at all true, 5 = completely true). Pekrun's anxiety scale (Cronbach's $\alpha = .81$) included items such as "When I have problems learning the material in this course, I get anxious," and was also assessed at Time 1 (Cronbach's $\alpha = .79$) to be used as a covariate in the Time 2 analyses on anxiety. Negative attribution–dependent feelings of *guilt* (Weiner, 1985) were also assessed at Time 2 using a 10–point, single–item measure (M = 3.62, SD = 2.35) concerning students' performance in introductory psychology (1 = not at all, 10 = very much so).

Positive Academic Emotions. Learning–related *enjoyment* was assessed at Time 2 using a 6–item, 5–point Likert measure (Cronbach's $\alpha = .75$; 1 = not at all true, 5 = completely true) developed by Pekrun et al. (2000). This course–specific enjoyment scale asked participants to indicate the extent to which statements such as "Some topics are so fascinating that I am very motivated to continue studying them" were true of themselves. Enjoyment was also assessed at Time 1 using this scale (Cronbach's $\alpha = .72$) and was used as a covariate in analyses on the Time 2 measure. A 10–point, single–item measure of *hope* (M = 6.97, SD = 2.06) derived from Weiner's attribution theory (1985) was also assessed at Time 2. Participants were asked to rate themselves as feeling hopeful with respect to their performance in introductory psychology (1 = not at all, 10 = very much so).

Causal Attributions. Ascriptions for poor performance in introductory psychology were measured on a 10–point scale (1 = not at all, 10 = very much so) using participants' responses to the following item: "When you do poorly in your introductory psychology course, to what extent do each of the following explain your performance?" *Controllable attributions* were assessed at Time 2 (Cronbach's $\alpha = .65$) using a 2–item measure consisting of attributions to both effort and strategy. This measure was included at Time 1 (Cronbach's $\alpha = .63$) and used as a covariate in analyses on the Time 2 correlate. *Uncontrollable attributions* for failure were also measured at Time 2 (Cronbach's $\alpha = .63$) using a 4–item scale summing together attributions for poor performance to ability, luck, course professor, and test difficulty. This scale was also assessed at Time 1 (Cronbach's $\alpha = .61$) and used as a covariate in analyses on the Time 2 measure.

PROCEDURE

The first phase of the study (Time 1) occurred in a classroom setting, six weeks after the regular academic session began (October). Time 1 was

scheduled intentionally to ensure that all participants had completed and received feedback on at least one course exam, giving them a basis upon which to respond to the questionnaire. During this phase, participants completed a questionnaire including the primary and secondary control measures, Time 1 correlates of the dependent measures (used as pre–AR covariates), as well as various demographic and background items. After completing the questionnaire, participants in the AR treatment condition were asked to remain in their seats, and those in the No AR condition were dismissed. Students selected a study session to attend from those allotted for their course section, and either the AR or No AR treatment condition was administered during a given session.

For participants in the AR condition, the treatment was administered immediately following the Time 1 questionnaire and was conducted in the same classroom setting. Those in the handout and writing AR condition ($n = 129$) first received an explanation of the AR handout by the experimenter, and were then allowed to study the handout before starting the writing assignment. Participants in the videotape and writing AR condition ($n = 126$) were first shown the attributional retraining videotape, after which the writing assignment was completed. In both cases, the informational phase of the AR treatment in which the attributional information was presented lasted approximately 10 minutes. During the consolidation phase of the AR treatment, participants were instructed to write continuously for a period of 15 minutes as is consistent with the Pennebaker model. All participants in the AR treatment condition were then provided an AR handout to keep in their possession after the writing assignment was complete and were subsequently dismissed. As such, the total AR treatment consisting of both the presentation and consolidation phases lasted approximately 35 minutes.[5]

Time 2 of the study was conducted during the first and second months of the second academic term (February to March) in the same classroom setting used at Time 1 ($n = 211$). All participants were expected to attend Time 2 sessions, during which participants completed the post–AR follow–up questionnaire including the self–report dependent measures. The third phase (Time 3, May) occurred two months following the final Time 2 session, and involved the experimenter obtaining introductory

5. Multiple treatment sessions were not administered based on previous research on college students showing additional AR sessions to not enhance the effectiveness of the initial intervention (e.g., Menec et al., 1994; see Wilson, Damiani, & Shelton, 2002, for more information on one–time attributional treatments). Further, the AR treatment was administered at this point in the academic year to provide potential assistance to the large proportion of students who leave during the first two months of classes (Elkins et al., 2000; Tinto, 1987).

psychology exam scores and final grades from course instructors for consenting students.

RESULTS

RATIONALE FOR ANALYSES

Our analytic model assessed individuals' primary academic control (PC) and interpretive secondary academic control (SC) using "low" or "high" groupings on these measures based on a median split consistent with the median–split technique used in other studies involving primary and secondary control (e.g., Chipperfield et al., 1999; Halliday & Graham, 2000; Perry et al., 2001; Thompson, Nanni, & Levine, 1994; Weisz et al., 1994; Wrosch, Heckhausen, & Lachman, 2000). Given the theoretical and empirical significance of the at–risk and optimal combinations of primary and secondary control proposed by Rothbaum et al. (1982) and reported by Hall et al. (in press), *only individuals classified as high in primary academic control were assessed* (i.e., high–PC/low–SC and high–PC/high–SC students). Participants were also classified as having had either an academic failure (below 60%) or success experience (above 80%) early in the academic year based on how they performed on their first test in introductory psychology. An extreme separation of the groups into non–overlapping distributions was employed in order to ensure that students scoring below average perceived themselves as less successful than their higher scoring counterparts, $t(479) = 29.15$, $p < .001$. Analyses were conducted separately for unsuccessful and successful students, as high–PC individuals high in secondary control were expected to outperform their low–SC counterparts only following an academic failure experience.[6]

The main analyses consisted of secondary control (low/high) by attributional retraining (AR vs. No AR) 2×2 analyses of covariance (ANCOVAs) for students high in primary control using end–of–year at-

6. Low–primary–control students were excluded for three main reasons. First, high–PC/low–SC (at–risk) and high–PC/high–SC (optimal) individuals were of specific theoretical importance in Rothbaum et al.'s (1982) original model. Second, research by Hall et al. (in press) found these two groups to have the most significantly different and theoretically consistent patterns of development in failure versus success situations. Third, preliminary 3–way ANCOVA analyses (PC × SC × AR; Time 1 covariates) for unsuccessful versus successful students revealed significant 3–way interactions on multiple variables showing these two groups of unsuccessful, high–PC students to have the most dramatic and opposite results following AR (e.g., on final grades, anxiety, perceived success). Based on these main reasons and to keep the study focused on our research questions, only high–PC students were included in the present study.

tributions, perceived success, emotions, and achievement measures as dependent variables. The two AR treatments (handout and writing, videotape and writing) were combined into one AR condition, based on two–tailed *t*–tests which revealed no significant differences between the AR groups on any of the dependent measures. To control for initial differences on the dependent variables between the control and treatment conditions (i.e., high school grades: $F(1, 1072) = 2.75$, $p < .10$; enjoyment: $F(1, 1073) = 15.74$, $p < .001$; uncontrollable attributions: $F(1, 1065) = 14.91$, $p < .001$), corresponding Time 1 measures were included as covariates in the analyses for successful and unsuccessful students where available.

Based on the proposed directional hypotheses, a priori, one–tailed *t*–tests were used to test whether, for unsuccessful students in the No AR condition, the low–SC group performed more poorly than the high–SC group on final course grades. One–tailed *t*–tests were also used to compare the AR and No AR treatment conditions for unsuccessful, low–SC students on perceived success, academic emotions, and achievement, as this group was expected to perform better, despite poorer levels of perceived success and emotions, following the AR treatment. Otherwise, post hoc, two–tailed *t*–tests were used to assess significant interaction effects for high–PC students at each level of secondary control and AR, respectively. To assess potential increases in secondary control for unsuccessful, low–SC participants in the AR condition, supplementary ANCOVA analyses were conducted on secondary control at Time 2 controlling for Time 1 levels, with one–tailed *t*–tests used to compare the AR and No AR conditions for these individuals. Preliminary correlations based on the larger study sample (N = 1093) are presented in Table 1.

UNSUCCESSFUL STUDENTS

See Table 2 for the *F*–table of ANCOVA main and interaction effects for *unsuccessful, high–PC students*. No significant main effects, interaction effects, or contrasts were found on positive academic emotions or controllable attributions for unsuccessful students.

Academic Achievement. A significant 2–way interaction on final course grades (see Figure 1), $F(1, 66) = 4.35$, $p < .05$, $\eta_P^2 = .06$, indicated that low–SC students in the AR condition (M = 61.43%) scored approximately 10% higher than their counterparts in the No AR condition (M = 51.33%). As anticipated, a priori contrasts found a significant treatment effect (AR vs. No AR) for low–SC students, $t(39) = 1.71$, $p < .05$, showing that the AR treatment was effective in improving course performance for these low–SC students. Our hypotheses were also supported by a priori contrasts which found that high–SC students (M = 57.86%) out-

TABLE 1. Zero–Order Correlations Among Study Variables

Variable	1	2	3	4	5	6	7	8	9	10
1. Primary control[a]	—									
2. Secondary control[a]	.11*	—								
3. Final course grade[c]	.18*	.01	—							
4. Perceived success[b]	.25*	.07†	.78*	—						
5. Course anxiety[b]	-.24*	-.02	-.27*	-.34*	—					
6. Course enjoyment[b]	.17*	.26*	.09*	.23*	-.04	—				
7. Guilt[b]	-.05	-.02	-.32*	-.40*	.33*	-.07†	—			
8. Hope[b]	.18*	.19*	.32*	.34*	-.08*	.27*	-.11*	—		
9. Cont. attributions[b]	.22*	.06†	.15*	.16*	-.06†	.07*	.08*	.20*	—	
10. Uncont. attributions[b]	-.24*	-.01	-.02	-.08*	.26*	-.07*	.10*	.02	.12*	—
M	42.36	25.89	70.56	12.71	15.00	19.81	3.62	6.97	14.31	19.32
SD	4.67	5.36	13.23	3.68	4.91	4.10	2.35	2.06	3.67	6.59

Note. Correlations based on larger study sample (N = 1093). Cont. = controllable; Uncont. = uncontrollable. [a]Time 1 measure. [b]Time 2 measure. [c]Time 3 measure. † $p < .10$. * $p < .05$.

TABLE 2. *F*–Table of Main Effects and Interactions for Unsuccessful, High–PC Students

			Secondary control (SC)		Attributional retraining (AR)		SC × AR	
Measure	***MSE***	***df*[a]**	***MS***	***F***	***MS***	***F***	***MS***	***F***
Final course grade	148.17	66	1.36	0.01	242.02	1.63	644.06	4.35*
Perceived success	9.50	44	16.96	1.79	1.11	0.12	42.50	4.48*
Course anxiety	15.85	43	56.78	3.58†	53.75	3.39†	84.98	5.36*
Course enjoyment	13.12	44	12.31	0.94	2.54	0.19	20.10	1.53
Guilt	5.55	46	19.12	3.45†	3.50	0.63	14.68	2.65
Hope	4.97	46	5.09	1.02	2.24	0.45	0.00	0.00
Cont. attributions	15.54	45	22.54	1.45	0.06	0.00	0.35	0.02
Uncont. attributions	27.30	44	2.77	0.10	193.08	7.07*	0.00	0.00

Note. Cont. = controllable; Uncont. = uncontrollable. [a]Numerator *df* = 1 for all *F*–tests. † $p < .10$. * $p < .05$.

performed their low–SC counterparts by 6.5% in the No AR condition, $t(32) = 2.31$, $p = .01$, illustrating that low–SC students performed more poorly than the high–SC group in the absence of AR.

Perceived Academic Success. The predicted significant 2–way interaction was also found on students' perceptions of academic success at Time 2, $F(1, 44) = 4.48$, $p < .05$, $\eta_p^2 = .09$, showing opposite end–of–year patterns of results for low–SC and high–SC students following AR (see Figure 2). As expected, the a priori contrast also demonstrated significantly lower perceived success levels among low–SC students in the AR condition ($M = 7.57$) than in the No AR condition ($M = 9.81$), $t(22) = 1.75$, $p < .05$. Post hoc contrasts found high–SC students reporting significantly greater perceptions of academic success than low–SC students only in the AR treatment condition (*M*s = 10.79, 7.57, respectively), $t(22) = 2.52$, $p < .01$.

Academic emotions. A significant 2–way interaction was found on end–of–year learning–related anxiety, $F(1, 43) = 5.36$, $p < .05$, $\eta_p^2 = .11$ (see Figure 3). As expected, the a priori contrast showed a significant treatment effect for low–SC students, $t(20) = 2.84$, $p < .01$, with low–SC students in the AR condition reporting higher levels of course–related anxiety than their No AR counterparts (AR: $M = 19.54$; No AR: $M = 14.70$). A significant post hoc contrast was also found for AR participants between the low–SC and high–SC groups (*M*s = 19.54, 14.59, respectively), $t(22) = 3.01$, $p < .01$.

Although low–SC students in the AR condition reported more guilt than all other groups, the interaction effect was not significant, $F(1, 46) = 2.65$, $p = .11$. However, the a priori contrast for low–SC students was significant, $t(22) = 1.67$, $p < .05$, showing that low–SC students reported higher levels of guilt in the AR condition compared to their No AR counterparts (AR: $M = 5.70$; No AR: $M = 4.07$). A significant post hoc contrast was also found in the AR treatment condition between the low–SC and high–SC groups (*M*s = 5.70, 3.36, respectively), $t(22) = 2.40$, $p < .05$.

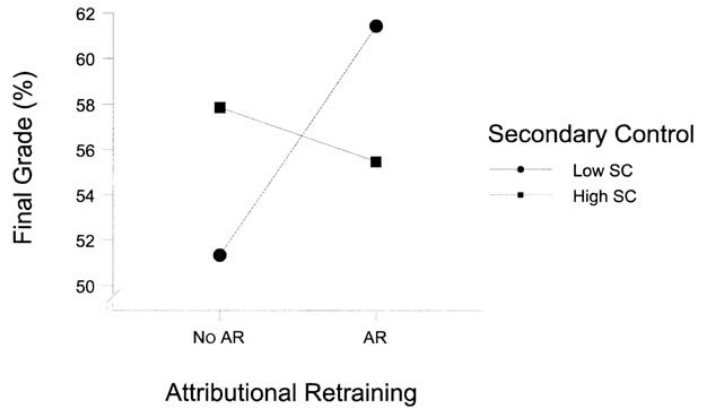

FIGURE 1. Attributional Retraining by Secondary Control on Final Course Grade (%) for Unsuccessful, High-Primary-Control Students.

Causal Attributions. None of the main effects, interaction effects, or contrasts on controllable attributions at Time 2 reached significance. Nonetheless, as anticipated, both secondary–control groups continued to report high end–of–year levels of controllable attributions (*M*s = 14.01, 15.39, respectively) likely due to being high in primary control. As expected, however, a significant AR main effect was observed on end–of–year uncontrollable attributions, with the AR group reporting fewer attributions to uncontrollable causes than their No AR counterparts (No AR: $M = 18.71$; AR: $M = 14.69$), $F(1, 44) = 7.07$, $p < .05$, $\eta_p^2 = .14$.

SUPPLEMENTARY ANALYSES

Change in Secondary Control. Improvements in end–of–year interpretive secondary control for unsuccessful low–SC students having received the AR treatment were also assessed. Although the 2–way inter-

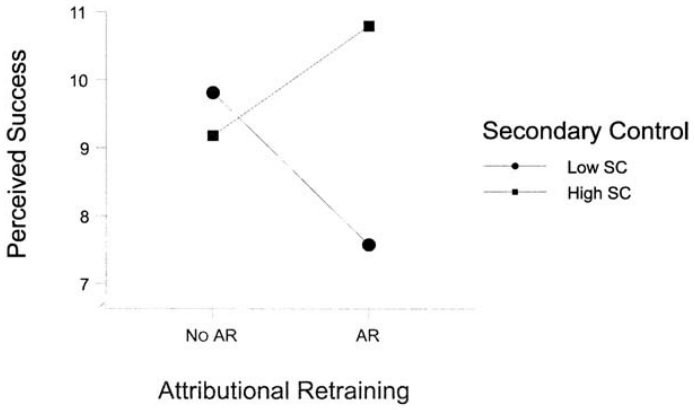

FIGURE 2. Attributional Retraining by Secondary Control on Perceived Academic Success for Unsuccessful, High-Primary-Control Students.

action effect on secondary control did not reach significance, a priori contrasts did reveal a significant difference in interpretive secondary control only for low–SC students in the AR group relative to No AR controls (No AR: $M = 23.23$; AR: $M = 26.41$), $t(22) = 1.90$, $p < .05$. Moreover, the post hoc contrast between the low–SC and high–SC groups in the AR condition was not significant, $t(23) = .81$, $p = .42$, indicating that these two groups no longer differed on the secondary–control measure on which the group distinction was initially based.

Academic Expectations. To assess the *veridicality* of unsuccessful students' expectations for future academic success, anticipated introductory psychology final grades at Time 2 controlling for Time 1 levels (1 = 50% or less, 10 = 91% to 100%) were contrasted with the actual final course grades obtained. On average, low–SC students in the No AR condition and high–SC students in general were overly optimistic, expecting final grades in the range of 66% to 70% but actually receiving much lower grades (low–SC, No AR: $M = 51.33\%$; high–SC, all: $M = 56.67\%$). As such, the lower academic expectations found for low–SC students in the AR condition in fact reflected a more *realistic* subjective estimation of their end–of–year performance (expected range: $M = 61\%$ to 65%; final grade: $M = 61.43\%$).

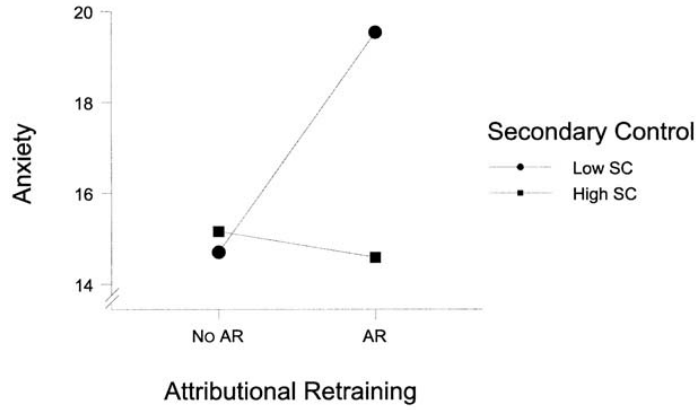

FIGURE 3. Attributional Retraining by Secondary Control on Learning-Related Anxiety for Unsuccessful, High-Primary-Control Students.

SUCCESSFUL STUDENTS

See Table 3 for the *F*–table of ANCOVA main and interaction effects for *successful, high–PC students*. No significant main effects or interaction effects were found on end–of–year final course grades, controllable attributions, or feelings of guilt and enjoyment for successful students.

Perceived Academic Success. A significant main effect of secondary control on end–of–year perceptions of current and future academic success was found, $F(1, 148) = 5.89$, $p < .05$, $\eta_p^2 = .04$, with low–SC students ($M = 15.96$) reporting lower assessments of academic success than high–SC students ($M = 16.74$).

Academic Emotions. A significant main effect of secondary control on end–of–year learning–related anxiety was observed, $F(1, 151) = 4.08$, $p < .05$, $\eta_p^2 = .03$, with low–SC students ($M = 13.10$) reporting greater anxiety than high–SC students ($M = 11.89$). A significant secondary control main effect was also observed on feelings of hope, $F(1, 153) = 6.91$, $p < .01$, $\eta_p^2 = .04$, due to low–SC students ($M = 7.44$) reporting lower levels of hope than high–SC students ($M = 8.20$).

Causal Attributions. A significant attributional retraining main effect was found on end–of–year uncontrollable attributions, $F(1, 150) = 22.71$,

TABLE 3. *F*–Table of Main Effects and Interactions for Successful, High–PC Students

			Secondary Control (SC)		Attributional Retraining (AR)		SC × AR	
Measure	***MSE***	***df*[a]**	***MS***	***F***	***MS***	***F***	***MS***	***F***
Final course grade	47.73	168	0.69	0.01	23.64	0.50	24.81	0.52
Perceived success	3.74	148	22.04	5.89*	1.96	0.52	8.39	2.24
Course anxiety	13.43	151	54.75	4.08*	32.55	2.42	2.57	0.19
Course enjoyment	9.87	149	31.78	3.22†	21.41	2.17	0.12	0.01
Guilt	4.69	153	3.11	0.66	7.57	1.62	1.46	0.31
Hope	3.22	153	22.20	6.91**	5.92	1.84	1.61	0.50
Cont. attributions	10.77	151	5.23	0.49	28.27	2.63	3.29	0.31
Uncont. attributions	26.55	150	1.49	0.06	603.09	22.71**	19.08	0.72

Note. Cont. = controllable; Uncont. = uncontrollable. [a]Numerator *df* = 1 for all *F*–tests. †$p < .10$. *$p < .05$. **$p < .01$.

$p < .001$, $\eta_p^2 = .13$, such that students in the AR condition ($M = 16.05$) reported lower levels of uncontrollable attributions than students in the No AR condition ($M = 20.06$).

DISCUSSION

Research on achievement motivation and performance has repeatedly demonstrated modest yet consistent improvements from attributional retraining for at–risk individuals in academic achievement settings. Important developments in the research literature on attributional retraining have concerned not only the identification of cognitive and psychosocial variables which predispose individuals to poor performance (Perry et al., 1993), but also the assessment and improvement of intervention techniques. Although the empirical evidence is somewhat mixed (e.g., Struthers & Perry, 1996), we now know that AR can be particularly effective for college students who are at risk academically. Specifically, the AR treatment has been found to benefit students who have experienced failure, endorse uncontrollable attributions, have low perceptions of success, have overly optimistic beliefs, infrequently use elaborative learning strategies, are performance–oriented, or have an external locus of control (Hall et al., 2004; Menec et al., 1994; Pelletier et al., 1999; Perry & Penner, 1990; Perry & Struthers, 1994; Ruthig et al., 2004; Struthers & Perry, 1996). The results of the present longitudinal study contribute to this research by highlighting the importance of both primary and secondary control in a challenging achievement setting

(Rothbaum et al., 1982), as well as the benefits and drawbacks of providing AR to unsuccessful individuals favoring primary over secondary control.

PRIMARY AND SECONDARY CONTROL

Recent research indicates that unsuccessful individuals high in primary control yet low in secondary control are at risk of academic failure on longitudinal measures of achievement and attrition (Hall et al., in press). The results of the present study of high–primary–control students provide further empirical support for the importance of this at–risk classification, showing significant differences between the secondary–control groups in the No AR condition on final course grades, with low–SC students scoring 6.5% lower than their high–SC counterparts. Contrary to our initial hypotheses, no significant differences were found between unsuccessful low–SC and high–SC students in the control group on the self–report measures of perceived success and academic emotions. Thus, despite low feelings of success, unsuccessful high–PC individuals in both the low–SC and high–SC groups reported high positive and low negative affect, adaptive causal attributions, and expected their grades to improve by the end of the academic year. However, further analyses revealed the expectations of high–PC students low in secondary control to be overly optimistic, with these individuals obtaining final course grades approximately *17% lower* than expected just two months previous! These results suggest that high–PC/low–SC individuals are ill–equipped to deal with failure experiences due to the striking inconsistency between their overly confident expectations for future success and considerably poorer cumulative performance.

For successful students, significant differences were found in favor of the high–PC/high–SC group for perceived success, course anxiety, and hope, with a similar pattern found on learning–related enjoyment. These results suggest that, although secondary control was not related to achievement for successful high–PC individuals, the psychological benefits of relying on both primary and secondary control were evident even among those with high initial performance levels. That is, among successful students high in primary control, high–SC students reported higher levels of present and expected academic success, hope, enjoyment, and lower learning–related anxiety than their low–SC counterparts. Thus, in contrast to previous research highlighting the importance of secondary control in low–control circumstances (e.g., Chipperfield et al., 1999; Thompson et al., 1994), these findings suggest that interpretive secondary control may be of benefit to high–control individuals in a

demanding achievement setting following both success and failure experiences.

ATTRIBUTIONAL RETRAINING AND PRIMARY/SECONDARY CONTROL

As predicted, the main effect of attributional retraining was significant for end–of–year uncontrollable attributions to poor academic performance (i.e., ability, luck, instructor, test difficulty) in both unsuccessful and successful individuals. That is, for our sample of high–primary–control students, lower endorsement of uncontrollable attributions was found following the AR treatment, relative to No AR controls, regardless of initial academic performance (i.e., success/failure on first course exam). Consequently, these results suggest that for high–control individuals who are already making controllable attributions, decreases in *uncontrollable* attributions may be a more appropriate indicator of attributional change than increases in controllable attributions following the AR treatment.

Consistent with our hypotheses, our findings also showed that the Writing Assignment AR treatment was effective primarily for high–primary–control individuals low in secondary control. Specifically, ANCOVA analyses found that unsuccessful, high–PC/low–SC students who received attributional retraining (M = 61.43%) obtained significantly higher final course grades than their No AR counterparts (M = 51.33%); *a difference of approximately 10% or one full letter grade* (i.e., D to C)! Nonetheless, as hypothesized, these results suggest that perceived academic success and negative affect are poorer for unsuccessful, high–PC individuals low in secondary control following the AR treatment. Significantly lower perceptions of current and future academic success as well as higher course–specific anxiety were observed for these initially unsuccessful, high–PC/low–SC participants who received AR, relative to the control group. This trend was also evident for these individuals on feelings of guilt and positive affect, however, these effects were not significant. Unsuccessful high–PC/low–SC students' feelings of hope concerning their course performance were unaffected by the AR treatment.

Although somewhat disconcerting, these results appear to be a by–product of the unusually dramatic improvements in academic achievement experienced by the at–risk individuals in this study, and may shed some light on the potential causes of their poor performance. First, it is important to note that such a considerable improvement presupposes that these individuals have the *capability* to succeed. Thus, it follows that high–PC/low–SC students most likely experienced academic failure due a lack of effort, attention, or some other controllable cause of success, motivated by their unmitigated perceptions of primary control (i.e., academic overconfidence). In the absence of attributional retraining, these individuals continue to believe they can greatly improve their academic performance even up to two months prior to course completion, but apparently do not invest the effort required to meet these unrealistic expectations.

This explanation would also account for why unsuccessful, high–PC/low–SC students in the No AR condition did not demonstrate perceived uncontrollability as originally hypothesized by Rothbaum et al. (1982). Instead, these findings suggest that these students did not feel helpless but believed they would achieve success in their courses and thus did not engage in secondary control, as would their more academically successful counterparts. The present results suggest that these at–risk individuals feel invulnerable to failure, placing little importance on secondary control and failing to act upon their primary–control beliefs. This interpretation is consistent with research highlighting the drawbacks of overly inflated primary–control beliefs (Chipperfield et al., 1999; Heckhausen & Schulz, 1995, 1998; Lackovic–Grgin et al., 2001; Shapiro et al., 1996; Weisz et al., 1984), as well as recent research concerning unrealistic optimism in college students (Higgins, St. Amand, & Poole, 1997; Klein & Helweg–Larsen, 2002; Ruthig et al., 2004).

Consequently, the findings of this study suggest that attributional retraining prompts unsuccessful individuals relying mainly on primary control to *act on their primary–control beliefs*, resulting in a substantial increase in effort, as evidenced by considerably higher course grades relative to controls, and feelings of guilt (i.e., culpability) reported by these capable and motivated students. However, the corresponding increase in negative affect may be indicative of the difficulty involved in overcoming a serious academic setback, which should be particularly aversive for those neglecting secondary–control beliefs and strategies which effectively buffer the emotional impact of failure events. On the other hand, in light of Carver and Sheier's (1990) findings, this negative affect could also have resulted from these individuals becoming increasingly aware that their overly ambitious goals would not be achieved.

The results of this study also suggest that as initially unsuccessful, high–PC/low–SC students encountered resistence to their primary–control efforts following AR, that is, efforts aimed at trying to overcome their initial poor performance, they in turn adopted more realistic expectations. According to Heckhausen and Schulz (1995, 1998), downgrading expectations is an effective compensatory secondary–control strategy for reducing anxiety and feeling in control. In con-

trast, the apparent procrastination evidenced by unsuccessful, high–PC/low–SC participants in the No AR condition is described by these authors as a dysfunctional secondary–control strategy common in achievement settings. This finding parallels recent attributional research by Forsterling and Morgenstern (2002) involving unrealistic expectations in college students, which suggests that both "veridicality and optimism seem to facilitate overall performance" (p. 580).

ENHANCING SECONDARY CONTROL THROUGH ATTRIBUTIONAL RETRAINING

As anticipated, analyses of secondary control at Time 2 demonstrated that greater reliance on interpretive secondary control did in fact occur for initially unsuccessful, high–PC individuals low in secondary control following the Writing Assignment AR treatment. Moreover, these results indicated that among the high–PC students in the AR condition, the low–SC group was no longer significantly different from their high–SC counterparts on the secondary control measure on which the initial perceived control classifications were based. Thus, individuals who were initially high in primary control but low in secondary control appeared to incorporate a secondary–control approach to their studies following the AR intervention. One possible reason for this increase in secondary control is the inclusion of the final item in the AR writing assignment which explicitly encouraged participants to consider reinterpreting academic failure in a positive manner, a technique similar to that successfully employed in an earlier study by Weisz et al. (1997).

However, it is also possible that the AR intervention as a whole may have fostered an increase in secondary control for these at–risk individuals. Specifically, unsuccessful, high–PC students lacking secondary control may have realized the maladaptive nature of their overly confident academic expectations following AR, and in turn, acknowledged that their grades were suffering and would not improve without considerable effort. According to Heckhausen and Schultz (1995, 1998), secondary–control strategies are employed mainly following unsuccessful attempts at primary control, that is, failure experiences. As such, these at–risk individuals may have begun to use valuable secondary–control strategies such as positive reappraisal and lowering expectations (see Wrosch et al., 2000) simply as part of their ensuing uphill struggle to overcome their initial academic setback and improve their course average.

LIMITATIONS AND IMPLICATIONS

In discussing the findings of the present study, two limitations should be considered when interpreting our results. First, the loss of information and power resulting from dichotomization of variables are well known limitations of the median–split technique (Maxwell & Delaney, 1993; Taylor & Yu, 2002). However, median splits may be justified when non-normality is evident and when specific groups are of theoretical and practical importance due to possible treatment implications, as in the present study (Cohen, 1983; Farrington & Loeber, 2000; MacCallum, Zhang, Preacher, & Rucker, 2002; Maxwell & Delaney, 1993). Consistent with the at–risk and optimal combinations of primary and secondary control proposed by Rothbaum et al. (1982), as well as previous research on these constructs employing the median–split procedure (Halliday & Graham, 2000; Thompson et al., 1994; Weisz et al., 1994; Wrosch et al., 2000), this analytic technique was also adopted in the present study to address our secondary control by AR interaction hypotheses.

A second limitation of this study concerns the dependent measures being assessed two months prior to course completion, thus, not allowing for the full psychological impact of academic failure on unsuccessful, high–PC/low–SC students to be assessed. Upon receiving very low final course grades, the salience and uncontrollability of this large–scale academic failure experience would no longer afford these at–risk students the luxury of overly high academic expectations. From a developmental perspective, Heckhausen, Wrosch, and Fleeson (2001) describe such events as involving a "transition to a condition of lost opportunities" (p. 401) in which the deficits associated with low secondary control should become more evident. It is perhaps only at this point that these at–risk students may experience considerable declines in perceived success and academic emotions, possibly leading to guilt–motivated increases in effort (as found following the AR treatment), or feelings of helplessness and a greater likelihood of continued poor performance and attrition. Thus, future longitudinal research addressing how high–PC/low–SC individuals respond to more serious and indisputable failure experiences is warranted.

Aside from these limitations, the present study contributes in a number of ways to the research literature in primary and secondary control, as well as the assessment and improvement of attributional retraining techniques. First, these findings further refine our understanding as to the specific types of primary and secondary control which predispose individuals to poor performance in achievement settings. Specifically, this study utilized academic–oriented measures of primary control (Perry et al., 2001) and secondary control in order to provide a more ac-

curate domain–specific assessment of college students' perceptions of control. Consistent with recent research on secondary control in young adults (Hall et al., in press; Halliday & Graham, 2000; Petito & Cummins, 2000; Wadsworth & Compas, 2002), the measure of interpretive secondary control used in this study was also found to correspond to optimal psychological adjustment and performance among unsuccessful students high in primary control.

Second, the present research demonstrates that although self–report measures may accurately reflect perceptions of academic control, such measures cannot be assumed to reflect actual achievement–striving behaviors for some at–risk individuals (see Schulz & Heckhausen, 1999). Specifically, although initially unsuccessful, high–PC/low–SC students strongly endorsed primary–control beliefs, these same students paradoxically appeared to not invest the effort required to succeed in their introductory psychology course. Third, this study also improves upon previous research in terms of the content, implementation, and mechanisms underlying the effectiveness of the AR techniques administered. The present AR treatment incorporated varied areas of socio–psychological research including cognitive elaboration (Entwistle, 2000), attribution theory (Weiner, 1985, 1995), secondary control (Weisz et al., 1997), and written discourse (Pennebaker, 1997; Pennebaker & Seagal, 1999). The present findings also demonstrated significant attributional changes presumed to occur following attributional retraining on uncontrollable attributions following the AR intervention.

Finally, the present study contributes significantly to ongoing research on perceived control and attributional retraining in suggesting that both primary *and* secondary control can be encouraged through writing–based AR techniques, accounting for the dramatic improvements in achievement found for at–risk individuals in this study. Specifically, these results indicate that the Writing Assignment AR technique encouraged students favoring primary over secondary control to not only act on their primary control beliefs and improve their grades, but also increase their reliance on failure–oriented, secondary–control beliefs and strategies. In this manner, the present study also links Rothbaum et al.'s (1982) dual–process model of perceived control with recent research outlining the drawbacks of unrealistic optimism (Forsterling & Morgenstern, 2002; Higgins et al., 1997; Klein & Helweg–Larsen, 2002; Radcliffe & Klein, 2002; Ruthig et al., 2004). In sum, this research provides compelling evidence in support of writing–based AR treatments to significantly improve performance and foster more realistic expectations in challenging achievement settings by encouraging greater reliance on both primary and secondary control.

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