Minimizing Iatrogenic Effects of Web-based Motivational Programs on Academic Achievement

K. Hubbard, J. Ringo, N. C. Hall, & L. Julió
Department of Educational and Counselling Psychology, McGill University

Background

Attributional retraining (AR) is a remedial intervention that targets students' maladaptive causal attributions for poor performance by encouraging controllable attributions that correspond to improved academic motivation and achievement[1,2]. AR interventions are derived from Weiner's attribution theory[3,4] that demonstrates how performance and achievement striving are influenced by the attributions individuals make about evaluative outcomes. The present study investigated how web-based AR impacted achievement (GPA) in university students as moderated by their self-esteem levels.

Recent AR studies on academic achievement[5] and employment success[6] have found an unusual iatrogenic effect of in-person treatment methods in which high self-esteem students (typically considered "non-risk" students) performed worse after receiving AR. The goal of the present study is therefore to determine if this effect occurs following the web-based AR format. It is anticipated that by evaluating if this iatrogenic effect is observed using Internet-based methods, we can develop AR programs to prevent its occurrence.

Method

Participants

The initial study sample consisted of 888 university students (mean age = 20.67, *SD* = 2.93, 65% male) enrolled in a multi-section introductory psychology course.

Procedure

In the second semester of data collection (winter 2007), all participants completed a web-based questionnaire including self-esteem and demographic measures (20-30 minutes). Participants were assigned to the AR treatment or No AR control group based on the order at which they arrived at the preceding questionnaire (i.e., even numbers = AR, odd numbers = No AR). Participants in the AR treatment were randomly assigned to one of two conditions (an aptitude test or writing assignment) and were then immediately presented with the intervention (20 minutes). Sessional grade point averages (GPA) were obtained from the university registrar's office for all study participants.

Method (cont.)

Independent Measures

Internet-based attributional retraining (**AR**). Participants in the AR treatment group first reviewed a brief, web-based reading (i.e., an informational schematic) based on an AR handout used in previous in-person AR studies[7]. The reading consisted of a variety of statements informing them of the benefits of personally controllable causal attributions (e.g., effort: "I didn't study hard enough") as opposed to uncontrollable attributions (e.g., ability: "I'm not smart enough to succeed in this course") following poor performance (e.g., low test score). The reading thus suggested a number of adaptive attributions that the participants could adopt following poor performance.

In the second phase, participants completed a timed aptitude test or writing assignment. The aptitude test[8,9] consisted of two sections including verbal analogy and mathematics questions (5 minutes per section). The test was intentionally difficult in order to elicit feelings of inadequacy and reactance, and also promote the usage of the adaptive failure attributions outlined in the AR reading. The writing assignment[10] required that the participants think about the AR information provided in the first phase by having them summarize it, list potential reasons for poor performance in university, and provide examples of how they can use the AR information in their own academic pursuits (15 minutes).

The subsequent debriefing page notified the participants of the intended purpose of the version they had received as well as how past studies[11] have shown AR treatments to be effective in raising students' grades. The AR reading was shown one final time and participants could then exit the browser.

Self-esteem. Rosenberg's[12] global self-esteem scale consists of 10 items on a 5-point Likert scale (1 = *strongly disagree* to 5 = *strongly agree*). The top and bottom thirds of participants on the continuous self-esteem measure were classified as high vs. low self-esteem in order to more clearly evaluate the hypothesized interaction effect.

Dependent Measure

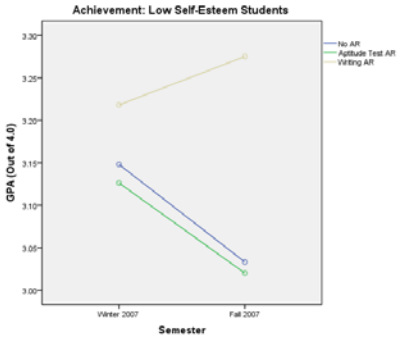
Grade point average (GPA). Three sessional GPAs were obtained for the fall 2006, winter 2007, and fall 2007 semesters.

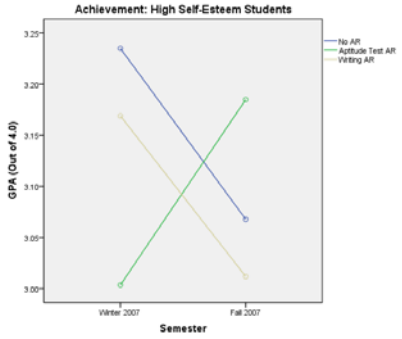
Analysis

The analysis consisted of a 2 (low/high self-esteem) x 3 (Aptitude Test AR, Writing AR, No AR) repeated-measures ANCOVA on two post-AR GPAs. To control for potentially confounding results due to the degree to which the participants were engaged in the experimental protocol, the covariates included were the time elapsed during the pre-AR survey and the order in which the participants began the preceding questionnaire[13]. Based on one-way ANOVAs and chi-square analyses revealing significant AR initial differences on English as a first language and Fall '06 GPA, these variables were also included as covariates. Additionally, course load was included as a covariate to eliminate potential confounds due to students' enrollment status.

Results

The repeated-measures ANCOVA revealed a significant within-subjects three-way interaction between time, self-esteem, and AR on GPA, $F(2, 321) = 2.527$, $p < .10$. Effects under $p < .10$ were considered significant in light of the exploratory nature of this analysis.





Discussion

The present findings revealed that web-based AR helped low self-esteem students and hurt high self-esteem students on measures of GPA. Writing-based AR was optimal for assisting low self-esteem students in improving the GPA across two semesters. This finding is consistent with previous in-person AR research on employment success in which low self-esteem students had the greatest chance of obtaining a job after participating in a writing-based AR intervention[6].

In the case of high self-esteem students, the findings suggested that only aptitude test AR harmed GPA (writing AR participants performed similarly relative to controls). In previous in-person AR studies[5], both AR versions were found to harm high self-esteem students.

The results of the present study are encouraging in that the unusual iatrogenic effect of previous in-person AR research[5,6], in which high self-esteem students performed worse after receiving AR, was only found for one version of the web-based AR. Furthermore, the iatrogenic effect for high self-esteem students in the aptitude test version began to reverse itself by the end of the next semester. Future research to investigate whether these trends continue on more longitudinal measures is needed to gain a more comprehensive understanding of the effects of web-based AR on academic performance.

References

1. Haynes, T. L., Perry, R. P., Stupnisky, R. H., & Daniels, L. M. (2009). A review of attributional retraining treatments: Fostering engagement and persistence in vulnerable college students. In J. Smart (Ed.), *Higher education: Handbook of theory and research* (Vol. 24, pp. 227-272). The Netherlands: Springer.
2. Perry, R. P., Hechter, F. J., Menec, V. H., and Weinberg, L. (1993). Enhancing achievement motivation and performance in college students: An attributional retraining perspective. *Research in Higher Education, 34*, 687-720.
3. Weiner, B. (1985). An attributional theory of achievement motivation and emotion. *Psychological Review, 92*, 548-573.
4. Weiner, B. (2006). *Social motivation, justice, and the moral emotions: An attributional approach*. Mahwah, NJ: Lawrence Erlbaum Associates.
5. Hall, N. C., Musu-Gillette, L., Perry, R., Nett, U., Goetz, T. (2010, April). *Attributional retraining and self-esteem: "Robin Hood" effects on academic achievement*. Paper presented at the American Educational Research Association Annual Meeting, Denver, CO.
6. Hall, N. C., Jackson, S. E., Goetz, T., & Musu-Gillette, L. E. (2011). Attributional retraining, self-esteem, and the job interview: Benefits and risks for college student employment. *Journal of Experimental Education, 79*(3), 318-339.
7. Perry, R. P., & Struthers, C. W. (1994, April). *Attributional retraining in the college classroom: Some causes for optimism*. Paper presented at the American Educational Research Association Annual Meeting, New Orleans, LA.
8. Hall, N. C., Hladkyj, S., Perry, R. P., & Ruthig, J. C. (2004). The role of attributional retraining and elaborative learning in college students' academic development. *Journal of Social Psychology, 144*, 591-612.
9. Perry, R. P., & Dickens, W. J. (1984). Perceived control in the college classroom: Response-outcome contingency training and instructor expressiveness effects on student achievement and causal attributions. *Journal of Educational Psychology, 76*(5), 966-981.
10. Entwistle, N. (2000). Approaches to studying and levels of understanding: The influences of teaching and assessment. In J. Smart (Ed.), *Higher education: Handbook of theory and research* (Vol. 15, pp. 156-218). New York, NY: Agathon Press.
11. Perry, R. P. (2003). Perceived (academic) control and causal thinking in achievement settings. *Canadian Psychology, 44*(4), 312-331.
12. Rosenberg, M. (1965). *Society and the adolescent self-image*. Princeton, M. J.: Princeton University Press.
13. Hall, N. C., Perry, R. P., Ruthig, J. C., Haynes, T. L., & Stupnisky, R. H. (2005, April). *Internet-based attributional retraining: Longitudinal effects on academic achievement in college students*. Paper presented at the American Educational Research Association Annual Meeting, Montreal, QC.