An Intervention to Retrain Attributions Using CBT: A Pilot Study

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The role of affective and cognitive factors in learning have long been recognised as imperative determinants of the learning process. Maladaptive styles with which we perceive and explain accomplishments and failures in achievement outcomes have an important motivational impact upon approach and avoidance behaviours towards academic tasks. Interventions to change these maladaptive styles are well established, although they stand to gain via addition of cognitive behavioural therapy components. A pilot study attribution retraining intervention was implemented with eight secondary school students, and their results on academic performance, self-concept, and attributional styles were compared to a control group. With significant gains in some specific academic domains, the attributional retraining program is being substantiated for effective use within secondary schools. Implications suggest that this could be an effective tool to retrain students' attributions, with some gains, as the reattribution technique is revisited and reinvigorated.

■ **Keywords:** educational psychology, school psychology, inclusive education, special education, positive psychology, attribution retraining, attributions, cognitive behaviour therapy, school improvement

Of all human behaviours, learning is perhaps the most dynamic and pervasive. Countless institutions are dedicated to the pursuit of knowledge, and most individuals spend a significant part of their early life learning within schools; others spend even longer. Learning has been affirmed as more complex in structure than simple cognitive processes, with a range of factors influencing the learning process (VandenBos, 2007). A crucial cognitive factor known to moderate learning is the attributions attached to success and failure, which have significant implications for future academic performance and motivational qualities throughout the life cycle (Chodkiewicz & Boyle, 2016a; Hilt, 2004; Robertson, 2000; Toland & Boyle, 2008; Weiner, 1985).

Particularly, the means by which these attributions, or *perceived* causalities, are deemed to regulate academic approach and avoidance behaviours have been delineated by Weiner (1985) in his operational model of achievement motivation. Weiner's model of achievement motivation stipulates that important, unexpected, and adverse achievement outcomes stimulate a causative search to understand the cause of the

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event or behaviour. Within the academic domain, four salient causative explanations are usually invoked: ability, effort, task difficulty, or luck. These attributions are coded according to three specific dimensions: locus (event caused by internal/external factors), stability (cause attributed to stable or transient causes), and controllability (causes can be controllable or are uncontrollable). When assessing causality of achievement outcomes, Weiner notes that a profile along these three dimensions is generated and that this specific profile has inhibitory or facilitative properties for future academic performance.

Within the academic achievement domain, the directions in which attributions are dimensionally appraised and how they affect subsequent learning and motivation efforts can be outlined as follows: if a student attributes poor academic performance to an internal, unstable and controllable cause, such as lack of effort, they are more likely to be motivated to apply themselves at future academic tasks (Haynes Stewart et al., 2011; Toland & Boyle, 2008). This process operates on the principle that *lack of effort,* by virtue of its dimensional qualities, is unstable and controllable, and will therefore enhance motivation, as it proffers that change is possible. Conversely, attributing poor academic performance to internal, stable and uncontrollable causes, such as deficiency in ability or intelligence, is likely to hinder any likelihood of the student's successful performance and functional motivation at future academic tasks as it indicates that failure is imminent, stable and uncontrollable (Haynes Stewart et al., 2011).

Students utilising the latter attributional style begin a vicious cycle characterised by poor perceptions of competence, confidence, motivation, and avoidance of activities associated with the maladaptive attribution style (Toland & Boyle, 2008). Avoidance in turn leads to lack of practice, which in turn guarantees failure to acquire integral skills and knowledge. Subsequently, a downward trajectory ensues and a failure cycle begins at the detriment of further learning, thus further confirming and strengthening the maladaptive attributional style that began the destructive cycle in the first instance (Westwood, 2008).

Framed within the foundations of attributional theory, techniques developed to modify maladaptive attributional styles are broadly referred to as attributional retraining (AR). AR involves enhancing one's views towards success and failure to improve and promote future motivation to achieve (Robertson, 2000). A study by Duckworth and Seligman (2005) also demonstrated the importance of internal factors in learning success. Their conclusion was that self-discipline was more of a reason for students not reaching their potential than any other factors.

A pioneering study by Dweck (1975) saw change in attributions towards failure on a problem-solving task achieved for 12 children with poor grades. Particularly, when the children failed at tasks, the examiner verbalised adaptive effort attributions, which the children subsequently internalised. The results indicated favourable attribution change, as well as an improvement in task performance, as compared to a group experiencing successful problem-solving tasks only.

Since this benchmark set by Dweck (1975), an influx of research investigating the effectiveness of AR for such purposes has been documented (Chodkiewicz & Boyle, 2014, 2016a; Hilt, 2004; Koles & Boyle, 2013; Robertson, 2000; Toland & Boyle, 2008). More recently again, research on positive psychology within a school-based context has also become prevalent (e.g., Chodkiewicz & Boyle, 2016b; Seligman, Ernst, Gillham, Reivich, & Linkins, 2009). While most previous research, including that of Dweck (1975), had been of the indirect AR variant, where persuasive feedback is used, the

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research of Fowler and Peterson (1981) heralded initiation of the naïve attributor into the fold of AR. Rather than being primed, influenced, and *persuaded* to think a certain way, the attributor became a partner in the AR program and was actively taught why certain adaptive attributions should take precedence over other maladaptive ones.

More recent research within the field, such as that conducted by Ziegler and Heller (2000) and Horner and Gaither (2004), indicated implementation of successful AR programs embedded within physics and mathematics classes respectively; while Haynes and Stewart et al. (2011) conducted an AR program with 661 tertiary students, assessing the likelihood of course failure longitudinally. The authors noted that the AR intervention was capable of producing widespread academic gains, with a significant reduction in course failure. Further, the AR intervention predicted course performance better than several well-established predictors of academic achievement. Such research uniquely demonstrates the potential widespread and general gains of an AR program.

The use of AR programs, however, has not always been supported. Miranda, Vilaescusa, and Vidal-Abarca (1997) outlined that AR components are redundant and unnecessary, and that children struggling academically require strategy training in order to increase their academic performance. With this in mind, the authors of this pilot study implemented a strategy training technique for reading skills, and supplemented one strategy training group with an AR adjunct. The authors found that students from both groups demonstrated equally good attributional profiles with no documented attributional change for the group receiving AR.

More recently, however, Berkeley, Mastropieri, and Scruggs (2011) implemented a reading strategy intervention with an appended AR component in one group and compared their results against a control group. The authors noted that both groups were comparable in their performance in reading comprehension, although the AR intervention group maintained a larger effect size at follow-up. This indicated that the group receiving AR was more motivated in applying and utilising their newly acquired strategies, although no perceived differences in achievement outcomes were observed.

Moreover, it should be noted that proponents of the strategy training approach rely on the premise that strategy training teaches the academic skills necessary for successful performance. While this approach may be viable with learners at primary school level, where there are a small number of academic areas one could teach strategies for, strategy training would be ill advised with individuals at secondary school level, a population that Hilt (2004) notes to be under-represented and in need of further AR inquiry.

However, Weiner (1988) notes that disparate AR research may be mitigated by diversifying and extending the techniques with which AR is typically implemented. In fact, given that attributions are cognitions and that the goal of cognitive behavioural therapy (CBT) is to challenge internal maladaptive thought patterns, a viable extension in techniques may be gained by implementing AR interventions with principles derived from CBT (Pugh, 2010).

Relevantly, Toland and Boyle (2008) have formulated an AR intervention appended via CBT principles, as guided by Stallard's (2002) materials for CBT with children. The authors utilised a 12-week intervention program to identify and modify maladaptive attributional styles in children between the ages of 9 to 11. Modification of maladaptive attributional styles occurred by way of cognitive restructuring to assist participants to develop positive attributional styles. The findings of Toland and Boyle indicated

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gains in untargeted reading proficiency, motivation, and self-esteem with 29 children with learning difficulties. Although the authors had expected an increase in spelling proficiency also, this was not attained.

Yet, in retraining attributions, Toland and Boyle (2008) implemented effort attributions for success and failure. Perry, Stupinsky, Hall, Chipperfield, and Weiner (2010), however, note that a combined effort and strategy attribution for failure fosters a more adaptive mindset, in that attributing failure to the use of an incorrect strategy carries far fewer negative connotations for personal self-worth. Further, Robertson (2000) notes that attributions for success should reflect ability explanations. Margolis and McCabe (2006) concur, adding that ability attributions for successful outcomes have the largest impact upon perceived self-competence and overall achievement measures. In further support, Sakaki and Murayama (2013) note that ability information is most salient and motivating to individuals, and should therefore be utilised to ascribe success causality.

In line with such considerations, this article aims to substantiate the favourable effect of an AR program abridged with CBT principles, as outlined by Toland and Boyle (2008). A further aim is to shorten the intervention (as has been achieved in Chodkiewicz and Boyle, 2016a), as well as to alter the dimensional profile of success attributions to ability, and failure attributions to effort and strategy use, in line with current literary recommendations. This research is aimed at the under-represented secondary school cohort, and to substantiate the effectiveness of an AR program within a population sample without difficulties in learning.

Thus, it was hypothesised that the AR program appended via CBT principles will result in significantly larger gains in academic achievement post-intervention, as compared to a control group. It was also hypothesised that the AR program will lead to significant gains in overall academic self-concept post-intervention, as compared to a control group. And lastly, it was hypothesised than an AR program will lead to an increase in overall adaptive attributional styles post-intervention, as compared to a control group.

Method

Participants

A total of 20 students from within the 9th-grade cohort of a single school in Melbourne, Australia were identified for potential participation. The participants were identified by student support personnel in the school and on the basis of inadequate levels of scholastic and behavioural performance not deemed commensurate with expected levels. Of these 20 participants, four elected not to participate for reasons unspecified.

The remaining sample comprised a total of 16 students. Participants were aged between 14 and 16. Participants spoke English without difficulty and were from a number of backgrounds deemed representative of their school's diversity (Australian, Indian, Albanian, Afghan, Somali, Samoan, and Chinese). Via random allocation, two females and six males participated in the intervention, while seven males and one female were part of the control group. It is noted that there was a larger representation of males in both the control and intervention groups. In this particular cohort of students, more male than female students were regarded as requiring intervention by the student support personnel, although it is of relevance to note that two children within the control group were part of an accelerated program at the school and were

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considered to be children with high intellectual potential, relative to peers matched for age and grade.

Materials

Attributional style. To assess attributional styles, the Children's Attributional Style Questionnaire — Revised (CASQ-R) was administered. The CASQ-R is a 24-item questionnaire that delineates causality attributions to positively or negatively valenced hypothetical events via a forced-choice format, thereby coding causality attributions along internal-external, stable-unstable and global-specific dimensions (Thompson, Kaslow, Weiss, & Nolen-Hoeksema, 1998). High and low values on the CASQ-R are deemed representative of an adaptive and maladaptive attributional style respectively. The CASQ-R is a shortened version of the original CASQ developed by Seligman and colleagues, and comprises moderate Cronbach's alpha of .61 for internal consistency, test–retest reliabilities of .50, and sound criterion-related validity (Thompson et al., 1998).

Academic achievement. To assess participants' academic achievement, the Wechsler Individual Achievement Test, 2nd Edition, Abbreviated (WIAT-II-A) was administered. The WIAT-II-A is a standardised brief measure for identifying and tracking basic academic skill and achievement, relative to a representative and comparative peer group. The WIAT-II-A yields measures on three pertinent academic domains; namely, reading, mathematics, and spelling. Further, these three domains combine to yield a composite index of overall academic achievement. Wechsler tests are known to be psychometrically robustly standardised and representative (Flanagan, 2000). Further, reliability and validity studies demonstrate that Wechsler tests are of sound reliability, validity, and internal consistency (Flanagan, 2000).

Academic self-concept. To evaluate academic self-concept, the Myself-as-Learner-Scale (MALS) was administered. The MALS was developed by Burden (1998) to assess academic self-perceptions of children aged between 9 and 16 years. The MALS comprises 20 items that are answered on a 5-point Likert-type scale, from (1) *strongly disagree* to (5) *strongly agree*. For the MALS, scores between 60 and 82 represent ratings within the average range, while scores below 60 and above 82 indicate a low and high academic self-concept respectively. The scale was originally standardised on a large sample and boasts large reliability coefficients (Burden, 1998).

Procedure

Five schools were approached via pamphlet distribution, emails to key personnel, and school visits, out of which two schools consented. Student support personnel were asked to identify 20 participants on the basis of perceived inadequacies in levels of scholastic and behavioural performance that were not deemed commensurate with expected levels of performance. The student support team noted that most children were identified on the basis of perceived difficulties with motivation and unjustified scholastic performance, as well as issues with occasional truancy. At this point, one school was unable to source adequate numbers of consenting participants to continue their involvement within the program.

The remaining school's identified participants were approached with explanatory statements outlining the nature of the research and the proposed study schedule,

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and were provided with parental consent forms. Four participants elected not to participate, and they ceased involvement at this stage.

The remaining 16 participants were randomly allocated to either a control or an intervention group. Academic achievement, academic self-concept, and overall attributional styles were assessed during a half-hour individual interview. The intervention and control groups were tested at pre-commencement and within one week of program completion. While the control group's involvement required testing at two time points only, the intervention group participated in an attribution retraining program.

Attribution retraining program. Children within the intervention participated in six weekly sessions, lasting approximately 75 minutes, conducted by a researcher during normal school hours. The program broadly incorporated the structure outlined by Chodkiewicz and Boyle (2015), as well as following guidelines from Toland and Boyle (2008), with some materials adapted from Stallard (2002). The current program was designed so that the length and breadth suited an older student cohort.

The sessions aimed to establish links between thoughts, feelings and actions, understanding the impact of negative and positive thoughts on learning, utilising skills such as thought-stopping and positive self-talk to achieve change, retraining thoughts to attribute ability to success and effort, plus strategy attribution for failure, as well as a concluding review session. Sessions were presented via instruction on key points, discussions and examples, as well as practice. Whenever possible, the Socratic approach was utilised, where an instructor poses thoughtful questions, and by guiding students slightly, allows them to come up with intended key information themselves (Frankel & Myatt, 2003). Session content was delivered via presentations, group discussions, quizzes, worksheets as well as homework tasks.

Results

Primary and Ancillary Analyses

Primary analyses were conducted according to the three hypotheses and separately for each dependent variable of interest. A series of 2 × 2 (Group [intervention, control] × Time [pre-, post-intervention]) mixed-model, between-within subjects analysis of variance (ANOVA) were conducted for the three achievement domains, overall attributional composite, and the academic self-concept variables. Condition by time interaction statistics are reported as tests of overall intervention effects. Effect sizes were calculated using partial eta squared, small (.01), medium (.06), and large (.14), according to the guidelines set out in Cohen (1988).

One-way ANOVAs were conducted to test for initial differences between the intervention and control group on each of the dependent variables (Reading, Mathematics, Spelling, Academic Self-Concept, Overall Attribution Score). No significant differences between conditions at pre-intervention were found.

Achievement analyses. The effect of the intervention on reading achievement across the two time points, and as compared to a control group, was assessed using a mixed between-within subjects ANOVA. This analysis yielded a significant interaction effect between intervention and time, $F(1,14) = .23.75$, $p < .01$, partial eta squared = .63, which is a large effect. This interaction indicates that the increase in reading achievement for the intervention group was significantly larger over the two time

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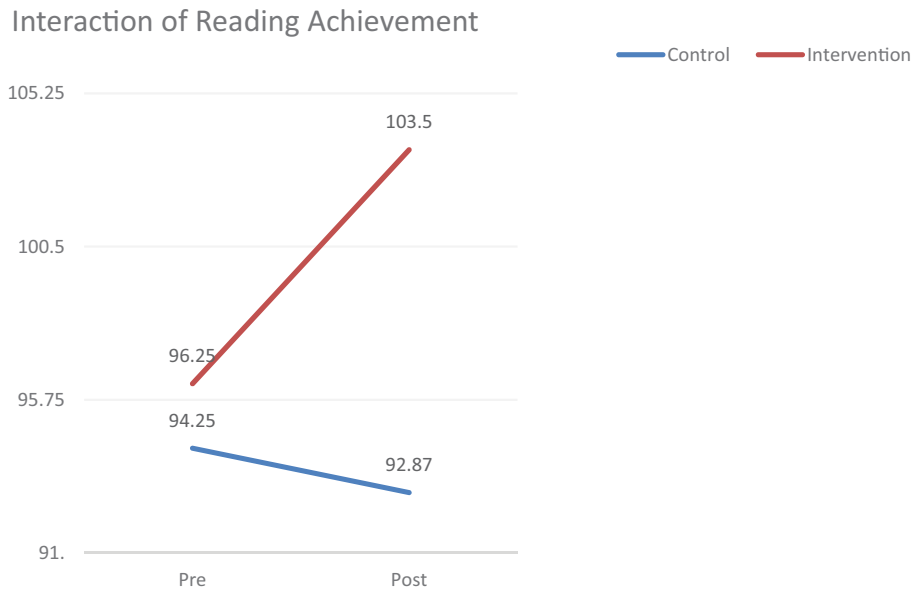


FIGURE 1

Interaction effect for mean pre- and post-intervention reading achievement scores for the intervention and control group.

points than that of the control group, which was found to decrease incrementally. A graphical representation of this interaction effect has been presented in Figure 1.

To assess the impact of the AR intervention on achievement in mathematics, a mixed between-within subjects ANOVA was conducted. There were no interaction effects observed, $F(1,14) = 1.87$, $p = .19$, partial eta squared $= .12$.

The impact of the intervention on spelling achievement between the two time points was also assessed via a mixed between-within subjects ANOVA. There was a substantial main effect for time, $F(1,14) = 9.24$, $p < .01$, partial eta squared $= .40$, indicating a large effect, with both the intervention and control group showing an increase in spelling achievement across the two time points (see Table 1). However, no significant interaction effect, $F(1,14) = .06$, $p = .81$, partial eta squared $= .00$, was identified.

Academic self-concept analyses. A mixed between-within subjects ANOVA was conducted to assess the effect of the intervention on academic self-concept for the intervention and control groups, across the two time points. There was no significant interaction between intervention and time, $F(1,14) = .34$, $p = .56$, partial eta squared $= .02$, indicating that the intervention group did not obtain greater gains across the two time points than the control group.

Attribution analyses. A mixed between-within subjects ANOVA was conducted to assess the impact of an attributional retraining intervention on overall attributional composites across the two time points for the two groups. There was no significant interaction between intervention and time, Wilks' lambda $= .93$, $F(1,14) = 1.12$,

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TABLE 1
Pre-and Post-Intervention Means and Standard Deviations of Scores for Control and Intervention Groups

	Pre		Post	
	Intervention	Control	Intervention	Control
Achievement domain				
Reading	96.25 (11.68)	94.25 (18.20)	103.50 (13.35)	92.87 (18.63)
Mathematics	82.62 (15.81)	98.00 (17.44)	84.62 (15.94)	96.75 (19.06)
Spelling	88.50 (9.89)	94.87 (20.04)	91.87 (11.41)	97.75 (22.64)
Attributional composite				
Overall	0.37 (3.24)	3.37 (.84)	2.87 (1.72)	4.87 (1.88)
Academic self-concept				
Overall	63.37 (10.17)	73.00 (8.33)	66.62 (12.01)	73.12 (7.07)

$p = .31$, partial eta squared $= .07$, suggesting that the program was not successful in significantly changing attribution styles.

Discussion

The hypothesis that the AR program will result in significantly larger gains in academic achievement post-intervention, as compared to a control group, was supported, but only in the domain of reading ability. Specifically, the AR group was seen to demonstrate increased reading achievement over time while the control group decreased. This association yielded a moderate effect size, indicating that the intervention had a significant impact. Meanwhile, the intervention did not yield any significant changes in mathematics or spelling achievement.

Such findings are similar to that reported by Toland and Boyle (2008) and Chodkiewicz and Boyle (2015a), who demonstrated that a significant increase in reading, although not spelling achievement was maintained following an AR intervention. The authors reasoned that given the nature of reading, and given the relative ease with which it is practised, it is a skill that one is easily motivated to engage in. Such reasoning can also be used when trying to understand the current results, as spelling and mathematics are not often independently practised by students and is perhaps not overly dependent upon the *motivation* to perform, as not knowing a long division equation or how to spell 'hierarchical' remains unknown, even though you may be motivated enough to succeed. Further, as Robertson (2000) as well as Horner and Gaither (2004) noted, such academic areas often require rote learning over significant periods of time, and the effectiveness of an intervention may not be pronounced at one week post-intervention for such skills.

The hypothesis that the AR program will lead to significant gains in overall academic self-concept post-intervention, as compared to a control group, was not supported. Even though the current research failed to find a link between an AR program and increased academic self-esteem, other researchers have suggested there may be a strong link between the two (Toland & Boyle, 2008; Yasutake, Bryan, & Dohrn, 1996; Ziegler & Heller, 2000). This association is posited to occur as a result of the AR program, where participants' overall outlook on learning-related behaviours and cognitions is mediated by an adaptive attributional style. In turn, elevated academic self-concept

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leads to greater motivation and engagement with academic tasks, and performance on tasks is further reinforced by adaptive attributional styles.

Lastly, the hypothesis that an AR program appended via CBT principles will lead to an increase in overall adaptive attributional styles post-intervention, as compared to a control group, was also not supported. This result was unexpected, given that the main aim of AR is to induce a positive change on attributional styles, which has been observed by some, but not all, previous researchers (Haynes Stewart et al., 2011; Perry et al., 2010; Ziegler & Heller, 2000).

Attribution retraining is an approach that could be undertaken by educational or school psychologists as an intervention with the results measured so as to ascertain progress. Other educational professionals could also use AR, after suitable training and guidance by a psychologist. It is an approach that may benefit children in special school settings (Boyle, 2007), and this would be an area for future research. Other possibilities are interventions in the higher education sphere, which can be often neglected vis-à-vis educational interventions. AR may also be utilised in more clinical settings where CBT is already partially successful (Davidson, Boyle, & Lauchlan, 2008).

Significant findings notwithstanding, this research is not free from caveats or limitations. First, the sampling methods, where student support personnel identified suitable participants, may not have been objective in their selection of students to be involved in the study. It is unclear what effect, if any, this may have had on the attained results. Second, the attributional measure selected was not, in its entirety, based on Weiner's (1985) model of achievement motivation and the three dimensions by which causality is thought to be appraised. Namely, the attributional measure selected did not yield a controllability dimension, as Weiner's model outlines, but rather comprised a globality component, which although not part of Weiner's model, is posited by him to be an important yet unexplored factor. Though the CASQ-R measure is widely used in the field (Feravich, 2010; Gadson, 2009), any findings confirming Weiner's model are speculative, at best.

This study was conceived as a pilot study so as to gain an understanding as to the validity of the attributions approach with a secondary school cohort. Pilot studies provide a useful method for applying an intervention but on a much smaller scale than a comprehensive study. The aspects of this approach are that fewer resources are required, thus reducing costs, as well as because a more simplistic form of analysis is required. Furthermore, a main disadvantage of this type of study is that while useful from a study experimental base, the generalisability is reduced and the results are less robust than larger studies. Most research (as detailed earlier) has concentrated on primary school-aged students, hence the reason for attempting the research as a pilot study. Other pilot studies have been successful and have led to future studies with larger populations (e.g., Chodkiewicz & Boyle, 2016a).

Further limitations may be due to two participants included within the control group, who represented 25% of the sample's control group. Namely, post-program commencement, at which point it was too late to take methodological action and make amends, it became apparent that two participants within the control group had been previously assessed as having high intellectual potential and were part of accelerated programs of the school. Thus, while the two students remained in the control group throughout the study, it is expected that their rate of academic progress would have been *accelerated* by the very definition of their membership, and this rate of academic

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gain could not have been matched by the intervention group, who did not have any accelerated children within the group.

It is posited that once a student's attributional style has changed, it requires some time to take effect and lead to higher approach behaviours towards academic tasks, and therefore to reinforcement of positive attributions. Thus, follow-up would have been a pertinent indicator to measure potential changes in attribution style and potentially greater academic gains over time.

Meanwhile, this research has some important implications for the current methods with which attributional training is implemented within schools. Specifically, it has been demonstrated that CBT offers potentially vital techniques that can be successfully applied within a group intervention setting, in order to retrain attributions.

Conclusion

In summary, of all human behaviours, learning is the most dynamic, and it is a worthy goal to clarify what it is that eases learning and those factors which inhibit it. Weiner's model of achievement motivation offers a number of pathways by which academic approach and avoidance is maintained, with the most important pathways those by which we explain the causes of our academic achievements and shortcomings. Albeit with significant limitations, the findings of this research are reasonably generalisable to 9th-grade secondary school cohorts, populations that have been significantly under-represented within the AR literature (Hilt, 2004). This article has demonstrated that implementing an AR program abridged with CBT principles yields significant gains in specific achievement domains; in this case, reading. Important work is yet to be done, as attribution retraining is reinvigorated long after its inception.

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Conflicts of Interest

None.

Ethical Standards

The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008.

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