Enhancing self-concept: Preliminary findings from a large-scale, longitudinal ARC study

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The enhancement of self-concept is widely valued as a desirable educational goal, and is frequently posited as a mediating variable that facilitates the attainment of other desired outcomes such as academic achievement. Consequentially there have been many intervention studies designed to enhance self-concept, but well-controlled interventions attempted in the past two decades have typically not systematically affected self-concept. Intervention studies are plagued with methodological flaws including the use of weak interventions, the failure to incorporate a logical match between intended outcomes and outcomes measured, the lack of utilization of multidimensional instruments with construct validity, and the use of small sample sizes and weak experimental designs (Marsh & Richards, 1988; Marsh, Richards & Barnes, 1986a; 1986b). Newer studies can capitalise on recent advances in theory (Marsh & Shavelson, 1985; Marsh, Byrne & Shavelson, 1988) and development of multidimensional measuring instruments (Marsh, 1988a) based on theoretical models. These recent advances enable researchers to overcome many past limitations and extend the understanding of relevant processes that effect self-concept.

New enhancement studies embodying recent advances are developing promising strategies. These studies suggest that there is a greater probability of interventions succeeding if: a) specific facets of self-concept (e.g., reading and mathematics self-concept) are targeted; b) new measurement instruments are utilized; c) treatments emulate and foster desirable naturally occurring processes; and d) effects are evaluated in light of current theory. Self-concept researchers have demonstrated that self-concept is related to academic achievement (e.g. Brookover & Erickson, 1975; Byrne, 1984; Hansford & Hattie, 1982; Marsh, 1986; Marsh, 1988b; 1990a; 1992; Marsh & Richards, 1988) and self-attributions (e.g. Marsh, 1984; 1986; Marsh, Cairns, Relich, Barnes, & Debus, 1984). Furthermore they assume by manipulating self-concept through various positive feedback mechanisms, academic achievement and desirable self-attributions (e.g. I succeeded on that mathematics task because I have the ability to do well in mathematics) can be increased. By enhancing academic self-concept and its related constructs in the primary school, educationists can contribute to maximising the full potential of young Australians at an early age. Given that the multidimensionality of self-concept has been established by previous research (see Marsh, 1988b for summaries) and

multidimensional measurement instruments for preadolescents are now available (Marsh, 1988b), the time is ripe for developing interventions that enhance academic self-concept in the primary school.

Interventions in educational settings may be administered in special settings removed from the classroom. Researcher control of administration of the intervention assists clarification of key processes that effect self-concept and related constructs. The strength of this approach is that high internal validity is incorporated in the research design. As yet, the value of interventions in natural settings (e.g. classrooms), mediated by natural agents (e.g. teachers) has not been fully explored. Designing interventions to be administered by natural agents in naturalistic settings is a desirable goal as this is the target setting where interventions have most direct practical

significance. As self-concept enhancement research, based on new developments in theory and measurement is in its infancy, both approaches are desirable to incorporate in enhancement research designs.

New self-concept enhancement studies can contribute to: a) assisting educators to enhance pupil self-concept in specific facets; b) identifying techniques to enhance self-concept and related constructs; c) helping students to feel good about themselves and their abilitites; d) assisting children with low self-concept to regard themselves as worthwhile; and e) the advancement of academic excellence in Australia via self-concept change. Hence new studies offer potential educational and social benefits to Australian society.

A BRIEF REVIEW OF THE LITERATURE

Methodological Issues in Intervention Studies

Recent advances in theory and measurement provide a new basis for the design of powerful intervention programs that can systematically target self-concept and related facets to overcome the limitations of earlier research. Past well-controlled interventions have typically not systematically affected self-concept, despite many possible biases that would be expected to produce changes in self-concept responses (e.g., placebo effects, acquiescence to the experimenter, post-group-euphoria, etc,). Marsh, Richards and Barnes (1986a; 1986b) suggested two reasons for this lack of success. First, most research is based on ill-defined measures of self-concept rather than on multidimensional measures where some of the dimensions are specifically relevant to the focus of the intervention. Second, the size of the effect

is typically small relative to probable error because the intervention is weak or because a potentially powerful intervention is administered to only a small number of subjects.

The multifaceted, hierarchical model of self-concept developed by Shavelson, Hubner, and Stanton (1976) has been of great heuristic value in self-concept research and fostered promising new directions for self-concept enhancement research. Recent reviews (Byrne, 1984; Marsh, Byrne & Shavelson, 1988; Marsh & Shavelson, 1985; Shavelson & Marsh, 1986; 1990b; Marsh, Shavelson, & Byrne, 1992) support the multifaceted structure of self-concept and indicate that self-concept cannot be adequately understood if its multidimensionality is ignored. Some aspects of the model have been revised in light of 1980's research (Marsh, 1988; Marsh, Byrne & Shavelson, 1988; Marsh & Shavelson, 1985; Shavelson & Marsh, 1988). The multidimensionality of self-concept posited in the Shavelson et al. model is now well established but support for the hierarchical structure is more complicated . Subsequent research has indicated that the hierarchy is more complicated than originally posited, leading to a revision in the model (Marsh, Byrne & Shavelson, 1988; Marsh & Shavelson, 1985) whereby two second-order academic facets -math/academic and verbal/academic- were required instead of just one as originally proposed by Shavelson. Multidimensional measuring instruments (Marsh, 1988) have now been developed based explicitly on the Shavelson model, and empirical results have been used to support, refute or revise the instrument and the theory upon which it is based.

Currently, relatively few enhancement studies (e.g. Craven, 1989; Craven, Marsh & Debus, 1991; Marsh, Richards & Barnes, 1986a; 1986b; Marsh and Richards, 1988) the authors are aware of have utilized these new advances in theory and research. These interventions based on theoretical multidimensional self-concept models (Shavelson et al., 1976; Marsh & Shavelson, 1985; Marsh, Byrne & Shavelson, 1988) that utilize multidimensional measuring instruments (Marsh, 1988; 1990), have measured and enhanced the facets of self-concept specific to the goals of each intervention. Only one of these studies (Craven, 1989; Craven et al., 1991) has been undertaken in a regular school environment.

These successful interventions offer directions for future research. Marsh, Richards & Barnes (1986a, 1986b) presented a construct validity approach to the study of intervention effects and the validity of interpretations resulting from such studies. Using this approach they argued that specific dimensions of self-concept that are most relevant to the intervention should be most affected, while less relevant dimensions should be less affected

and serve as a control for response biases. Applications of this approach have demonstrated that changes due to interventions that target non-academic facets of self-concept (Marsh, Richards & Barnes, 1986a; 1986b) or academic facets of self-concept (Craven, 1989; Craven, Marsh, & Debus, 1991; Marsh & Richards, 1988) are specific to the goals of the intervention. These interventions clearly demonstrate that the multidimensionality of self-concept as defined in the Shavelson model is critical to consider in research designs that aim to enhance self-concept. This advance in methodology in combination with recent developments in theory and measurement instruments has provided the basis for overcoming the limitations of past self-concept enhancement research by ensuring considerations of measurement instruments, interventions and theory are intertwined.

Approaches to Modifying Self-Concept

Direct Enhancement Approaches

Interventions designed to enhance self-concept directly typically employ performance feedback as a component of the treatment. Schunk (1981; 1983; 1985) considers that performance feedback can influence self-efficacy by providing information to students that they are mastering skills. "Feedback that students are making progress (e.g. 'That's correct' and, 'You're doing much better') informs them that they are acquiring skills and knowledge, which can sustain motivation and enhance learning efficacy" (Schunk, 1985, p. 216). Feedback on actual performance is also deemed a desirable educational goal in classroom settings. The underlying assumption in this approach is that the provision of performance feedback will encourage children to generate feelings of competency which should directly enhance self-concept. Praise is widely used to convey performance feedback. It is often used, however, without considering appropriate strategies to maximize its effectiveness.

Research has indicated that praise enhances performance more than tangible feedback (e.g. Barringer & Gholson, 1979). Praise is recommended as a desirable form of reinforcement because it is thought to build self-esteem and encourage pupil effort. However, as Brophy (1981) noted, praise is not always reinforcing and is often determined by teachers' perceptions of student needs rather than by the quality of their performance. He suggested twelve guidelines for praising effectively to overcome the problems of ineffective praising strategies, which include: (a) specifying the accomplishment; (b) ensuring praise is credible; (c) providing information to students about their competence; (d) attributing success to effort and ability; and (e) ensuring praise is delivered contingently and infrequently. By praising sparingly and meeting the criteria of contingency, specificity

and credibility, teachers can teach children to attribute outcomes to their own efforts or ability and thus assist them to gain a sense of personal control. Hence effectively presented praise that is credible may be an important component for an intervention designed to enhance academic self-concept.

The utilization of performance feedback based on effective praise strategies will only enhance self-concept if the feedback is internalised by the child. Feedback that informs a child he/she has done well on a specific mathematics task does not mean the child will think he/she is in general good at mathematics. An internal mediating process is involved in transferring the feedback to a self-concept internalisation whereby: the child receives performance feedback ("You have done that mathematics task well."), perceives their efforts as competent ('I did well on that task."), generalises the feedback to a subject area ("I'm good at mathematics."), and internalises this feedback as a positive feeling or a self-concept internalisation ("I feel good about my abilities in mathematics."). Typically, self-concept researchers have not defined specific components of internally mediating processes that directly affect self-concept, simply assuming that performance feedback will generate positive outcomes. By not focussing interventions to target directly the internal mediating process involved in enhancing self-concept, the effectiveness of interventions based on performance feedback is limited.

Consistent with the above view, previous research suggests that techniques focussing on internal mediating processes would be an effective manipulation to directly enhance self-concept. For example, Ames (1978; Ames and Felker, 1979) found that high self-concept children self-reinforce more than low self-concept children. Andrews and Debus (1978) suggested that a necessary development "in future programs would be the shift from the use of arbitrary external reinforcement systems in the acquisition stage to the generating of systems of self-reinforcement that would operate to support attributional change" (p. 165). Training low self-concept children to utilize systems of self-reinforcement to generate desirable internal mediating processes would ensure performance feedback is internalised. An additional advantage of such an intervention design is the emulation of an ecologically natural internal mediating process for self-concept enhancement. Directly targeting self-concept via the internal mediating process of self-reinforcement would seem a desirable inclusion in an enhancement intervention.

Indirect Enhancement Approaches

Self-concept is postulated (e.g., Marsh, 1984) to be linked into a network of relationships with other variables (e.g; achievement, self-attributions). Adaptive behavioural tendencies, characteristic of high self-concept children, are often identified as mediating processes that postitively affect constructs related to self-concept. The relationship of self-concept to other constructs is of relevance to the design of interventions intended to enhance self-concept. By examining mediating processes that enhance effects on constructs related to self-concept, intervention strategies can be identified to indirectly enhance self-concept via the enhancement of a related construct.

Interventions that target constructs related to self-concept have focussed on a variety of primary targets according to researchers' guiding theoretical positions. Results with the Self Description Questionnaire (SDQ) and Sydney Attribution Scale (SAS) demonstrate a consistent pattern of relations between multidimensional self-concepts and multidimensional self-attributions for the causes of success and failure

(see Marsh, 1988). Results from Marsh, Cairns, Relich, Barnes, and Debus (1984) study suggest that high self-concept is correlated substantially with attributions when success is attributed to ability (.59) or effort (.55). Marsh (1984) proposed an equilibrium model whereby self-attributions, academic self-concept and academic achievement form a network of reciprocal relationships whereby change in any one will lead to further changes in the others. Self-concept interventions that target both self-concept and constructs related to self-concept, particularly self-attributions therefore seem potentially useful.

Interventions based on attributional retraining have been guided by the attributional model of achievement motivation (Weiner, 1979; 1984; 1985;Weiner & Kukla, 1970), self-efficacy theory (Bandura,1977; 1982; Schunk, 1981; 1985), self-worth theory (Covington, 1984; Covington & Omelich, 1981) and the model of learned helplessness (Abramson, Seligman, & Teasdale, 1978; Seligman, 1975). Differences in the way children attribute outcomes to causes are shown to be related to school performance, self-concept, self-efficacy, and academic behaviours (Andrews and Debus, 1978; Bandura, 1982; Bandura & Schunk,1981; Bar-Tal, 1978; Covington, 1984; Dweck, 1975; Forsterling; 1985; Fowler & Peterson, 1981; Relich, Debus, & Walker,1986; Marsh, Cairns, et al., 1984; Schunk, 1983; 1984a; 1984b; 1985; Weiner, 1979; 1980). The aim of these studies is to teach subjects desirable causal attributions about behavioral outcomes (i.e. success and failure) in an attempt to reduce undesirable academic behaviours that are believed to be maintained by maladaptive attributional styles.

Indirect self-concept enhancement treatments that incorporate attributional feedback might be expected to contribute to the enhancement of self-concept via an emphasis on internal (effort, ability, ability/strategy) attributions.

Successful outcomes that are ascribed to the self are thought to result in greater self-esteem than success that is externally attributed (see Marsh, Cairns et al., 1984; Marsh, Smith & Barnes, 1983; Marsh, Relich and Smith 1983). Research (Brown and Weiner, 1984; Covington and Omelich, 1979c; Nicholls, 1976) emphasises competency as the dominant source of a positive self-concept as results suggest that praise for ability is most valued. Thus praise for effort alone may not be sufficiently rewarding for the student (Covington and Beery, 1976, p 34). However, research (Schunk, 1982; 1983; 1985; 1986) has demonstrated that praise for effort is also critical as this promotes perceptions of self-efficacy and contributes to enhancing skills. These results suggest that in interventions there is a need to balance an image of both competency and diligence as sources of self-concept. Further research by Clifford (1988) has suggested that self-attributions of success to use of effective strategies has considerable potential in enhancing self-concept.

Self-worth theorists suggest that students use self-serving strategies to preserve public and private impressions of competency when risking failure (Covington, 1985; Covington & Omelich, 1979a; 1979b, 1984; Nicholls, 1979, 1983). Marsh, Cairns et al. (1984, p. 5) noted that "a substantial body of literature has demonstrated that subjects are more likely to attribute their own success to internal causes such as ability and effort, while attributing failure to external causes." This pattern of attributions has been termed the self-serving bias and it is interpreted as an attempt to protect self-esteem. By taking credit for success and denying blame for failure individuals may be able to protect their self-concept. Alternatively, Marsh (1986) used the term self-serving effect instead of bias. He noted that denial of responsibility for failure was a reasonable

response for children who had high academic self-concepts, were academically able, and were seen as academically able by their teachers. Encouraging low self-concept children to increase self-reinforcement by emulating naturally occurring self-reinforcing processes utilized by high self-concept children would seem a useful component of an intervention to enhance self-concept indirectly via changes in patterns of self-attributions.

Developing Interventions to Enhance Self-Concept

Low academic self-concept is apparently amenable to enhancement from attributional change programs (e.g., Craven, 1989). Forsterling (1985) suggested that existing and modified forms of current attributional change programs could be applied more broadly to other dysfunctional processes. Two forms of change programs seem desirable. To target self-concept directly a change program that attempted to change low self-evaluations ("I'm hopeless at mathematics") to high self-evaluations ("I did that task well. I'm good at mathematics.") could be devised. Performance feedback that encouraged children to internalise administered feedback seems a useful intervention to foster change in self-evaluations via internally mediated processes. Such a treatment would be a critical component of a self-concept enhancement treatment as self-concept is targeted by direct means to ensure the potential effectiveness of the intervention is high. An attributional change program based on attributional feedback would be a desirable indirect means to enhance self-concept. Current research indicates that a relationship exists between self-concept and self-attributions such that the processes affecting self-attributional change may also be related to self-concept change and vice versa. The combination of both indirect and direct change programs seems a promising approach for devising a potentially powerful self-concept enhancement intervention.

Training administrators of treatments to use positive performance feedback effectively, and training pupils to generate functional systems of self-reinforcement to enhance self-concept reinforcing strategies and self-attributional styles, are posited to be effective strategies for incorporation in academic self-concept enhancement treatments. Training children to emulate ecologically natural internal mediating processes (e.g., the self-serving effect, attributions to ability and effort) utilized by high self-concept children seems promising. Examination of current research and theory points to the possibility of strengthening the development of current interventions by utilizing both direct and indirect approaches to enhance internal mediating processes. Applying these strategies to ecologically undisturbed settings, and ensuring components of interventions are mediated by ecologically natural agents would extend the application of previous and new research findings.

In a small-scale study Craven et al. (1991; Craven, 1989) implemented a new enhancement intervention in a single primary school based on both direct and indirect enhancement approaches. The primary purpose of the study was to enhance reading and mathematics self-concept and secondary effects were predicted to occur in self-attributions and academic achievement. Two potentially powerful change programs based on performance feedback and attributional feedback were combined. In order to

enable students to generate appropriate systems of self-reinforcement that would assist to enhance academic self-concept by a direct means, ability attributional statements (Schunk, 1981; 1983; 1985) were coupled with performance feedback. This type of feedback which the researchers have named internally focussed feedback was devised to train students to directly

change low self-concept attributions to high self-concept attributions. Brophy's (1981) guidelines for effective praise were incorporated in this strategy by ensuring internally focused feedback was delivered contingently, infrequently and for appropriate gains in performance to ensure the feedback was credible whilst avoiding random praise and global positive reactions. Attributional feedback was also used as a component of the treatment to enhance self-concept by an indirect means. The underlying assumption was that the relationship of academic self-concept and self-attribution is reciprocal so that change in attributions should be associated with change in academic self-concept (see Marsh, 1984). The treatment was applied in educational settings including both the regular classroom and withdrawn assistance groups.

The results demonstrated that the researcher-administered treatment was successful in enhancing targeted facets of self-concept and some logically related self-attributions. Despite its similarities to the successful researcher-administered treatment, the intervention administered by teachers in the context of ongoing classroom activities did not result in significant changes in self-concept. The effectiveness of the treatment when mediated by external researchers indicates the capacity of the treatment principles to instigate processes of self-concept change. Craven et al. (1991; Craven, 1989) suggested greater possibility for positive teacher-generated effects if: a) frequency of reinforcement schedules could be maintained by teachers; b) the intervention was introduced at the beginning of the school year to ensure students perceived feeedback as salient; and c) the treatment implementation period was extended. The authors also suggested a time lag after the completion of an intervention may be needed to allow changes in self-concept to increase desirable academic striving behaviours and subsequent achievement.

This pilot study potentially makes an innovative contribution in that it is the first new enhancement study to involve: a) an enhancement treatment in a natural school environment; b) combining two approaches to modifying self-concept in the one intervention; and c) demonstration of a consistent and logical pattern of effects associated with an intervention implemented in the primary school. The large-scale

investigation funded by an Australian Research Council Grant utilizes the promising features of this small-scale study and incorporates the authors' suggestions for developing more powerful research designs.

THE PRESENT INVESTIGATION

The primary purpose of the large-scale study is to build on promising features of previous small-scale enhancement studies by: a) incorporating recent developments in theory and measurement; b) fully investigating the combined effects of internally focussed feedback and attributional feedback by using a large sample size and a sophisticated research design; c) examining the treatments effects on mathematics, reading and a combination of the two subject areas in order to examine the effects in light of Shavelson's hierarchical model of self-concept; d) modifying and extending procedures to maximize the successful implementation of a teacher-administered treatment in a naturalistic setting; and e) examining the durability of effects associated with the treatment longitudinally.

The study aims to: a) incorporate recent advances in theory and measurement by applying Shavelson's model to the development of a research design that targets the less stable lower order facets in the hierarchy; b) enhance specific facets of academic self-concept (reading and/or mathematics) in order to focus the study on educational settings where the enhancement of these facets is deemed desirable and has significant practical applications; c) identify strategies and procedures teachers can utilize to enhance academic self-concept in the classroom by incorporating a teacher-administered treatment; d) identify useful strategies to enhance academic self-concept in controlled settings by incorporating a researcher-administered treatment; e) test Shavelson's hierarchy of self-concept to determine if changes in higher order factors (academic and general-self) will occur when lower order facets are targeted (reading and mathematics); and f) examine the effects of the treatment on constructs (self-concept, academic achievement and self-attributions) longitudinally using a construct validity approach. The study will also illuminate and contrast: the combined and differential effects of the treatment on mathematics and/or reading self-concept in terms of Shavelson's model of self-concept; and the differential effects of a researcher-administered and teacher-administered intervention.

RESEARCH PLAN, METHODS AND TECHNIQUES

Subjects for the longitudinal analysis were 1300 predominately middle class suburban children from 8 schools in metropolitan Western Sydney from each of the grades of 3,4 and 5. From each of the 50 classes participating in the study, 18 subjects with the lowest academic self-concept scores measured by the SDQ were selected from the longitudinal pool to participate in the enhancement component of the study. Eighteen students from each of 42 experimental classes were matched in pairs by sex, age and level of academic self-concept. The matched pairs were then randomly assigned to control or experimental treatments. Experimental subjects were then randomly assigned to a teacher-administered treatment or a researcher-administered treatment, resulting in 4 students being assigned to the teacher-administered treatment and 8 students being assigned to the researcher-administered treatment per class. Subjects in the teacher experimental treatment were then randomly assigned to one of three target subject areas: a mathematics treatment, a reading treatment, or a treatment in both reading and mathematics resulting in two children in the combined treatment and one child in each of the remaining treatments. Subjects in the researcher-administrated treatment were randomly assigned to one of three target subject areas: a mathematics treatment, a reading treatment, or a treatment in both reading and mathematics resulting in four children in the combined treatment and 2 children in each of the remaining treatments (see table 1). One class from each of the 8 schools was experimentally assigned to be an experimental diffusion control group. This group did not receive either the teacher-administered or researcher-administered intervention. Pretests were completed in the first and second weeks of the first school term.. The intervention was implemented over a period of 14 weeks commencing at the beginning of the forth week of the first term.

INSERT TABLE 1 ABOUT HERE

The initial longitudinal sample of 1300 pupils completed the Self Description Questionnaire 1(SDQ I), a newly modified version of the Sydney Attribution scale (SAS) which includes a scale for attributions to strategies in success and failure situations in mathematics and reading, a questionnaire measuring student attitudes to learning, a standardized mathematics (PAT maths) and reading achievement test (TORCH). Year 3 students also completed a simple mathematics test at time 1 as the researchers predicted that young students would find the PAT maths test difficult to

complete at the beginning of year 3.

As the TORCH test seemed too difficult for year 3 students to complete future tests of this age group's reading ability were based on ACAP reading tests. To allow comparison across groups ACAP was also administered in addition to the TORCH test to years 4 and 5 at time 2 and time 3 testing periods.

To examine the short-term effects of the intervention all pretest measures (with the exception of the TORCH test for year 3) were administered one to three weeks after the conclusion of the intervention. All years also completed ACAP reading tests. To examine predicted differential changes expected after an elapse of time after the intervention and to examine the maintenance and durability of intervention effects all instruments were administered again 5 months after the intervention.

Treatments

The treatments were implemented over a period of 14 weeks during the first and second terms of the 1991 school year. The researcher-administered treatment was implemented in group and individual settings. The teacher-administered treatement was delivered in the course of normal classroom lessons. The researcher-administered treatment was delivered by research assistants to individual subjects in the attributional feedback treatment and groups of subjects in the internally focussed feedback treatment. The combined group participated in both individual and group activities for their assigned target subject areas. All activities were extensions of the procedures utilized in the Craven (1989) study. Internally focussed feedback involved: identifying competence by providing performance feedback ("This is good work."), generalizing the feedback directly to a subject area (" You're doing very well in mathematics"), and directly stating and an internal attribution to academic self-concept in the area ("You must feel good about your abilities in mathematics."). Attributional feedback involved the researcher attributing success on graded reading and mathematics tasks to ability or effort in using the correct strategy, and attributing failure to the need to learn the correct strategy coupled with ability attributional statements. Alternate attributions to ability and effort/strategy each session were made based upon 10 tasks in each of the areas of mathematics and reading, commencing with ability to maximize the number of preferred attributions.

Before the commencement of the treatment teachers were trained to use internally focussed feedback and/or attributional feedback depending on the style of feedback delivery they have been assigned. A list of example phrases was distributed to

teachers and they were encouraged to maintain spontaneity and ensure feedback was relevant to the specific classroom situation. Teachers were advised of Brophy's guidelines for effective praise and requested to follow these guidelines when administering feedback. Teachers were instructed to praise 3 target children using both internally focussed feedback and attributional feedback feedback in specific subject areas (1 in mathematics, 1 in reading and 1 in both reading and mathematics) once each day. Normal feedback was aked to be maintained with assigned feedback being additional. Failure was attributed to using the incorrect strategy coupled with ability statements (e.g. " No that's not right. You have the ability to do well in reading and will do well when you use the right strategy and keep trying hard."). Teachers completed a checklist listing the feedback delivered daily to each subject to enable the researchers to monitor weekly the amount of feedback delivered. Teachers were given a breakdown of the feedback they managed to deliver over the period of each week and a cumulative total breakdown of the progressive feedback delivered up until the end of each week to encourage them to deliver appropriate amounts of feedback.

Control Group

The control group received regular classroom praise that was not based on attributional feedback or internally focussed feedback. Teachers were instructed to maintain normal levels of interaction and praise. An additional advantage of the current design that is rare in self-concept enhancement research is a placebo control for all measures. For example, students receiving the maths only treatment provide a placebo control for students receiving the reading only treatment.

Hypotheses

Both the researcher-administered and teacher-administered treatments are predicted to be effective self-concept enhancement interventions. Major effects predicted are positive gains in specific facets of self-concept and increases in desirable self-attributions as a result of the treatment. The effects of the treatment on self-concept will be consistent with Shavelson's hierarchical model whereby change in lower order facets will be associated with change in higher order facets up to and including the apex (general self-concept) of the model. Academic achievement is also predicted to increase after the elapse of a time-lag to enable gains to be applied to desirable academic striving behaviours. The effects of the treatment are predicted to be sustained over time. Differential and combined effects of treatments are expected to vary in a logical manner. For example,

subjects who receive the combination of internally focussed feedback and attributional feedback are predicted to display higher gains than subjects who have received one aspect of the treatment due to the targeting of both direct and indirect processes that effect self-concept. More specifically: 1. Subjects who have experienced internally focussed feedback and/or attributional feedback delivered by either the researchers or teachers in both mathematics and reading, will display higher self-concepts in reading, mathematics, school, academic and general school self-concept as implied by the Shavelson model than students who have not experienced the treatment; 2. Subjects who have experienced attributional feedback, internally focussed feedback or the combination treatment will in reading and/ or mathematics according to their assigned target subject area, increase their attributions to effort/strategy and ability in success situations, decrease their attributions to lack of ability and effort in failure situations and increase their attributions to incorrect strategies in failure situations in specific subject areas compared to the students who have not received these treatments; 3. Subjects who have experienced internally focussed feedback, attributional feedback or the combination treatment will display an increase in their academic achievement in reading and/ or mathematics according to their assigned target subject area, after the elapse of a time lag after the conclusion of the intervention compared to subjects who have not received the intervention; 4. Gains 1 to 3 will be maintained over time; 5. Changes in self-concept, self-attributions and academic achievement as a result of the interventions will be limited to facets related to the goals of the intervention and will support the equilibrium model and self-concept, self-attributions and academic achievement will demonstrate a logical pattern of relationships over time; and 6. Subjects who have experienced combined feedback or targeting of both subject areas will display higher gains in self-concept, self-attributions and academic achievement compared to students who have experienced one aspect of the treatment solely.

Statistical Analyses

Preliminary comparison of within-class control groups with external-class control groups suggest that self-concept enhancement effects have diffused to within-class control subjects in experimental classes and across self-concept facets.Means for within-class control groups increase from time 1 to time 2 for all facets of self-concept. Means also increase from time 2 to time 3 for.most facets of self-concept with the exception of physical, parent, school, and general self-concept. The increase in means is not specific to academic areas of self-

concept. In contrast means for external-class control groups are more stable over time Examination of the means suggest that teachers who were not taught intervention techniques have not significantly enhanced the self-concept of students with weaker self-concepts than other students in their class over time in either academic or non-academic facets of self-concept.

A series of multiple regression analyses were conducted to test for significant differences between the within-class control group and the external class control group at time 2 and time 3, with time 1 scores used as the covariate (see table 2). To examine stability of scores over time, a difference score between time 3 and time 2 was calculated and a multiple regression analysis conducted with time 1 scores as the covariate.

Subjects in within-class control groups had higher self-concepts in all academic facets of self-concept at time 2 with the exception of reading self-concept . The main effect for reading self-concept was perhaps weakened by an aptitude treatment interaction at time 2 which suggested subjects with prior low and medium reading self-concepts benefited more from the intervention than subjects with higher prior reading self-concepts. A main effect was present for reading self-concept at time 3 ($p < .05$, B=.58) suggesting that subjects in the within-class control group had higher reading self-concepts than subjects in the external-class control group at time 3.

Aptitude treatment interactions were present for all academic facets of self-concept with the exception of reading self-concept at time 3. These aptitude treatment interactions suggest that subjects with prior low and medium self-concepts in the academic facets of math, school, general and total academic self-concept , who were in the within-class control group had higher self-concepts than students with low or medium prior self-concepts in the external-class control group.These results suggest that subjects in the within-class control group have higher self-concepts than subjects in the external-class control group over time 2 and time 3 in specific academic facets of self-concept.

Higher non-academic self-concepts are also present for subjects in the within-class control group. Subjects in the within-class control group had significantly higher physical,

appearance, peer, parent and non-academic self-concepts at time 2 than subjects in the external-class control group. Aptitude treatment interactions were also present for parent and total non-academic self-concept. These interactions suggest that subjects with prior low and medium parent self-concepts in the

within-class control group had higher parent self-concepts at time 2 than subjects in the external-class control group. No main effects or aptitude treatment interactions were present for either time 3 scores or difference scores. Non-significant effects for difference scores suggests that the difference in time 3 and time 2 scores is not significantly different. Hence changes are stable over time despite significant differences not being present for non-academic facets at time 3.

Subjects in the within-class control group also had higher total self-concepts at time 2 than subjects in the external-class control group. Aptitude treatment interactions were also significant at time 2 and time 3. Interpretation of these interactions suggest that subjects with low and medium prior self-concepts in the within-class experimental group had higher total self-concepts than subjects in the external-class control group.

Hence diffusion effects are present across non-academic and academic facets of self-concept for comparisons between the within-class control group and the external-class control group. Differences are stronger for academic facets of self-concept at time 3 suggesting that changes in academic facets of self-concept are more stable over time than changes in non-academic self-concept facets. This may suggest that teachers of experimental classes, after the conclusion of the intervention are perhaps focusing their reinforcement strategies more on academic facets of self-concept than non-academic facets of self-concepts measured by the SDQ1.

This diffusion effect implies that teachers assigned to experimental classes are perhaps not focusing the enhancement treatment on experimental subjects and the target facets of self-concept. Perhaps teachers are integrating the intervention techniques into their natural reinforcement repertoire.

The identification of a diffusion effect in relation to the within-class class control group is predicted to weaken tests of significance in that within-class control group seems to have been contaminated, resulting in significant gains in academic and non-academic facets of self-concept in comparison to the external-class control group. Subsequent analyses were focused on experimental groups compared to a combination control group that consisted of both within-class controls and external-class controls and a non-corrupted control group consisting solely of the external-class control group.

A series of multiple regression analyses were conducted on longitudinal data collected. Patterns of relationships among the key variables of self-concept, self-attribution, and academic

achievement are currently being examined. As preliminary data analysis is currently being undertaken only preliminary results for the interventions effect on self-concept facets will be presented.

The researcher-administered intervention in both mathematics and reading increased reading, mathematics and academic self-concept at time 2 (see Table 3). This increase in self-concept was maintained in mathematics and academic facets at time 3.

INSERT TABLE 3 ABOUT HERE

The researcher-administered intervention in reading increased reading self-concepts at time 3 (see table 4). However, no main effects were present for reading self-concept difference scores were present suggesting that positive non-significant gains were also made in reading self-concept at time 2. Main effects were also present for school self-concept at time 2, maths self-concept at time 3, and academic self-concept at time 3. Target areas of self-concept and related areas were enhanced by the researcher-administered intervention in reading. However, effects were not confined to the target subject area as a significant main effect for mathematics self-concept is present at T3.

The researcher-administered intervention in mathematics increased target facets of self-concept and related self-concept facets. Main effects were present for mathematics self-concept at time 2 ($p < .05$, B=.53). Aptitude treatment interactions (ATIs) were significant at time 2 for mathematics ($p < .001$, B= -.84), general ($p < .05$, B= -.39) and academic self-concept facets ($p < .05$, B= -.39). Examination of these ATIs suggest that pupils with prior low mathematics self-concept had higher mathematics, general and academic self-concepts at time 2 than pupils with prior higher levels of mathematics self-concept.

The teacher-administered intervention in both mathematics and reading self-concept increased general self-concept at time 2 ($p <.05$, B=.32). These results were disappointing in that the combined treatment was predicted to enhance all target facets of self-concepts. The teacher-administered intervention in reading had a main effect on academic self-concept at time 2 (p , .05, B= .49). ATIs at time 2 were present for reading ($p < .01$,B= -.76), mathematics ($p < .01$, B=-.83), school (p , .05, B= -.56), general ($p < .01$, B=-.78) and academic ($p < .01$, B=-.78) self-concept facets. Preliminary examination of ATIs suggest that main

effects may have been weakened as pupils with prior low reading self-concepts had higher self-concepts in reading, mathematics, school, general and academic self-concept at time 2 than pupils with higher prior reading self-concepts. Hence the treatment may have benefitted students with prior low reading self-concepts more than pupils with higher prior reading self-concepts. Significant effects of the teacher-administered intervention were not isolated to the target self-concept facet of reading self-concept or academic facets of self-concept which suggests teachers may have experienced difficulty administering the intervention to target subjects solely in the target area. The teacher-administered intervention in mathematics had a significant main effect on mathematics self-concept at time 3 ($p < .05$, $B = .62$). No other main effects or ATIs were present for other academic facets of self-concept at time 2 or time 3.

Summary

Preliminary analyses of the effects of a self-concept enhancement intervention suggest that self-concept can be enhanced in educational settings when indirect and direct enhancement strategies are combined in the context of a strong research design. The preliminary results exploring the effect of the researcher-administered intervention suggest that pupils' self-concepts in specific facets can be enhanced in withdrawn assistance groups. The preliminary results exploring the effect of the teacher treatment suggest that teachers can enhance pupils' self-concepts in naturalistic educational settings but perhaps experience difficulty confining such treatments to target facets of self-concept and target individuals.

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TABLE 1:

ASSIGNMENT TO WITHIN CLASS EXPERIMENTAL GROUPS

	COMBINED TREATMENT ONLY	READING ONLY	MATHS	TOTAL
RESEARCHER	4 (168)	2 (84)	2 (84)	8 (336)
TEACHER	2 (84)	1 (42)	1 (42)	4 (168)
TOTAL	6 (252)	3 (126)	3 (126)	12 (504)

Note: Numbers written in normal type refer to numbers of subjects within each experimental class assigned to specific treatment groups. Numbers in parenthesis refer to the number of subjects in all experimental classes assigned to specific treatment groups.

Table 2:

Comparison of within-class control group (n=) with external class control group (n=) on academic facets of self-concept at time 2 and time 3

FACET OF SELF-CONCEPTTIME 2

T2 with T1TIME 3

T3 with T1DIFFERENCE SCORES
(T3-T2) with T1
MainATIMainATIMainATIReading
**
-.72
-.09
*
.58
.08

*
.73
.10
Mathematics
*
.53
.06

*
-.64
-.07
*
-.60
-.06School
*
.57
.07

*
-.72
-.09General
**
.58
.08
*
-.59
-.08
Academic
*
.52
.08
*
-.59
-.08

Note: *p < .05, ** p < .01, *** p <. 001, main-main effects, ATI-aptitude treatment interactions, T-time. Numbers in standard type refer to unstandardised beta weights, numbers in italic refer to standardised beta weights. Main effects should be interpreted by examining standardised beta weights. ATI's should be interpreted by examining unstandardised beta weights.

Table 3:
Effects of the researcher-administered intervention in both mathematics and reading on self-concept facets in comparison to all control groups

FACET OF SELF-CONCEPTTIME 2

T2 with T1TIME 3

T3 with T1DIFFERENCE SCORES
(T3-T2) with T1MainATIMainATIMainATI
Reading
*
.33
.06

Mathematics
*
.40
.07

**
.47
.08
School

General

Academic
*
.29
.06

*
.27
.06
Note: *p < .05, ** p < .01, *** p < .001 main- main effects, ATI- aptitude treatment interactions, T- time. Numbers in standard type refer to unstandardized beta weights, numbers in italic refer to standardises beta weights. Main effects should be interpreted by examining standardized beta weights. Aptitude treatment interations should be interpreted by examing standardized beta weights.

Table 4:

Effects of the researcher-administered intervention in reading on self-concept facets in comparison to all control groups

FACET OF SELF-CONCEPTTIME 2

T2 with T1TIME 3

T3 with T1DIFFERENCE SCORES
(T3-T2) with T1MainATIMainATIMainATI
Reading
*
.45
.07

Mathematics
**
.55
.07

School

**
-.56
-.08

*
-.46
-.08
General
Academic
*
.42
.07

uˇterpreted by examining unstandardised beta weights.

Table 3:
Effects of the researcher-administered intervention in both mathematics and reading on self-concept facets in comparison to all control groups

FACET OF SELF-CONCEPTTIME 2

T2 with T1TIME 3

T3 with T1DIFFERENCE SCORES