Locus of Control, Self-Efficacy, and Motivation in Different Schools: Is Moderation the Key to Success?

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This study used a novel multidimensional locus of control instrument (I-SEE) to investigate the relationship between locus of control, motivation, and academic achievement in three different types of school. The strengths of the I-SEE are that it incorporates the construct of self-efficacy and that it is embedded in a model of personality and action based on field-theoretical conceptions. Further, it includes the role of the environment and personality in determining action. The results support a multidimensional conceptualisation of locus of control and the utility of the I-SEE. There were statistically significant differences between schools for motivation and achievement and also a mediating effect between locus of control and school type, suggesting that interactional models are required in investigating the relationship between locus of control, motivation, and academic achievement in different schools. Moderate levels of locus of control and self-efficacy appear to be more adaptive than either extremely high or low levels.

Locus of control, as originally conceptualised by Julian Rotter (1966), refers specifically to people's perceptions of control over reinforcements. As such, it attempts to bridge the gap between operant and cognitive psychology. Control orientations have been extensively studied and have been found to be critical in relation to academic achievement and motivation. Over the years, various constructs and instruments have been developed, during which new terms and reinterpretations of old notions have been proposed. Because of such alternative notions, there has often been a lack of attention to building solid theoretical foundations, causing confusion and making interpretation and integration of findings difficult.

*L: Locus of Control, Self-Efficacy, and Motivation in Different Schools: Is Moderation the Key to Success? AU: Anderson, Angelika; Hattie, John; Hamilton, Richard J. SO: Educational Psychology; v25 n5 p517-535 Oct 2005DE: Descriptors: Personality; Student Motivation; Self-Efficacy; Academic Achievement; Locus of Control; Measures (Individuals) AB: Abstract: This study used a novel multidimensional locus of control instrument (I-SEE) to investigate the relationship between locus of control, motivation, and academic achievement in three different types of school. The strengths of the I-SEE are that it incorporates the construct of self-efficacy and that it is embedded in a model of personality and action based on field-theoretical conceptions. Further, it includes the role of the environment and personality in determining action. The results support a multidimensional conceptualisation of locus of control and the utility of the I-SEE. There were statistically significant differences between schools for motivation and achievement and also a mediating effect between locus of control and school type, suggesting that interactional models are required in investigating the relationship between locus of control, motivation, and academic achievement in different schools. Moderate levels of locus of control and self-efficacy appear to be more adaptive than either extremely high or low levels.

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particular in relation to studies investigating the relationship between locus of control and academic achievement.

This study presents a model integrating these notions of control into a theoretical framework and a model of action and personality. This model is congruent with and builds upon Rotter’s original conception of the locus of control. The paper also introduces a new locus of control instrument, which is then used to investigate the relationship between locus of control (as defined by the action model), academic achievement, and motivation across three different types of school.

The early work with the construct locus of control relied on unidimensional notions and instruments, which dichotomised the construct and divided the world into externals and internals, typically equating internal with good and external with bad. This was particularly striking in studies that investigated cognitive activity (such as memory, attention, etc.), where externals seemed to be deficient compared to internals (Lefcourt, 1982). Some time ago researchers began to suggest that unidimensional conceptualisations of locus of control are inappropriate (Krampen, 1985; Levenson, 1981), as equating internality with health and externality with pathology reflects an overly simplistic view of the construct (Krampen, 1991; Krampen, von Eye, & Brandtstaedter, 1987; Krampen & Wieberg, 1981; Levenson, 1981). Rather, both extremes (extreme internality as well as extreme externality) are associated with a loss of reality (Krampen, 1985).

Rotter’s work has been extended significantly by Krampen who integrated the construct of locus of control into his action-theoretical model of personality (AMP; see Figure 1). The AMP aims to link personality variables systematically to situational variables (Krampen, 1988). It occupies the middle ground between those action theories on one hand which aim to predict and describe behaviour in specific situations only (with little regard for enduring personality variables and personality theories), and those on the other hand that are concerned with the description of relatively stable personality constructs without attempting to link specific experiences to the development of these enduring orientations.

The AMP is an action-theoretical model of personality, because it describes personality development as a process of generalisation of situation-specific experiences over time and indicates how personality variables and person variables determine action in given situations or domains. It attempts to offer a functional perspective, which connects interactionist ideas with the possibility of making statements about the relative descriptive and predictive value of generalised personality variables and situation-specific person variables. Hence the AMP implies ways of measuring for diagnostic and scientific purposes. Depending on the kind and the differentiation of the situation structure, situation-specific, domain-specific, or generalised construct operationalisations are indicated.

Within the AMP, there are a number of factors that are predicted to mediate the relationship between locus of control and academic achievement. Personal variables including age, sex, reading ability, and culture/ethnicity can differentially affect outcomes (Stipec & Weisz, 1981), as do some aspects of the instructional environment (Lefcourt, 1982). In addition, some argue that academic achievement
Figure 1. Action-theoretical partial model of personality (AMP; Krampen, 1988)
and locus of control are related indirectly, mediated by motivation/motivated
behaviour such as task completion, participation, and engagement (Finn & Rock,

Previous research has shown that the instructional environment mediates the
relationship between locus of control and achievement. Internals generally report
greater satisfaction with schooling than externals. Externals prefer high discipline
conditions (Parent, Forward, Canter, & Mohling, 1975) and more structured educa-
tional settings (Trice, 1980). Skinner, Wellborn, and Connell (1990) found that
pupil perceptions of both teacher involvement and contingency affected measures of
engagement in pupils. Boggiano, Main, and Katz (1988) found that in the absence
of evaluative pressure there were no differences in the motivation of children with
high and low perceptions of control. Krampen (1987) found that different kinds of
teacher feedback (social, individual, and factual) affected performance outcome and
altered locus of control orientation in schoolchildren. Individual (non-comparative)
feedback was the most beneficial for children both in terms of achievement
outcomes and in changes of locus of control orientations in the direction of
increased internality. In all, there are relatively few studies investigating the
interaction between locus of control and the environment using a multidimensional
measure of locus of control, and little of the above research is integrated into a
coherent theoretical framework.

Generally, much more is known about the effect of environments on the
development of locus of control. Little is known about the possible moderating
effects of environment on the relationship between locus of control and action,
specifically academic achievement and related behaviours. The AMP suggests that
both processes are linked (Krampen, 1988).

Environments that allow people to develop appropriate situation-specific locus of
control orientations foster adaptive behaviour in a given situation as well as the
development of generalised internality, or locus of control configurations adaptive in
a given society. Other person variables such as the ability to discriminate and classify
environmental cues appropriately are likely also to influence this process. One
reason for the strong association between generalised locus of control and achieve-
ment could be that the same person variables which foster adaptive development
and appropriate behaviour in specific situations are also predictive of academic
achievement. Some of these are essential cognitive skills, such as the ability to
discriminate and classify.

Measures of generalised personality constructs are better predictors of behaviour
in novel or unstructured situations, while domain- or situation-specific measures are
better predictors of behaviour in well known or structurable situations. Central
variables of the AMP (other than locus of control and competency beliefs) include
level of conceptualisation, which is subjective knowledge about the dynamics of
situations and is related to intelligence and problem-solving competence, and value
orientations, which are measures of the relative importance or value of outcomes and
consequences, similar to Rotter’s “need value.” In the AMP model such value
orientations not only refer to terminal values, but also emotionally, socially, and
culturally mediated valuations. According to Krampen all the above variables play a part in determining a person’s behaviour in a given situation.

In accordance with field–theoretical conceptualisations (Lewin, 1952; Rotter, 1954), personality and environment are expected to interact in determining outcomes in terms of academic achievement and related behaviours such as motivated behaviour in the classroom. In addition it is expected that generalised locus of control is most predictive of behaviour in novel, less structurable (weak) situations, and domain- or situation-specific locus of control is more predictable in well-known or structurable (strong) situations. Research in domains other than academic achievement have confirmed this expectation (Sarafino, 1994). One would therefore expect that generalised locus of control should not be predictive of behaviour in the latter years of secondary schools, because by that time students have had a number of years’ experience with schools. In addition there should be sufficient collective experiences and representations about schools within a given society for social norms and so on to exist.

Contrary to theoretical expectations, and in contrast with findings in other domains, the research literature has shown consistently that generalised locus of control is predictive of academic achievement and related behaviours (Kalechstein & Nowicki, 1997) and no effective domain-specific locus of control instruments have been developed. A possible explanation is that most of the previous research has used unidimensional measures of locus of control, neglected the role of environment, and was not based on a theoretical model of personality and action. Alternatively it is possible that Walberg’s suggestion that academic achievement is multiply determined (Walberg, 1981; Walberg, Fraser, & Welch, 1986) means that generalised measures of locus of control should be expected to predict behaviour in academic contexts.

The aim of the current study was to investigate the relationship between generalised locus of control and academic achievement and related behaviour within an action–theoretical model in three different types of school. This involved using a new multidimensional measure of generalised locus of control in several schools that differed on dimensions of the environment likely to interact differentially with locus of control to predict outcomes. It is hypothesised that the results will show:

1. A relationship between locus of control and academic achievement and related motivated behaviours.
2. This relationship will be stronger in a less structured and competitive school environment.
3. Overall, neither extreme levels of internality or self-efficacy, nor extreme levels of externality will be associated with best outcomes – rather, realistic (moderate) locus of control and competency beliefs will be associated with the highest levels of motivated behaviour.

**Method**

The participants were Year 12 students (age 16/17) from four classes in each of three Auckland secondary schools. In all 215 largely “Pakeha” (of European
descent) students participated; 121 were female and 94 were male. They were selected from three schools which were deemed by expert judges to differ on the dimensions of structure, co-operativeness, and competitiveness.

Sample Selection Process

A list of all Auckland secondary schools was compiled. From this list schools that were extreme in terms of decile ranking (in New Zealand decile rankings are an indicator of the socio-economic status of a school; 9–10 = high, 1–2 = low) were eliminated, as were single-sex schools. Lists of the remaining schools were given to three expert judges, all of whom were senior academics and/or previously school principals, who were very familiar with Auckland secondary schools. They were asked to make judgements about each school and rate them on the dimensions of structure, competitiveness, and co-operativeness. Structure was defined as the salience/presence of rules and regulations, competitiveness as concerned with the salience of normative evaluations (such as streaming), and co-operativeness as relating to the emphasis on group work and positive peer interactions. These judgements were used to identify two extreme schools and one moderate, or non-extreme, school.

School 3 was judged to be high on structure and competition, and low on co-operation, by all three judges. School 2 was judged to be low on structure and competition, and high on co-operation, by all three judges. School 1 was considered neutral and not extreme on any of the above dimensions (it was not consistently selected by any of the judges as high or low on any of the above dimensions). Schools 1 and 2 were large urban schools (with 1,508 and 2,026 students respectively) with a decile ranking of 5. School 2 was smaller (802 students) and had a decile ranking of 7.

The principal of each school nominated four classes to participate in this study. The selected samples from the three schools were comparable in terms of ethnic composition. The sample from School 1 had significantly more girls than boys than the samples of the other two schools (65% of the total sample from this school compared to 51% and 54% of the sample from Schools 2 and 3 respectively).

Measures

There were five measures, which will be described in detail in this section.

Locus of control measure. The English version of the FKK (Fragebogen zu Kompetenz- und Kontrollüberzeugungen; Krampen, 1991) was used – the I-SEE

This instrument was developed by Krampen (1991) in German in 1991, by translating Levenson’s IPC scales (Levenson, 1981) into German and changing all items into less culturally-dependent statements. Further, a fourth scale measuring “self-concept of own ability” was added. Thus, the FKK consists of four primary
scales each with eight items assessed on a six-point Likert-type scale ranging from “not at all true” to “very true”: FKK–SK, self-concept of own ability (items 4, 8, 12, 16, 20, 24, 28, and 32); FKK–I, internality (items 1, 5, 6, 11, 23, 25, 27, and 30); FKK–P, social externality (items 3, 10, 14, 17, 19, 22, 26, and 29); and FKK–C, fatalistic externality (items 2, 7, 9, 13, 15, 18, 21, and 31). The minimum and maximum scores for each scale are 8 and 48 respectively, a high score indicating high levels of competency and control beliefs.

The FKK was normed on German 14–17-year-olds ($n = 248$) as well as adults ($n = 2028$), and has proved reliable in a number of studies (Krampen, 1991). Cronbach alphas for the largest of those studies ($n = 2028$) were: .76 for the competency belief sub-scale (FKK–SK); .70 for the internality sub-scale (FKK–I); .73 for the powerful others sub-scale (FKK–P); and .75 for the chance sub-scale (FKK–C). The corresponding test–retest reliabilities of the sub-scales were established in a different study ($n = 127$, interval 3 months): .75, .72, .68, and .84. The mean scores on the four primary sub-scales for the adult sample were FKK–SK 31.9, FKK–I 32.4, FKK–P 26.1, and FKK–C 26.8, and the teenage sample’s mean scores were 29.8, 32.2, 28.3, and 26.5 respectively.

Statistically significant intercorrelations between the primary scales in the theoretically expected directions support the formation of the secondary scales (SKI and PC). These secondary scales are derived by combining two primary sub-scales. The SK scale (competency belief) together with the internality scale (I) give a measure of self-efficacy (SKI). A combination of the two externality scales (C and P) gives a measure of overall externality (PC).

The FKK was translated into English by the backtranslation method. All of the items which were clearly straight translations of Levenson’s original items reverted to the original items. Therefore in the end 12 of the 32 items are Levenson’s original items (items 2, 3, 6, 7, 9, 14, 19, 23, 25, 27, 29, and 30). Estimates of reliability for the I-SEE sub-scales (coefficient alphas) for the total sample in the current study are as follows: I-SEE I (internality) = .62; I-SEE SK (self-concept) = .73; I-SEE P (powerful other) = .74; and I-SEE C (chance) = .70. For an extensive discussion of the I-SEE and the AMP, particularly in relation to developmental issues, see Greve, Anderson, and Krampen (2001).

Measures of motivation. In order to validly and reliably measure students’ motivated behaviour in the classroom three different measures were used: a self-report measure; a teacher rating; and a quantitative measure of task completion. The self-report scale was the 10-item involvement scale (CES–I) of the Classroom Environment Scales (Trickett & Moos, 1974), which measures the “extent to which students are attentive and interested in class activities, participate in discussions, and do additional work on their own.” (p. 2). This scale was adapted by changing statements into “I” statements, to obtain a self-report measure of engagement or motivated classroom behaviour (e.g., “I put a lot of energy into what I do here”; “I seem to be only half awake during this class”). The estimate of reliability
for this adapted CES–I scale (coefficient alpha) for the total sample in the current study was .72.

Teachers were asked to rate the level of participation of each student on a scale from 1 to 7 (1 = this student always participates actively, with relevant contributions, and 7 = this student never participates at all and seems disinterested).

A measure of task completion was obtained by working out the proportion of Year 12 English assignments the student had completed at the time of testing as a percentage of the number of assignments he/she should have completed at that time.

Measure of academic achievement. The fifth measure employed in this study was the School Certificate English results from the previous year, obtained from the school records. In New Zealand the School Certificate is a national, norm-referenced examination-based measure of achievement at the end of Year 11.

Additional information sought included socio-demographic variables (age, gender, and ethnicity).

Data Analysis

For each scale and sub-scale descriptive data were calculated (means, standard deviations, and coefficient alphas). Structural equation models were used (AMOS; Arbuckle, 1995). The RMSEA index of goodness of fit was used in this study as it is not influenced by the size of the sample, has a theoretically known distribution, and is regarded as the most effective measure to assess the quality of fit of the model to the data. Browne and Cudeck (1992) have commented that a RMSEA value of .05 or less is indicative of a close fit of the model, and that a RMSEA value of .08 or less indicates a reasonable error of approximation.

Means and standard deviations of measures of locus of control, measures of motivated behaviour, and previous School Certificate results were calculated. These were examined for statistical significance by carrying out multivariate analyses of variance (MANOVA) for class within school, sex by class within school, sex by school, school, and sex. MANOVA was used to allow for intercorrelations between dependent variables, thus increasing the power of the study. Where there were statistically significant MANOVA results, then univariate ANOVAs were used to ascertain the scales contributing most to the overall differences.

A K-means cluster analysis was carried out on the primary locus of control scale scores (I-SEE) to identify locus of control groupings (e.g., high I/E, low I/E, high I/low E, and low I/high E) in the sample in order to analysing it for person–environment interactions. K-means cluster analysis was used in this instance because of the relatively large number of cases to be grouped (n = 215; K-means cluster analysis is the recommended method when there are in excess of 200 cases; Coakes & Steed, 1999).
Discrepancy analyses were carried out in order to determine if there were any statistically significant differences in the distribution of locus of control cluster-members between classrooms and schools. An ANOVA was carried out for between-group differences in previous School Certificate results for school, I-SEE cluster, and school by I-SEE cluster.

Results

Reliability and Validity of Measurement Instruments

Figure 2 represents the path diagrams for the I-SEE locus of control scales used in this study (as estimated in AMOS), giving the standardised factor loadings for all items within scales and for all sub-scales. All correlations between sub-scales of the I-SEE scales are as expected, with strong positive correlations between the I-SEE I and the I-SEE SK scales, supporting the formation of the secondary scale of self-efficacy (I-SEE SKI), and a strong positive correlation between the I-SEE C and the I-SEE P scales, supporting the formation of the secondary scale of combined externality (I-SEE PC). The correlations between the I-SEE I and SK on one hand, and the I-SEE P and C scales on the other, are negative, as expected. The $\chi^2$ is 968.82, $df = 458$, and the RMSEA is .072, which is a reasonable fit.

Table 1 provides the means and standard deviations of scores on the major scales obtained by the sample as a whole and the estimates of reliability (coefficient alphas). All scales and sub-scales are sufficiently reliable to be included in further analyses.

Description of Sample in Terms of Locus of Control

A MANOVA showed that there were no statistically significant differences between groups in the current sample in levels of locus of control across schools, classes, and sex in the I-SEE primary scales (I-SEE SKI and I-SEE PC) or in the I-SEE secondary scales (I-SEE SKI and I-SEE PC). There were also no statistically significant interaction effects.

Description of Sample in Terms of Previous Academic Achievement

There were statistically significant differences between groups in terms of previous School Certificate results: between schools ($F[2,166] = 6.56$, $p < .005$), between classes within schools ($F[9,166] = 10.97$, $p < .001$), between sexes ($F[1,166] = 33.28$, $p < .001$), and between sexes within classes ($F[9,166] = 3.81$, $p < .001$). Table 2 shows that overall girls achieve higher scores in their School Certificate English results than boys, and that students in Schools 1 and 3 obtain higher scores in their School Certificate English results than students in School 2.
Measures of Motivated Behaviour

The three measures of motivated behaviour were CES–I (self-reported engagement), participation (teacher rating), and task completion. Table 3 shows that Schools 1 and 2 have higher levels of CES–I than School 3; schools 1 and 2 have higher levels
of task completion than School 3; and School 1 has higher levels of participation than Schools 2 and 3. There were statistically significant differences between groups in levels of motivation, both between classes within schools (Wilks $\lambda = 0.606$, $F[27,523] = 3.62$, $p < .001$) and between schools (Wilks $\lambda = 0.844$, $F[6,358] = 5.28$, $p < .001$). Univariate analysis of variance showed that classes within schools differed on levels of CES–I ($F[9,181] = 2.92$, $p < .005$), levels of participation ($F[9,181] = 5.36$, $p < .001$), and task completion ($F[9,181] = 3.11$, $p < .005$). There was also a significant main effect between schools for all measures of motivation: CES–I ($F[2,181] = 3.36$, $p < .05$), task completion ($F[2,181] = 13.93$, $p < .001$), and participation ($F[2,181] = 3.14$, $p < .05$). In order to investigate further the relationship between these measures of motivation and locus of control the sample was grouped by I-SEE configuration.

**Person–Environment Interactions**

According to the field–theoretical roots of the construct of locus of control and the AMP in which the I-SEE is integrated, both development and action are the result of person–environment interactions. In order to investigate the utility of the I-SEE to investigate such questions, a series of analyses were carried out. The purpose of these analyses was to identify interaction effects of locus of control and school environments in relation to motivated behaviour and development.

**Table 1. Description of I-SEE scales**

<table>
<thead>
<tr>
<th>Scale</th>
<th>Items</th>
<th>Mean</th>
<th>SD</th>
<th>$\alpha$</th>
</tr>
</thead>
<tbody>
<tr>
<td>I-SEE internality</td>
<td>8</td>
<td>34.30</td>
<td>5.52</td>
<td>.62</td>
</tr>
<tr>
<td>I-SEE self-concept</td>
<td>8</td>
<td>31.56</td>
<td>6.32</td>
<td>.73</td>
</tr>
<tr>
<td>I-SEE powerful other</td>
<td>8</td>
<td>23.50</td>
<td>6.66</td>
<td>.74</td>
</tr>
<tr>
<td>I-SEE Ccance</td>
<td>8</td>
<td>23.73</td>
<td>6.48</td>
<td>.70</td>
</tr>
<tr>
<td>I-SEE PC$^1$</td>
<td>16</td>
<td>47.2</td>
<td>11.52</td>
<td>.79</td>
</tr>
<tr>
<td>I-SEE ISK$^2$ (self-efficacy)</td>
<td>16</td>
<td>65.9</td>
<td>10.11</td>
<td>.77</td>
</tr>
</tbody>
</table>

$^1$This scale combines the I-SEE internality scale and the I-SEE self-concept scale
$^2$This scale combines the I-SEE powerful other scale and the I-SEE chance scale

**Table 2. Means and standard deviations for previous School Certificate results**

<table>
<thead>
<tr>
<th>School</th>
<th>Girls Mean</th>
<th>Boys Mean</th>
<th>All Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SD</td>
<td></td>
<td>SD</td>
</tr>
<tr>
<td>1</td>
<td>63.61</td>
<td>17.80</td>
<td>55.29</td>
</tr>
<tr>
<td>2</td>
<td>58.43</td>
<td>15.18</td>
<td>45.93</td>
</tr>
<tr>
<td>3</td>
<td>62.44</td>
<td>15.89</td>
<td>55.00</td>
</tr>
<tr>
<td>All schools</td>
<td>61.66</td>
<td>16.35</td>
<td>51.81</td>
</tr>
</tbody>
</table>
The sample was grouped by I-SEE configuration via a K-means cluster analysis for the primary scales of the I-SEE scales. A small number of individual subjects ($n = 3$) with extreme high externality/low internality configuration (in relation to the norm, here the mean scores of the total sample overall) were not included in this analysis. A four-cluster solution provided good fit to the data and can be described in relation to the mean scores of the total sample in a $2 \times 2$ grid:

An ANOVA showed that the between-cluster differences on I-SEE scores are statistically significant for I-SEE I ($F[2,206] = 7.017, p < .005$), I-SEE C ($F[2,206] = 114.549, p < .001$), I-SEE P ($F[2,206] = 109.313, p < .001$), and I-SEE SK ($F[2,206] = 67.602, p < .001$). Table 4 shows the means and standard deviations of I-SEE scores for the final I-SEE clusters.

A discrepancy analysis was carried out by cross-tabulation of school/class and I-SEE cluster. There were statistically significant discrepancies between observed and expected frequencies in the distribution of students by locus of control profiles among schools and classrooms ($\chi^2 = 33.92$, $df = 22$, which is significant at $p < .05$). Two classes in School 2 had significantly more external students than would be expected (critical ratios = 6.16 and 6.50 for the external cluster in the two classes respectively; any $z$ score $> 3.84$ is significant at $p < .01$).

**Motivated Behaviour by I-SEE Cluster by School**

There were statistically significant differences in measures of motivation by school ($\text{Wilks } \lambda = .799, F[6,376] = 7.243, p < .001$), by I-SEE cluster membership (Wilks
\( \lambda = 0.916, F[6,376] = 2.793, p < .05 \) and by school \( \times \) I-SEE cluster (Wilks \( \lambda = 0.900, F[12,376] = 1.686, p < .10 \). Univariate analysis of variance showed that schools differed significantly on measures of participation (\( F[2,199] = 4.307, p < .05 \)) and task completion (\( F[2,199] = 20.588, p < .001 \)). I-SEE clusters differed significantly on measures of task completion (\( F[2,199] = 3.481, p < .05 \)) and CES engagement (\( F[2,199] = 3.489, p < .05 \)). There is a weaker interaction effect for task completion (\( F[4,199] = 2.328, p = .058 \)) and participation (\( F[4,199] = 2.194, p = .071 \)).

Figures 3 and 4 show the means for measures of motivation (task completion and levels of participation) by school and I-SEE cluster membership. In task completion, the schools vary in the extent to which there are between-I-SEE cluster differences, with School 1 (neutral) having consistently high levels of task completion for all cluster groups, School 2 (low structure) showing some degree of between-I-SEE cluster variability, and School 3 (high structure) showing large between-I-SEE cluster variability for task completion (range 64.62–85.83%). In School 2 the external I-SEE cluster has the highest levels of task completion, and in School 3 it is the balanced I-SEE cluster which has the highest levels of task completion.

For participation it is again School 3 which has the greatest between-I-SEE cluster variability. Schools 1 and 2 have similar levels of variability between I-SEE clusters, but in School 1 it is the balanced group which has the lowest level of participation, while in School 2 it is the internal cluster which has the lowest levels of participation. In School 3 the balanced cluster has the highest, and the external cluster the lowest levels of participation.

Within this study a measure of academic achievement was obtained: School Certificate results in English. The cumulative effect of experiences in one particular school in interaction with a generalised measure of personality (here locus of control) might be reflected in such performance measures, which are the result of behaviour and action across a larger time-frame and in a number of contexts. Therefore an ANOVA was carried out to test for statistically significant between-group effects and possible interaction effects for School Certificate results (by I-SEE cluster and school). There are statistically significant main effects for school

| Table 4. Means and standard deviations of I-SEE scores for final I-SEE clusters |
|-----------------------------|-------------|-------------|-------------|-----------------------------|
| Cluster                     | Mean (SD)   | Mean (SD)   | Mean (SD)   | Overall (n = 209)           |
| 2 (n = 59)          | 3 (n = 107) | 4 (n = 43)  |             |                            |
| External             | I-SEE I    | 33.37 (3.91)| 34.22 (5.44)| 36.98 (5.03) | 34.55 (5.11) |
| Balanced            | I-SEE SK   | 27.31 (4.31)| 22.93 (4.70)| 38.47 (4.76) | 31.80 (6.14) |
| Internal            | I-SEE C    | 29.98 (4.17)| 22.60 (4.48)| 17.02 (4.35) | 23.54 (6.32) |
| Overall (n = 209)  | I-SEE P    | 29.34 (4.74)| 22.93 (4.70)| 15.91 (3.82) | 23.30 (6.49) |
(F[2,166] = 3.83, p < .05) and I-SEE cluster (F[2,166] = 3.268, p < .05) but no interaction effects.

Table 5 shows the means and standard deviations for School Certificate English results for the I-SEE clusters. The “average” cluster has the highest levels of School Certificate results, closely followed by the internal cluster.

**Discussion and Conclusion**

The aim of the current study was to investigate the relationship between generalised locus of control and academic achievement and related behaviour within an action-theoretical model in three different types of school. Concurrently the reliability and validity of a novel multidimensional measure of generalised locus of control (I-SEE) were assessed. The results showed that this instrument is of sufficient reliability.

The results reported here confirm that locus of control is a multidimensional construct – people can be high on both internality and externality. The cluster analysis illustrates this with a high internality/externality cluster, and a low internality/externality cluster. This shows that low externality, for example, is not automatically associated with high internality and self-efficacy, as unidimensional conceptualisa-

<table>
<thead>
<tr>
<th>I-SEE cluster</th>
<th>School Certificate Mean</th>
<th>SD</th>
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<tbody>
<tr>
<td>2: External</td>
<td>51.60</td>
<td>15.70</td>
</tr>
<tr>
<td>3: Average</td>
<td>60.52</td>
<td>15.61</td>
</tr>
<tr>
<td>4: Internal</td>
<td>57.91</td>
<td>16.21</td>
</tr>
<tr>
<td>Total</td>
<td>57.41</td>
<td>16.13</td>
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tions would suggest. In addition, although internality (I) and self-concept of own ability (SK) co-vary, the three clusters are distinguished more by variations in levels of SK and externality (P and C) than levels of I. The range of scores on the I scale between the three clusters is only 33.37–36.98, whereas the ranges of the other measures are much wider (SK: 27.31–38.47; C: 29.98–17.02; and P: 29.34–15.91). This gives strength to the argument that the SK scale is a useful addition in this instrument.

It is also apparent that the different measures of motivated behaviour differ in the extent to which they are influenced by environment or personality. The self-report measure of CES engagement was most dependent on I-SEE cluster membership; there were no significant between-school differences on this measure. The teacher rating (participation) was largely a function of school (no significant between-I-SEE cluster differences). Task completion was influenced by both personality and school. There might be school-wide policies on homework completion. At the same time task completion depends on behaviours and environmental factors outside of school. Participation also showed a weak interaction effect. This suggests that the findings of investigations into the influence of personality and environment on motivation might differ depending on how motivation is assessed. These results illustrate some of the complexities of investigating motivation and academic achievement.

This study confirms previous findings in the literature that there is a relationship between locus of control and academic achievement. This multidimensional measure suggests, however, that high externality might have a detrimental effect on academic achievement, rather than high internality having a beneficial effect. In addition Krampen’s (1985) expectation, that non-extreme control orientations might be associated with more realistic expectations and hence more adaptive outcomes, is supported by the findings reported here.

Figure 4. Levels of participation for I-SEE clusters by school
In New Zealand, as elsewhere, boys tend to achieve significantly less well than girls, particularly in English (Borg, Falzon, & Sammut, 1995; Fergusson & Horwood, 1997). This is confirmed by the data reported here: boys had significantly lower achievement levels in English than girls, in terms of School Certificate English. There were no statistically significant sex differences in this dataset in motivation or locus of control scores. There were also no interaction effects between sex and either school, or class within school, in relation to any of these measures. It is not levels of control that account for these differences. These findings are congruent with the literature. Kalechstein and Nowicki (1997), in a meta-analytic review, concluded that on the whole there are no sex differences in locus of control, nor are there sex differences in the relationship between locus of control and achievement at secondary school age.

The schools were selected to maximise the likelihood of sampling diverse environments. The three schools differed, according to expert judges, on the dimensions of structure, competitiveness, and co-operation. School 3 was judged to be the most structured and competitive, and least co-operative, and School 2 the least structured and competitive, and most co-operative. School 1 was judged to be somewhere in between Schools 2 and 3 on all dimensions.

The between-school differences in School Certificate English results provide evidence for school-wide variables. School 1 has significantly higher School Certificate results than School 2. School 1 also has the highest levels of motivated behaviour of all three schools, lending support to the contention that a sufficiently structured (rather than extreme) environment is most likely to foster adaptive behaviour and development. Such a small sample, however, mitigates against any strong conclusions.

Even though pupils at School 3 are comparable in terms of ability (previous School Certificate English) to pupils in School 1, pupils in School 3 exhibit lower levels of motivation than pupils in School 1. The non-extreme school judged to have medium levels of structure, competitiveness, and co-operation was associated with higher levels of motivation and achievement than the other schools. These findings suggest that school type may have a direct influence on classroom behaviour.

The theoretical expectation was that generalised locus of control should have a greater impact on classroom behaviour in relatively unstructured (novel/unpredictable) schools (Krampen, 1988, 1991). In such schools externals would be expected to be disadvantaged and evidence less adaptive behaviour. Alternatively, in schools where the high structure is associated with a high degree of perceived external control (strong extrinsic incentives to perform, perceived as controlling), internals might be disadvantaged. The ideal environment should be one that is sufficiently structured to be predictable, but not so structured as to limit action alternatives unduly (Krampen, 1991). In this study, a weak interaction effect between school and locus of control in determining motivated behaviour in the classroom does not support the expectation that locus of control in a less structured school should be more predictive of behaviour and that such a setting should be preferred by internals. The school judged to be highly structured (School 3) was associated with
the largest between-group differences in motivated behaviour by locus of control cluster. In addition, for participation (the most immediate measure here of classroom behaviour) externals had the lowest levels at School 3, compared to the other two locus of control clusters at this school, as well as in comparison to externals at the other two schools. That is, at School 3 members of the external locus of control cluster were likely to participate less than members of the other locus of control clusters as well as other externals in other schools. There was no difference between Schools 1 and 2 in terms of between-group differences in levels of participation by locus of control.

There is support for the negative effect of external control and a competitive environment on motivation in locus of control internals. Internals in School 3 had the lowest levels of task completion, both compared to members of the other locus of control clusters in their school and compared to other internals in the other two schools. One reason why School 3 was judged as highly structured could be because of tight and controlling homework policies. The factors considered to represent structure might not be factors that make action–outcome relationships more predictable for students. Furthermore, the highly structured school was also judged to be the most competitive school. In an environment where normative evaluations are salient, outcomes are not solely dependent on the students’ own behaviour, and hence less predictable. Interestingly, for task completion it is School 1 which is associated with both the highest levels of task completion overall and practically no between-group differences by locus of control cluster in measures of task completion. This strengthens the argument that some degree of structure is beneficial. School 1 might have elements of structure that make outcomes predictable, or is structured in such a way as to be predictable enough without limiting action alternatives unduly.

The results presented here have important implications for research and practice. The significant school-level differences in environment, and the significant school-level effects in terms of locus of control, motivated behaviour, and achievement mean that the effects of interventions, or other classroom-level research across several schools, need to be interpreted with caution. School-level effects could interfere with the efficacy of interventions, or compromise change at the classroom level. The results reported here also suggest that environmental interventions can override personality attributes that might disadvantage some students. On the whole, environmental variables had a more powerful effect on academic achievement and related behaviour than personality (here locus of control) did. Furthermore, some school environments eliminate between-group differences on those measures by personality type. These findings suggest that it is better to direct energy and effort at environmental interventions, to create school environments that foster achievement and motivation for all and minimise between-group differences in achievement and related behaviours, than attempt to change students’ control orientations. Future research should look to identify the ideal school environment to foster motivation, achievement, and the development of adaptive personality orientations. The AMP could be useful in guiding such research.
References


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