

# **Student Quality of School Life - A Multilevel Analysis**

**Carl Leonard, Sid Bourke, and Neville Schofield**

**The University of Newcastle, Australia**

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## *Abstract*

***This paper presents the results of a study incorporating a multilevel analysis of the impact of a stress management, a self-development and a relaxation technique on student quality of school life differences between four primary schools and four classes within each of these schools, in the Lower Hunter Valley, NSW. The Quality of School Life scales (Ainley & Bourke, 1992) were administered to 448 Year 5 and 6 students in the last weeks of Terms 2 and 3 in 2000. A causal model linking all components, namely the student and teacher background information, the general QSL scales, the specific QSL scales, and student absence was hypothesised and developed for testing.***

***Results indicated that student perception of the quality of their school life in Term 2, student absence in Term 3, and to a lesser extent Term 2, provided the bulk of the explanation of variance in student quality of school life in Term 3. At the classroom level, student quality of school life in Term 3 was significantly related to class streaming, teacher years teaching, and Term 3 teacher absence. At the school level, significant school differences were evident for various aspects of quality of school life, and absence. Possible explanations of these relationships are discussed, while implications including the apparent importance of positive peer relationships and an exciting and enjoyable curriculum in ensuring students have a high quality of school life are described.***

For further information about this study, contact:

Carl Leonard, email: [edcarl@cc.newcastle.edu.au](mailto:edcarl@cc.newcastle.edu.au)

## 1. The Model to be Analysed

This paper presents the results of a study incorporating a multilevel analysis of the impact of a stress management, a self-development and a relaxation technique on student quality school life differences between four primary schools and four classes within each of these schools in the Lower Hunter Valley, NSW. The Quality of School Life (QSL) scales (Ainley & Bourke, 1992) were administered to 448 Year 5 and 6 students in the last weeks of Terms 2 and 3 in 2000. Three separate interventions were implemented in the intervening period with one of the four classes at each school implementing one of the three interventions, and the fourth class acting as the control group. The three interventions, implemented over the period of ten weeks, were as follows:

1. A sequence of ten lessons aimed at improving students' communication and interaction skills adapted by the researcher from the Dutch program called "Action-Reaction" developed by Freerk Ykema (Woltring & Ykema, 1999).
2. The use of Progressive Relaxation, Breathing and Imagination as stress reduction techniques (Davis, Eshelman and McKay, 1995).
3. The strategic use of background / mood music selected by the researcher to promote an appropriate working environment and minimize stress and disruption at transition periods during the day such as before school, after recess and after lunch (*Background Music*).

A causal model linking all components, namely the student and teacher background information, the general QSL scales, the specific QSL scales and student absence was hypothesised and developed for testing. The potential intervening role of student absence in this model was encompassed in the research questions. The multilevel regression program MLwiN (Rasbash, Browne, Healy, Cameron, & Charlton, 2000) was used to recognise the structure of the data to be analysed. However, student quality of school life provided the third, and, with regard to the overall intent of the study, the most important stage in the hypothesised model of student and teacher factors affecting student quality of school life. This paper reports the analysis of this model, description of the multilevel path model identified, and technical considerations of the analysis undertaken. The research questions are stated below:

- a. *Which, if any, student and teacher variables impact on student absenteeism?*
- b. *Which, if any, student and teacher variables impact on student quality of school life?*

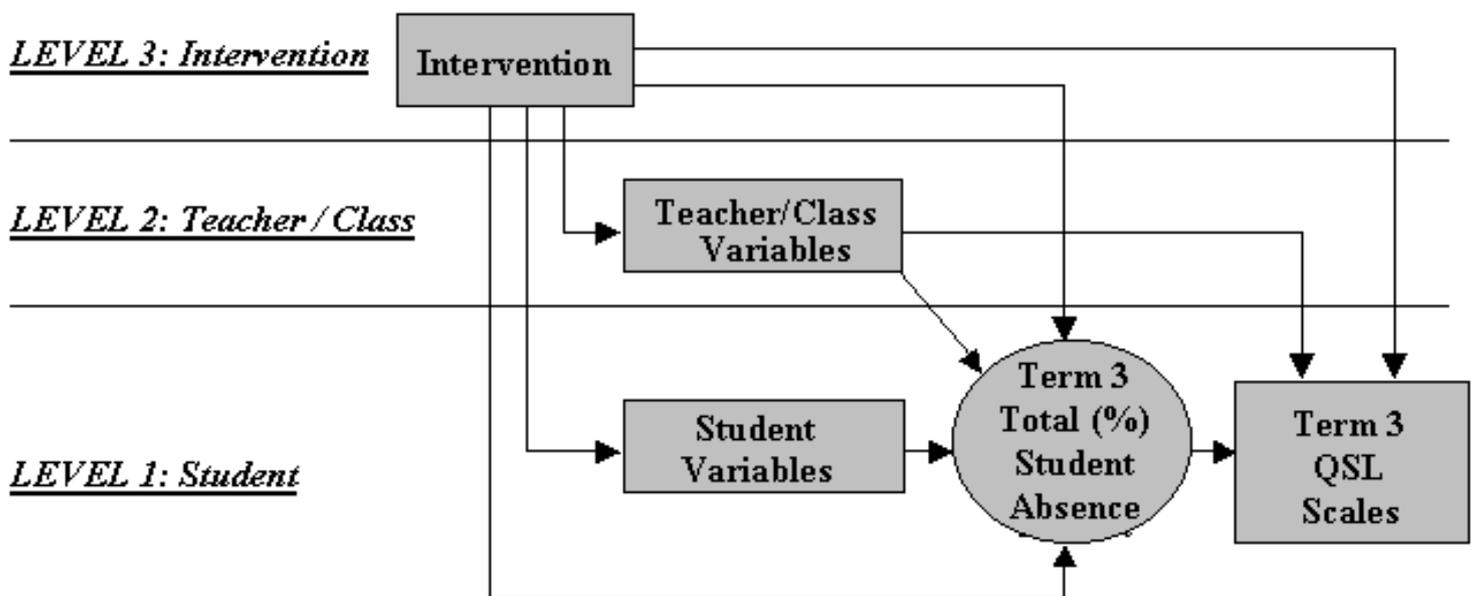
Students learn in classes and classes operate within schools. Thus there is a degree of dependence in data collected from students in the same class or at the same school. Students in the present study were also further grouped according to the nature of the intervention undertaken or as part of the control group. To recognise this lack of independence and to maximise the value of the data collected it was important to consider the system in which students were operating when attempting to establish which student, teacher, class, and intervention factors impacted on student quality of school life and student absence.

Multilevel modeling allows the analysis of individuals as members of groups, such as students in classes and/or schools using powerful statistical techniques (Rasbash & Woodhouse, 1995). A three level hierarchy was developed with students assigned to level 1, classes (and teachers) to level 2, and intervention to level 3. By performing an analysis of

the data using the hierarchical structure it was anticipated that a better understanding would be provided of how various student, teacher, class, school, and intervention characteristics were operating with regard to student absence and quality of school life in Term 3.

School was incorporated in the hierarchy as a level three dummy variable; however, the emphasis was on assessing the impact of the interventions. It was not practicable to introduce a cross-classified model incorporating both intervention and school at level 3, owing to each intervention being used with only one level 2 variable (class) at each of the four schools.

The model hypothesised that student and teacher variables were causally related to the Term 3 general QSL scales: General Satisfaction and Negative Affect, and the specific Term 3 QSL scales: Teacher, Opportunity, Achievement, Social Integration, and Adventure. It was also hypothesised that some of the student and teacher variables would be causally related to the student absence variable of Term 3 Total (%), hence a three-stage model was developed in which Term 3 Total (%) student absence and the Term 3 general and specific QSL scales were potentially influenced by all prior variables. A schematic representation of the model to be tested is presented in Figure 8.1.



**Figure 1 Schematic Diagram of the Model to be Tested**

The pattern of causation moves from left to right meaning that all variables to the left of the Term 3 QSL scales were hypothesised to be causally related to these scales. Hence, student and teacher variables may be directly related to any, or all, of the Term 3 QSL scales or indirectly related to the Term QSL scales through Term 3 Total (%) student absence which provides an intervening stage in the model.

With regard to the positioning of student absence and the QSL scales in the model, whilst some debate is still evident in the literature regarding the pattern of causation between student quality of school life and absence, in the current study, student absences in Term 3 were occurring during the intervention phase, while the Term 3 QSL instrument was a post-

intervention measure. Hence it was hypothesised that higher student absence led to lower QSL scores in this case.

## 2. Preparing for the Analysis

The data set to be analysed consisted of variables at three levels:

### *Level 1 - Student Level (N=448)*

- Student background variables - Year, Gender, and Term 2 Total (%) absence.
- Term 2 QSL scales - General Satisfaction, Negative Affect, Teacher, Opportunity, Achievement, Social Integration, and Adventure.
- Outcome variables - Term 3 Total (%) absence and the Term 3 QSL scales - General Satisfaction, Negative Affect, Teacher, Opportunity, Achievement, Social Integration, and Adventure.

### *Level 2 - Class Level (N=16)*

- Teacher background variables - Gender, Employment Status, Years at Current School, Years Teaching, Position, weekly Teaching Load, Class Composition, Class Streaming, Qualifications, perceived level of stress over the three months prior to the study, Term 2 TTotal (%) absence, and Term 3 TTotal (%) absence.
- Term 2 Teacher Stress scales - Conflict, Students and Physical Conditions, Time Pressures, Rewards and Recognition. The Term 3 Teacher Stress scales did not form part of the analyses as these variables were collected at the same time as the Term 3 student QSL outcome variables, hence were inappropriate for inclusion in the multilevel regression model.
- Term 2 Teacher Satisfaction scales - Workload and Conditions, Relationship with Students, Administration and Senior Staff. As was the case with The Term 3 Teacher Stress scales, the Term 3 Teacher Satisfaction scales did not form part of the analysis as they were collected at the same time as the Term 3 student QSL outcome variables, hence were also inappropriate for inclusion in the multilevel regression model.

### *Level 3 - Intervention Level (N=4)*

- The intervention undertaken and School were the only level 3 variables in the data set. Both were operationalised by entering Intervention and School as a series of dummy variables to determine any individual intervention effects and any individual school effects.

The purposes of the multilevel regression analyses were twofold. Firstly, the aim was to identify which of the potential explanatory variables were related to the response variables. Before undertaking the regression analyses, it was necessary to check the distributions of all variables to be included to determine if they significantly departed from normality. It was found that a number of the background variables including absence variables and student and teacher questionnaire scales were badly skewed suggesting these variables be normalised.

The second purpose was to determine the relative importance of the significant explanatory variables, which indicated the use of standardised regression coefficients. Consequently variables to be included in the regression analyses were standardised and normalised, as necessary, using the normalise facility within the MLwiN program. The criteria used to

determine if a variable required normalisation was a level of skew that was greater than twice the standard error.

The iterative generalised least squares procedure (IGLS) within the MLwiN program was used for the analyses. To answer the research questions fully, eight separate multiple regression analyses were carried out incorporating a different response variable on each occasion. All variables were standardised and constants omitted as a matter of course for each analysis. The constant is not significant as it simply represents the mean of the standardised response variable coefficient which is zero.

For simplicity of presentation, the results of the analysis are separated into two sections and two figures. Results for the analyses using the Term 3 Total (%) student absence and the two general Term 3 QSL scales, General Satisfaction and Negative Affect, response variables are presented in Section 3. Results for the analyses using the five specific Term 3 QSL scales, Teacher, Opportunity, Achievement, Social Integration, and Adventure, are presented in Section 4.

### 3. The Term 3 General QSL Scales and Student Absence

#### 3.1 Student Absence as the Response Variable

The first multiple regression analysis undertaken utilised Term 3 Total (%) student absence as the response variable. All student and teacher variables collected and discussed above, with the obvious exception of the Term 3 QSL scales and the Term 3 Teacher Stress and Teacher Satisfaction scales, were hypothesised to be potentially causally related to student absence as illustrated in Figure 1.

Before undertaking the explanatory analysis it was first desirable to test the data for multilevel effects using a simple variance components model with Term 3 Total (%) student absence as the response variable (see Woodhouse, Rasbash, Goldstein & Yang, 1995, pp.16-25). Results for the null or variance components model are presented in the upper section of Table 1.

**Table 1: Term 3 Total (%) student absence (Normalised) as Response**

#### Variable: Variance Components and Explanatory Models

Explanatory Variable	Standardised Regression Coefficient	Standard Error
<b>Variance Components Model</b>		
<b>Fixed Part</b>		
Constant	n/s	n/s
<b>Random Part</b>		
Level 3: Intervention	0.000	0.000
Level 2: Class/Teacher	0.000	0.000
Level 1: Student	0.903	0.060
<b>Explanatory Model</b>		
<b>Fixed Part</b>		
Term 2 Total (%) Stud. Absence	0.428	0.043
School 4	-0.475	0.096
<b>Random Part</b>		
Level 3: Intervention	0.000	0.000
Level 2: Class/Teacher	0.000	0.000
Level 1: Student	0.730	0.049

The random part of the model indicated that 100 percent of the variance in Term 3 Total (%) student absence was attributable to individual student effects (Level 1). Variances between classes (Level 2) and interventions (Level 3) were too small to be estimated and hence not significant. This result indicates that there were no observable systematic differences in Term 3 Total (%) student absence at the class or intervention levels, as these differences were not statistically significant.

The hypothesis that all the student and teacher variables collected and discussed above were potentially explanatory variables was then tested. The general method intended to complete the explanatory analysis was the simultaneous addition of all possible explanatory variables followed by the progressive elimination of non-significant variables from the equation. As there were class and intervention explanatory variables in the model the multilevel analysis was continued despite the absence of higher level effects in the initial form of the analysis.

However, it was recognised that many of the explanatory variables were correlated and that multicollinearity was a potential problem in the intended regression analyses. This was particularly the case for some of the QSL scales. Explanatory variables are intended to be independent of each other and multicollinearity problems occur when two or more correlated explanatory variables are added to a regression equation. The regression coefficients of other variables may be artificially inflated or depressed by one of the correlated explanatory variables in an unpredictable way (Bourke, 1984, p.132). When two explanatory variables are more highly correlated with each other than they are with the response variable, multicollinearity is especially a problem.

In this case the potential instability of coefficients was tested by temporarily removing the correlated explanatory variables from the regression equation one at a time, re-running the analysis, and comparing the coefficients obtained each time for individual variables. Where large differences are revealed in the coefficients for successive analyses it is necessary to remove permanently one or more of the explanatory variables, or combine two or more of the correlated variables (Berry & Feldman, 1985, p.48). Only the variables most strongly related to Term 3 Total (%) student absence were retained.

Ultimately two variables were found to be significantly related to Term 3 Total (%) student absence, the Term 2 Total (%) student absence variable and School 4. Results of the explanatory model are presented in the lower section of Table 1. The standardised regression coefficients allow direct comparison of the strength of the relationship with Term 3 Total (%) student absence for both of the explanatory variables. A strong negative correlation was evident for Term 3 Total (%) with School 4. A slightly weaker but positive correlation was evident for Term 2 Total (%) with Term 3 Total (%). These results indicate that students at School 4 were more likely to have lower rates of total absence in Term 3 than students at the other three schools. Students who had higher rates of total absence in Term 2 were also more likely to have higher rates of total absence in Term 3. The combination of these two explanatory variables provided the maximum explanation of variation in student absence, explaining approximately 19.1% percent of the variation in Term 3 Total (%) student absence.

### **3.2 Term 3 General Satisfaction as the Response Variable**

The second multiple regression analysis utilised the Term 3 General Satisfaction QSL scale as the response variable. Term 3 General Satisfaction (along with Term 3 Negative Affect) was hypothesised to provide a final stage in first causal model as illustrated in Figure 1. All student and teacher variables to the left of Term 3 General Satisfaction were potentially related to it. Again the first stage of the multilevel analysis involved a simple variance

components model with Term 3 General Satisfaction as the response variable. Results for the null or variance components model are presented in the upper section of Table 2.

**Table 2: Term 3 General Satisfaction (Normalised) as Response Variable:**

**Null and Explanatory Models**

<b>Explanatory Variable</b>	<b>Standardised Regression Coefficient</b>	<b>Standard Error</b>
<b>Variance Components Model</b>		
<b>Fixed Part</b>		
Constant	n/s	n/s
<b>Random Part</b>		
Level 3: Intervention	0.000	0.000
Level 2: Class/Teacher	0.111	0.050
Level 1: Student	0.816	0.056
<b>Explanatory Model</b>		
<b>Fixed Part</b>		
Term 2 General Satisfaction	0.633	0.035
Term 3 Total (%) Stud. Absence	-0.120	0.034
School 1	-0.302	0.081
Years Teaching	-0.109	0.039
<b>Random Part</b>		
Level 3: Intervention	0.007	0.008
Level 2: Class/Teacher	0.000	0.000
Level 1: Student	0.467	0.031

The random part of the model indicated that approximately 88 percent of the variance in General Satisfaction was attributable to individual student effects (level 1), and 12 percent to class effects (level 2). Variance between interventions (level 3) was too small to be estimated and hence not significant. This result indicates that there were no significant systematic differences in Term 3 General Satisfaction at the intervention level.

The hypothesis that all the student and teacher variables which preceded Term 3 General Satisfaction in the model were potentially explanatory variables was then tested by inserting these variables into the existing regression equation using the method described previously for the Term 3 Total (%) student absence regression analysis. Multicollinearity again emerged as a problem in this analysis and all successive analyses with Term 3 QSL scales as the response variable.

In these cases, the high correlations between some of the QSL scales meant that not all scales could be included in the regression equation simultaneously. Only the variables most strongly related to the Term 3 QSL scale response variable were retained or each analysis. Ultimately, four variables were found to be significantly related to student Term 3 General Satisfaction, the Term 2 General Satisfaction QSL scale, School 1, Term 2 Total (%) student absence, and teacher Years Teaching. Results of the explanatory model are presented in the lower section of Table 2. The only positive correlation with Term 3 General Satisfaction was evident for the QSL scale of Term 2 General Satisfaction. The strongest negative

correlation was evident for Term 3 General Satisfaction with School 1. A weaker relationship was evident for Term 3 General Satisfaction with Term 3 Total (%) student absence and teacher Years Teaching.

These results indicate that students who had higher levels of general satisfaction with school in Term 2 were more likely to have higher levels of general satisfaction in Term 3. Being at School 1 was associated with lower general satisfaction scores. Furthermore, students with higher rates of absence in Term 3 were generally less satisfied than students with lower absence rates in this term. Students who had more experienced teachers were also less satisfied in Term 3. The combination of these four explanatory variables provided the maximum explanation of variation in student Term 3 General Satisfaction, explaining approximately 48.9% percent of the variation.

### 3.3 Negative Affect as the Response Variable

The third multiple regression analysis utilised the Term 3 Negative Affect QSL scale as the response variable. Term 3 Negative Affect (along with Term 3 General Satisfaction) was hypothesised to provide a final stage in the first causal model as illustrated in Figure 1. All student and teacher variables to the left of Term 3 Negative Affect were potentially related to it. Results for the null or variance components model are presented in the upper section of Table 3.

**Table 3: Negative Affect (Normalised) as Response Variable:**

#### Null and Explanatory Models

Explanatory Variable	Standardised Regression Coefficient	Standard Error
<b>Variance Components Model</b>		
<b>Fixed Part</b>		
Constant	n/s	n/s
<b>Random Part</b>		
Level 3: Intervention	0.000	0.000
Level 2: Class/Teacher	0.023	0.019
Level 1: Student	0.816	0.056
<b>Explanatory Model</b>		
<b>Fixed Part</b>		
Term 2 Negative Affect	0.531	0.041
Term 2 Achievement	-0.122	0.040
School 2	-0.169	0.078
Class Streaming	0.171	0.080
<b>Random Part</b>		
Level 3: Intervention	0.000	0.000
Level 2: Class/Teacher	0.000	0.000
Level 1: Student	0.526	0.035

The random part of the model indicated that approximately 97.2 percent of the variance in Term 3 Negative Affect was attributable to individual student effects (level 1), and 2.8

percent to class effects (level 2). Variance between interventions (level 3) was too small to be estimated and hence not significant. Class and Intervention level differences were not statistically significant.

The hypothesis that all the student and teacher variables which preceded Term 3 Negative Affect in the model were potentially explanatory variables was then tested by inserting these variables into the existing regression equation using the method described previously for the student Term 3 Total (%) regression analysis. Four variables were found to be significantly related to Term 3 Negative Affect, the Term 2 QSL scales of Negative Affect and Achievement, School 2, and Class Streaming. Results of the explanatory model are presented in the lower section Table 3.

The strongest relationship with Term 3 Negative Affect was evident for the Term 2 Negative Affect QSL scale indicating that students who reported more negative feelings and emotions regarding school in Term 2 were also more likely to report similar feelings in Term 3. The relationship between the QSL scales of Term 2 Achievement and Term 3 Negative Affect indicates that students who were less happy with their level of achievement in Term 2 were also more likely to have negative feelings about school in Term 3.

Importantly students at School 2 reported more negative feelings and emotions regarding school than students at the other three schools as did students in academically streamed classes when compared to students in parallel classes. These variables provided the maximum explanation of variation in student Term 3 Negative Affect, explaining approximately 37.3 percent of the variation.

### **3.4 Multilevel Path Model No.1**

A multilevel path model was developed from the three regression analyses reported above incorporating all significant variables. This model is presented in Figure 2. The width of the path lines indicates the strength of the relationship between the variables. The standardised regression coefficients are also shown.

## **4. The Term 3 Specific QSL Scales and Student Absence**

The second series of multiple regression analyses utilised the Term 3 specific QSL scales as the response variables. These five QSL specific scales, Teacher, Opportunity, Achievement, Social Integration, and Adventure, were hypothesised to provide a final stage in the causal model, as illustrated in Figure 8.1. All student and teacher variables to the left of Term 3 specific QSL scales were potentially related to them.

The first stage of the multilevel analyses involved simple variance components models with the Term 3 specific QSL scales as the response variables. Results for the null or variance components model for each respective scale are presented in the upper section of the Tables 8.4 - 8.8.

The hypothesis that all the student and teacher variables that preceded the Term 3 specific QSL scales in the model were potentially explanatory variables was then tested by inserting these variables into the existing regression equations using the method described previously for the Term 3 Total (%) student absence regression analysis. Results of the explanatory models are presented for each respective scale in the lower section of Tables 8.4 - 8.8.

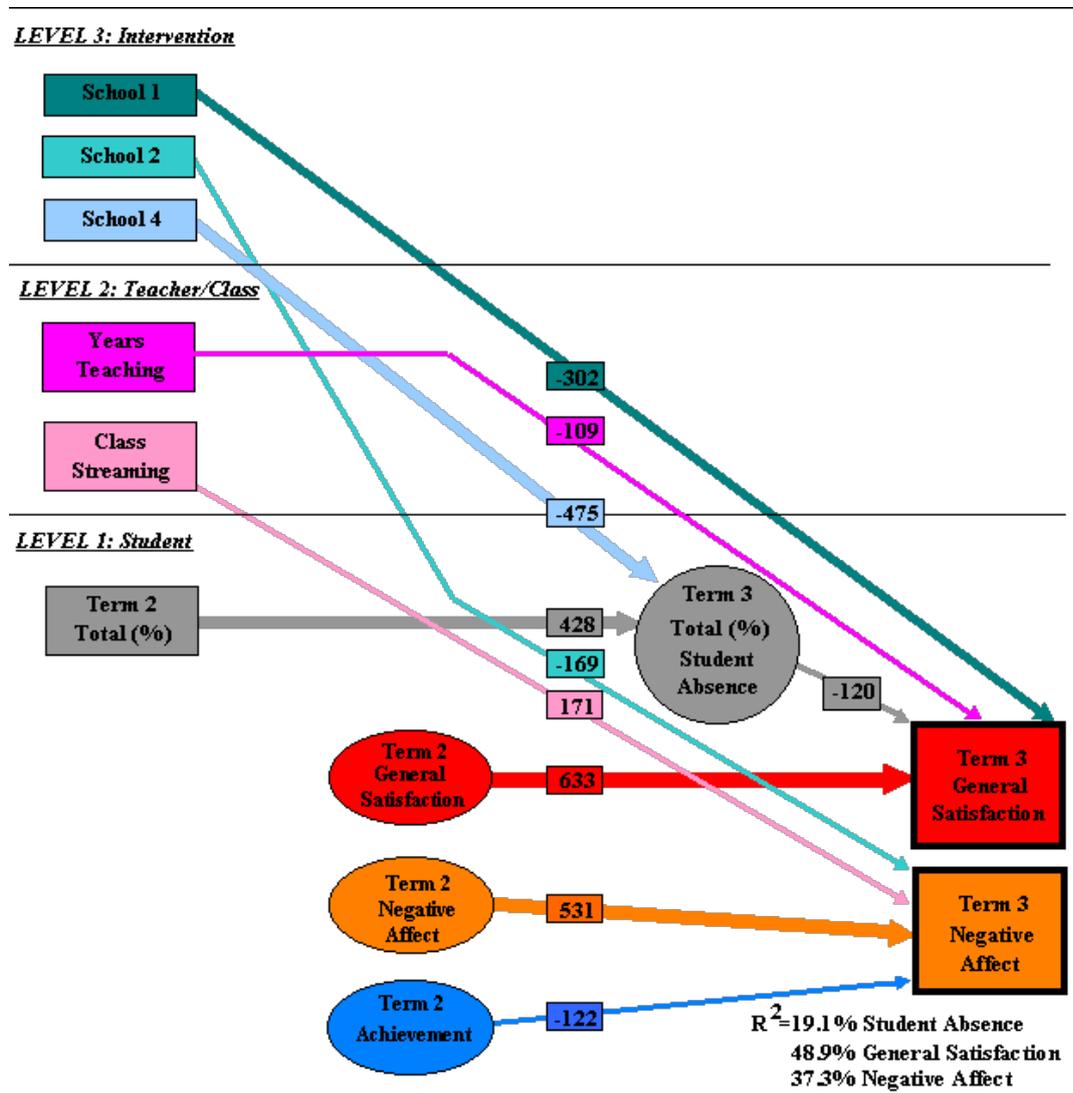
#### 4.1 Student Absence as the Response Variable

Results for the multiple regression analysis undertaken utilising Term 3 Total (%) student absence as the response variable were presented in Section 3.1.

#### 4.2 Term 3 Teacher as the Response Variable

The random part of the model indicated that approximately 80.5 percent of the variance in Teacher was attributable to individual student effects (level 1), and 19.5 percent to class effects (level 2). Variance between interventions (level 3) was too small to be estimated and hence not significant. This result indicates that there were no significant systematic differences in Term 3 Teacher at the intervention level.

**Figure 2 Multilevel Path Model Explaining Variation in Term 3 Student Absence and Term 3 General QSL Scales (only significant standardised paths (x1000) are shown)**



Three variables were found to be significantly related to student Term 3 Teacher, the Term 2 Teacher QSL scale, teacher Years Teaching, and School 2. Results of the explanatory model are presented in the lower section of Table 4. A strong positive correlation with Term 3 Teacher was evident for the QSL scale of Term 2 Teacher indicating that students who were happier with their relationship with their teacher in Term 2 were more likely to report being happier with relationship with their teacher in Term 3. A weaker positive correlation was evident for Term 3 Teacher with School 2 indicating that students at School 2 were generally happier with their relationship with their teacher than students at the other schools.

The negative correlation evident with teacher Years Teaching indicates that students who had more experienced teachers were likely to report being less happy with their relationship with their teacher in Term 3 than students with less experienced teachers. The combination of these three explanatory variables provided the maximum explanation of variation in student Term 3 Teacher, explaining approximately 48.2% percent of the variation.

**Table 4 Term 3 Teacher (Normalised) as Response Variable:**

**Null and Explanatory Models**

<b>Explanatory Variable</b>	<b>Standardised Regression Coefficient</b>	<b>Standard Error</b>
<b>Variance Components Model</b>		
<b>Fixed Part</b>		
Constant	n/s	n/s
<b>Random Part</b>		
Level 3: Intervention	0.000	0.000
Level 2: Class/Teacher	0.160	0.065
Level 1: Student	0.662	0.045
<b>Explanatory Model</b>		
<b>Fixed Part</b>		
Term 2 Teacher	0.642	0.037
Years Teaching	-0.113	0.035
School 2	0.219	0.074
<b>Random Part</b>		
Level 3: Intervention	0.000	0.000
Level 2: Class/Teacher	0.000	0.000
Level 1: Student	0.426	0.029

**4.3 Term 3 Opportunity as the Response Variable**

The random part of the model indicated that approximately 96 percent of the variance in Opportunity was attributable to individual student effects (level 1), and 4 percent to class effects (level 2). Variance between interventions (level 3) was too small to be estimated and

hence not significant. This result indicates that there were no significant systematic differences in student Term 3 Opportunity at the class or intervention level.

Three variables were found to be significantly related to Term 3 Opportunity, the Term 2 Opportunity and Negative Affect QSL scales, and School 3. Results of the explanatory model are presented in the lower section of Table 5.

**Table 5 Term 3 Opportunity (Normalised) as Response Variable:**

**Null and Explanatory Models**

<b>Explanatory Variable</b>	<b>Standardised Regression Coefficient</b>	<b>Standard Error</b>
<b>Variance Components Model</b>		
<b>Fixed Part</b>		
Constant	n/s	n/s
<b>Random Part</b>		
Level 3: Intervention	0.000	0.000
Level 2: Class/Teacher	0.033	0.021
Level 1: Student	0.778	0.053
<b>Explanatory Model</b>		
<b>Fixed Part</b>		
Term 2 Opportunity	0.581	0.040
Term 2 Negative Affect	-0.098	0.038
School 3	0.211	0.095
<b>Random Part</b>		
Level 3: Intervention	0.000	0.000
Level 2: Class/Teacher	0.009	0.009
Level 1: Student	0.478	0.033

A strong positive correlation with Term 3 Opportunity was evident for the QSL scale of Term 2 Opportunity indicating that students who reported that school was providing them with more opportunities for the future in Term 2 were more likely to report similar feelings in Term 3. A weaker positive correlation was evident for Term 3 Opportunity with School 3 indicating that students at this school generally reported higher Opportunity scale scores than students at the other three schools in Term 3. A negative correlation was evident for Term 3 Opportunity with Term 2 Negative Affect indicating that students who reported more negative feelings an emotions regarding school in Term 2 were more likely to perceive that school was providing them with less opportunities for the future in Term 3. The combination of these three explanatory variables provided the maximum explanation of variation in student Term 3 Opportunity, explaining approximately 39.9% percent of the variation.

**4.4 Term 3 Achievement as the Response Variable**

The random part of the model indicated that approximately 95.8 percent of the variance in Achievement was attributable to individual student effects (level 1) and 4.2 percent to class

effects (level 2). Variance between interventions (level 3) was too small to be estimated and hence not significant. This result indicates that there were no significant systematic differences in student Term 3 Achievement at the class or intervention levels.

Five variables were found to be significantly related to Term 3 Achievement, the Term 2 Achievement and Opportunity QSL scales, Term 3 Total (%) student absence, Term 3 Total (%) teacher absence, and School 3. Results of the explanatory model are presented in the lower section of Table 6. A strong positive correlation with Term 3 Achievement was evident for the QSL scale of Term 2 Achievement indicating that students who reported gaining a sense of achievement from school in Term 2 reported similar feelings in Term 3. Similarly, students who reported that school was providing them with more opportunities for the future on the Term 2 Opportunity scale were also more likely to report higher scores on the Term 3 Achievement scale.

**Table 6 Term 3 Achievement (Normalised) as Response Variable:**

**Null and Explanatory Models**

<b>Explanatory Variable</b>	<b>Standardised Regression Coefficient</b>	<b>Standard Error</b>
<b>Variance Components Model</b>		
<b>Fixed Part</b>		
Constant	n/s	n/s
<b>Random Part</b>		
Level 3: Intervention	0.000	0.000
Level 2: Class/Teacher	0.037	0.024
Level 1: Student	0.844	0.057
<b>Explanatory Model</b>		
<b>Fixed Part</b>		
Term 2 Achievement	0.591	0.040
Term 2 Opportunity	0.086	0.042
Term 3 Total (%) Stud. Absence	-0.101	0.034
Term 3 Total (%) Teach. Absence	-0.093	0.037
School 2	-0.204	0.078
<b>Random Part</b>		
Level 3: Intervention	0.003	0.005
Level 2: Class/Teacher	0.000	0.000
Level 1: Student	0.470	0.032

Importantly higher rates of both student and teacher Term 3 total absence were correlated with lower Term 3 Achievement scale scores indicating that students who were absent more and/or had teachers who were more absent more were likely to report lower Term 3 Achievement scale scores. A negative correlation was also evident for Term 3 Achievement with School 2 indicating that students at this school generally reported lower Achievement scales scores than students at the other three schools. The combination of these five

explanatory variables provided the maximum explanation of variation in student Term 3 Achievement, explaining approximately 46.2% percent of the variation.

#### 4.5 Term 3 Social Integration as the Response Variable

The random part of the model indicated that approximately 97.5 percent of the variance in Social Integration was attributable to individual student effects (level 1) and around 2.5 percent to class effects (level 2). Variance between interventions (level 3) was too small to be estimated and hence not significant. This result indicates that there were no significant systematic differences in student Term 3 Social Integration at the class or intervention level.

Three variables were found to be significantly related to Term 3 Social Integration, the Term 2 Social Integration and Negative Affect QSL scales, and School 4. Results of the explanatory model are presented in the lower section of Table 7. A strong positive correlation with Term 3 Social Integration was evident for the QSL scale of Term 2 Social Integration indicating that students who reported a favourable social life at school in Term 2 reported similar perceptions in Term 3. Negative correlations were evident for Term 3 Social Integration with Term 2 Negative Affect and School 2.

The Term 2 Negative Affect correlation indicates that students who reported more negative feelings regarding school in Term 2 were more likely to report a poorer social life at school in Term 3 than students who reported less negative feelings in Term 2. Students at School 4 generally reported lower Social Integration scale scores than students at the other three schools. The combination of these three explanatory variables provided the maximum explanation of variation in student Term 3 Social Integration, explaining approximately 40.5% percent of the variation.

**Table 7 Term 3 Social Integration (Normalised) as Response Variable:**

#### Null and Explanatory Models

Explanatory Variable	Standardised Regression Coefficient	Standard Error
<b>Variance Components Model</b>		
<b>Fixed Part</b>		
Constant	n/s	n/s
<b>Random Part</b>		
Level 3: Intervention	0.000	0.000
Level 2: Class/Teacher	0.023	0.020
Level 1: Student	0.924	0.063
<b>Explanatory Model</b>		
<b>Fixed Part</b>		
Term 2 Social Integration	0.570	0.041
Term 2 Negative Affect	-0.109	0.044
School 4	-0.168	0.082
<b>Random Part</b>		
Level 3: Intervention	0.000	0.000
Level 2: Class/Teacher	0.000	0.000
Level 1: Student	0.563	0.038

#### 4.6 Term 3 Adventure as the Response Variable

The random part of the model indicated that almost 93.4 percent of the variance in Adventure was attributable to individual student effects (level 1), and around 6.4 percent to class effects (level 2). Variance between interventions (level 3) was too small to be estimated and hence not significant. This result indicates that there were no significant systematic differences in student Term 3 Adventure at the class or intervention level as these differences were not statistically significant.

Three variables were found to be significantly related to Term 3 Adventure, the Term 2 Adventure and General Satisfaction QSL scales, and Term 3 Total (%) student absence. Results of the explanatory model are presented in the lower section of Table 8. A strong positive correlation with Term 3 Adventure was evident for the QSL scale of Term 2 Adventure indicating that students who reported that school was a fun and enjoyable place in Term 2 reported similar perceptions in Term 3.

**Table 8 Term 3 Adventure (Normalised) as Response Variable:**

#### Null and Explanatory Models

Explanatory Variable	Standardised Regression Coefficient	Standard Error
<b>Variance Components Model</b>		
<b>Fixed Part</b>		
Constant	n/s	n/s
<b>Random Part</b>		
Level 3: Intervention	0.000	0.000
Level 2: Class/Teacher	0.061	0.033
Level 1: Student	0.889	0.060
<b>Explanatory Model</b>		
<b>Fixed Part</b>		
Term 2 Adventure	0.520	0.058
Term 2 General Satisfaction	0.142	0.059
Term 3 Total (%) Stud. Absence	-0.092	0.037
<b>Random Part</b>		
Level 3: Intervention	0.000	0.000
Level 2: Class/Teacher	0.003	0.008
Level 1: Student	0.552	0.038

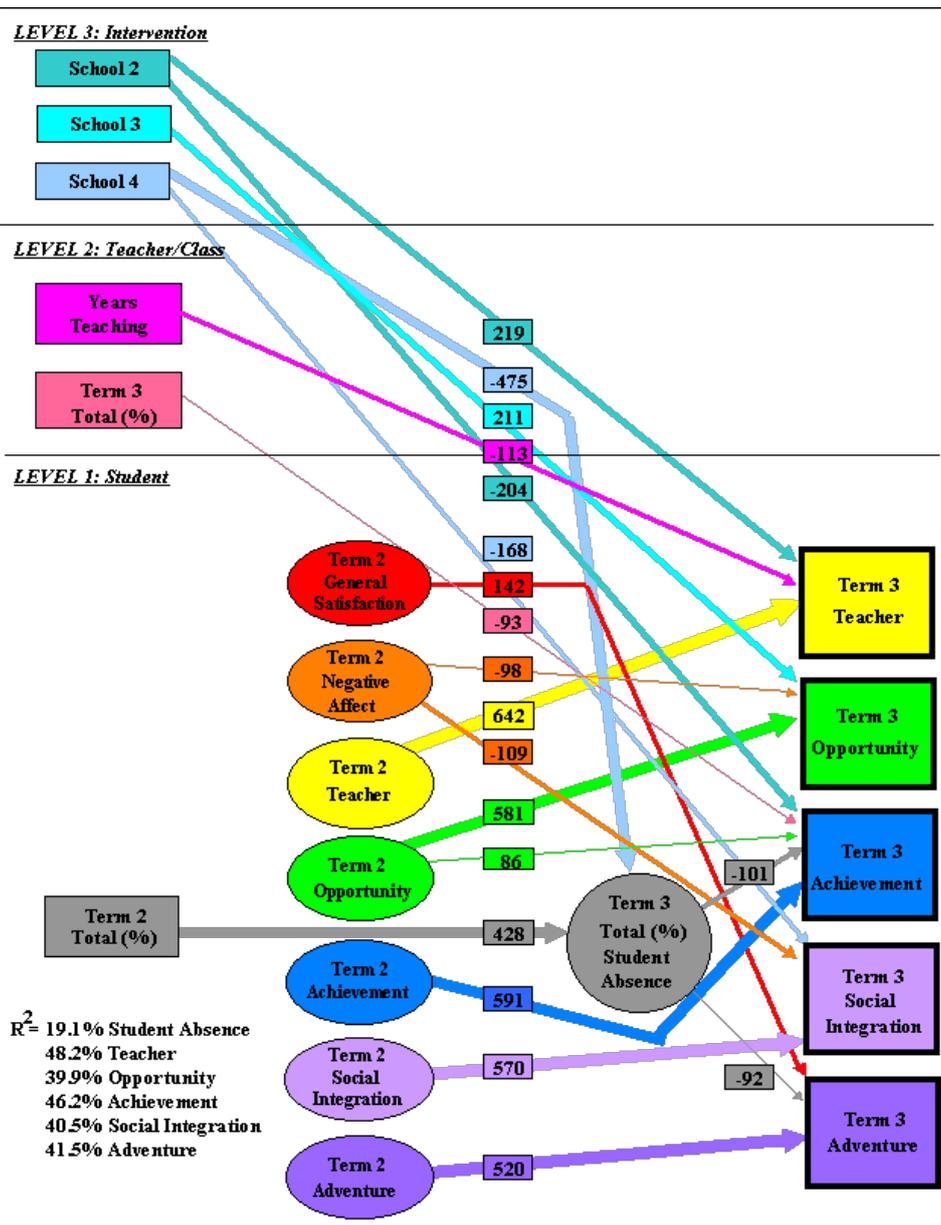
Also, students who were generally more satisfied in Term 2 were likely to perceive school as a fun and enjoyable place in Term 3. A negative correlation was evident for Term 3 Adventure with Term 3 Total (%) student absence indicating that students with higher total rates of absence in Term 3 were also less likely to perceive school as a fun and enjoyable place to be. The combination of these three explanatory variables provided the maximum

explanation of variation in student Term 3 Adventure, explaining approximately 41.5% percent of the variation.

#### 4.7 Multilevel Path Model No.2

A multilevel path model was developed from the five regression analyses reported above incorporating all significant variables and is presented in Figure 3. The width of the path lines indicates the strength of the relationship between the variables. The standardised regression coefficients are also shown.

**Figure 3 Multilevel Path Model Explaining Variation in Term 3 Student Absence and Term 3 Specific QSL Scales (only significant standardised paths (x1000) are shown)**



## **4.8 Summary of Multilevel Path Model**

This section provides a summary of the multilevel path model in terms of the importance of student and teacher variables. Some technical considerations of the analysis undertaken are also presented.

### **4.8.1 Level 1 Variables**

The overriding feature that is evident in the models is the strong link between each of the Term 2 QSL scales and their respective Term 3 QSL measure, with a strong positive correlation evident for all seven scales. Also evident are the relationships between some of the Term 2 QSL scales and different Term 3 scales. Students who reported more negative feelings and emotions regarding school in Term 2 were more likely to report less opportunities for the future and a reduced ability to get on with their peers in Term 3. Students who reported a lower level of achievement in Term 2 were more likely to perceive school as a negative and uninviting place in Term 3. Furthermore, students who perceived more opportunities for the future in Term 2 were more likely to report higher levels of achievement in Term 3. Students who were generally more satisfied in Term 2 were more likely to perceive school as a fun and enjoyable place in Term 3.

A clear link was also evident between student absenteeism and student perception of some aspects of the quality of their school life. Students with higher rates of total absence in Term 3 were more likely to perceive less fun and enjoyment from school, report lower rates of achievement, and be less satisfied generally. These relationships serve to support the relationship hypothesised in the model of causation between higher rates of student absence and reduced student quality of school life. Students with higher rates of total absence in Term 2 were also more likely to be absent in Term 3.

In summary, student perceptions of the quality of their school life in Term 2, student total absence in Term 3, and to a lesser extent Term 2, provided the bulk of the explanation of variance in student quality of school life in Term 3. However, it is important to note that these were the only significant level 1 variables. It may well be that the strength of the relationships between the Term 2 and Term 3 QSL scales served to mask the effects of other student level variables.

### **4.8.2 Level 2 Variables**

A surprising element of the model is the lack of importance of most of the Level 2 variables, especially the Teacher Stress and Teacher Satisfaction scales. Teacher Years teaching, Class Streaming, and Term 3 Total (%) teacher absence were the only significant Level 2 variables. The negative correlations evident between teacher Years Teaching and the student QSL scales of General Satisfaction and Teacher indicate that the longer teachers had been teaching, the more likely students were to have a lower level of general satisfaction with school and be less happy with their relationship with their teacher.

Secondly students in academically streamed classes were more likely to report negative feelings and emotions regarding school than students in parallel classes. Finally students whose teachers had a higher rate of total absence in Term 3 were more likely to perceive a lower level of achievement, than students whose teachers had lower rates of total absence in Term 3.

### **4.8.3 Level 3 Variables**

The Level 3 variables provided perhaps the most disappointing and interesting aspects of the model. The lack of significance of the interventions was clearly a disappointment. Yet the extent of the significance of the school variables was of particular interest.

With regard to school, students at School 1 were more likely to report lower general satisfaction with school. Students at School 3 were more likely to perceive increased opportunities for the future from their schooling than students at the other three schools. Students at School 2 were more likely to report less negative feelings and emotions regarding school, better relationships with their respective teachers, but also a lower sense of achievement in Term 3. Students at School 4 were more likely to have a lower rate of total absence in Term 3 but also poorer perceptions of their relationship with their peers than students at other schools.

Whilst none of the relationships between the interventions and the outcome variables was statistically significant, a number were approaching significance, especially the relationship between the Action Reaction intervention and the Term 3 QSL scales of Negative Affect and Teacher. It may well be that the strength of the relationships between the Term 2 and Term 3 QSL scales has served to mask the effects of the intervention level variables.

### **4.9 Technical Considerations of the Analysis Undertaken**

Finally it is important to note that although there were no large differences in response variables at the intervention level and, with the exception of the General Satisfaction and Teacher response variables, at the class level, the multilevel regression analysis was a desirable method of analysis of this data set. This is due to the presence of variables at three levels, and the consequent need for care in determining standard errors to be used in statistical significance testing. Overall it would appear that the strength of the relationships between the Term 2 and Term 3 student quality of school life and absence variables overpowered, and in some cases eliminated, the effects of the majority of the Level 2 and Level 3 variables.

Problems of skew and correlated explanatory variables, again particularly Term 2 and Term 3 student quality of school life and absence variables, forced some variables to be excluded from the analyses. However, the explanatory variables with the most significant relationships to the response variables were always retained. This was done in an attempt to ensure that these models are as accurate a representation of the causal relationships between student and teacher variables, student absence, and student quality of school life, as the statistical methods adopted will allow.

## **5. Theoretical and Educational Significance of the Research**

To the casual reader, the findings of this study may appear obvious and straightforward - students, who enjoy school, go to school more often than students who don't. What is not so obvious is that some educators, educational institutions, and educational authorities appear to have lost sight of this basic philosophy, that this author would argue should underpin quality education.

As responsible educators we need to promote such environments to ensure our students develop to their full potential and that our schools are workplaces where our students, and teachers, want to be. Ensuring student quality of school life is accomplished by an inclusivist culture. It is a spirit, an ethos, that values students and the importance of preparing students - all students, to be valuable members of society in the new millennium.

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