Optimism, pessimism and depression in school aged students: A longitudinal study

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The tendency for students to view the world from an optimistic or pessimistic framework has been linked with their achievement in school. Likewise, the incidence of depression in school aged students has implications for educational outcomes. A study was therefore undertaken to investigate the development of students' optimism and pessimism over a three year period and the relationship between this development and students' year level, gender and self-reported depression. At the commencement of the study all students in the sample were in primary schools, but by the third year almost half had moved into lower secondary schools. Significant relationships were found between the students' optimism, pessimism, depression, year level and gender. These findings are discussed in terms of their educational implications, and suggestions made for future studies.


Introduction

The tendency for people to filter their experiences of good and bad events in their lives through an optimistic or pessimistic frame of reference has been known for centuries. References to optimism and pessimism abound in popular parlance and occur daily in the print and electronic media. A large number of common sayings such as "a pessimist sees difficulty in every opportunity. An optimist sees opportunity in every difficulty" encapsulate the commonly held belief that peoples' causal framework affects their outlook on and approach to life. The term explanatory style has been applied to the characteristic way in which people explained the causes of events in their lives (Peterson & Seligman, 1984). If people attributed good events to stable, global and internal causes and bad events to unstable, specific and external causes they were considered to be optimistic (Peterson & Bossio, 1991). For pessimistically oriented people, bad events were attributable to causes which were universal, unchangeable and due to their own shortcomings and good events to factors that were transitory, specific and due to outside factors such as luck (Peterson & Bossio, 1991).

Explanatory style has been studied in adults in relation to a large range of phenomena including health, coronary heart disease, sport, motivation, employment and achievement (see Buchanan & Seligman, 1995). In children, explanatory style also has been related to health and illness indices, with a few studies considering the relationship between explanatory style and school achievement (Yates, 1998a; 1998b; Yates, Yates & Lippett, 1995; Nolen-Hoeksema, Girgus & Seligman, 1986; 1992). While detailed knowledge of the influences on children's development of optimistic or pessimistic explanations for events in their lives has yet to be ascertained, exploratory work has suggested that both genetic and environmental factors which encompass modelling, effects of adult feedback, consequences of significant events, differential outcomes of children's mastery and learned helplessness experiences and trust in close relationships may interact differentially to influence individual
development (Seligman, Kamen & Nolen-Hoeksema 1988; Peterson & Bossio, 1991; Eisner, 1995; Seligman, 1995). Seligman (1995) has asserted that teachers have a marked influence on students' optimism and pessimism, although at the present time the exact mechanisms by which this process occurs is poorly understood.

Although the precursors and development of explanatory style in children have received scant experimental examination, it is thought that adult-like optimism and pessimism appear during the third Piagetian stage of concrete operations (see Peterson & Bossio, 1991) and in adolescence "become solidified as a cognitive habit, depending on the degree to which each is entwined with the child's developing identity" (Peterson & Bossio, 1991, p. 69). Since these trait-like characteristics in children have been measured predominantly with pencil and paper questionnaires, studies only have been reported with children from the age of eight years. On the basis of these studies Nolen-Hoeksema and Girgus (1995) concluded that explanatory style was clearly established in American children by the age of nine years, with both boys and girls became more pessimistic between the ages of 11 and 13 years. The boys then appeared to rebound as they became more optimistic between the ages of 13 and 15 years, while the girls continued on a pessimistic path which then put them at greater risk for the development of depression. Since explanatory style has been associated with school aged students' general academic achievement (Nolen-Hoeksema, Girgus & Seligman, 1986; 1992), and achievement in mathematics (Yates, 1998a; 1998b; Yates et al., 1993; 1995), it is important to investigate the development of explanatory style in Australian school aged students.

Gender differences in the development of explanatory style also need to be considered. From a longitudinal study over five years, Nolen-Hoeksema et al. (1992) concluded that, in general, boys were more pessimistic than girls, with this pessimism being more evident when explanations for negative events were considered. This gender difference still held in their cross-sectional study, although in this instance boys were more pessimistic than the girls in relation to positive events (Nolen-Hoeksema, Girgus & Seligman, 1991). These gender differences for positive and negative events clearly require further investigation, particularly in light of the association between optimism, pessimism and depression.

In both adults and older children, pessimism or negative explanatory style has been found to be related to and predictive of depression. That pessimistic explanatory style constitutes a risk factor for the subsequent development of depression in children, and that children become increasingly vulnerable as they get older, appears to be well established within the research literature (Kaslow, Rehm, & Siegel, 1984; Seligman, 1990; Nolen-Hoeksema et al., 1986; 1992). In addition, these risks might have a differential effect on boys' and girls' depression, with studies either reporting no gender effects for depression in preadolescent children or with younger boys being more depressed than girls. Boys were more likely to be depressed between the ages of 11 and 13 years, but after puberty girls exhibited greater levels of both self reported and clinically determined depression, with this gender difference persisting into old age (Nolen-Hoeksema & Girgus, 1995).

The mechanisms by which the switch in pessimism and depression from preadolescent boys to adolescent girls occurred are as yet poorly understood, although Nolen-Hoeksema and Girgus (1995) have suggested that people's expectations for, evaluations of, and attributions for successes and failures in boys and girls became increasingly sex biased as children grew older. Furthermore, as depression was associated with lower achievement, children could have grounds for concluding that bad events were indeed stable, global and internally caused. Certainly, correlational studies have suggested that students with more depressive symptoms have a greater prevalence of academic difficulties (Reynolds & Coates, 1982), intellectual deficits (Kaslow, Tannenbaum, Abramson, Peterson & Seligman, 1983; Sacco & Graves, 1984; Dalley, 1986; Ward, Friedlander & Silverman, 1987) and social or behavioural
problems (Jacobsen, Lahey & Strauss, 1983; Sacco & Graves, 1984; Berenson, 1987; Blechman, McEnroe, Carella & Audette, 1986).

In a meta-analytic review of 28 studies involving children and adolescents, attributional style was related to depressive symptoms (Gladstone & Kaslow, 1995). In a separate meta-analytic review of 27 cross-sectional studies including more than 4,000 children and adolescents, attributional style was found to be associated with both self reported depression and clinical depression, and this held across age, gender and sample type (Joiner & Wagner, 1995). Evidence for differential rates of negative attributional style in clinically depressed and non-clinically depressed children was inconclusive, as was the interaction of negative life events with attributional style in association with depression. Joiner and Wagner (1995) concluded that attributional style and depression in children and adolescents clearly were correlated, and that the association between attributional style and depression to occur over time. At a general level, this association between attributional style and depression appeared to be similar for both children and adults, leading Joiner and Wagner (1995) to suggest that there was a developmental continuity in this relationship. However, the developmental origins of attributional style have yet to be explored thoroughly. The paucity of studies reporting sex effects was also noted, a phenomena which Joiner and Wagner (1995) considered was surprising, given what they referred to as well known sex differences in depression and in light of early speculation that learned helplessness may be an explanation for sex differences (for example, Radloff, 1975).

Mineka, Pury & Luten (1995) have stated that the relationships between explanatory style and depression can only be delineated fully with prospective studies in which explanatory style is measured in nonclinical populations, with these measures then being used in conjunction with other causal factors to predict who will become depressed. This study therefore set out to measure explanatory style in children and adolescents over three years, with depression measured on the second occasion when the students were in the more sensitive age bracket as indicated by Nolen-Hoeksema et al. (1992) and when it would be more likely that any differential effects of gender on depression would be more evident as students entered adolescence. Thus, it was possible to determine whether depression was predicted by either the proximal or distal measures of explanatory style or both, as well as to consider any gender differences prior to and during the onset of adolescence.

Method
Subjects

The sample of 243 students, presented in Table 1 by Year level and gender, was assessed in 1993 and again in 1995. In Term 4, 1993, the students attended one of two State primary schools, but by Term 4, 1995, the students were located in 26 primary and 24 secondary schools in the State, Independent and Catholic systems, with a few students being educated at home.

Table 1 Numbers of students by year level and gender in 1993 and 1995 Gender Year 3/5 Year 4/6 Year 5/7 Year6/ 8 Year 7/9 Total N Male

<table>
<thead>
<tr>
<th>Gender</th>
<th>Year</th>
<th>N</th>
<th>Male</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>Year 3/5</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>28</td>
<td></td>
</tr>
<tr>
<td></td>
<td>34</td>
<td>21</td>
<td></td>
</tr>
</tbody>
</table>
Instruments

The Children's Attributional Style Questionnaire

Students' optimism and pessimism was measured with the Children's Attributional Style Questionnaire (CASQ; Seligman, Peterson, Kaslow, Tannenbaum, Alloy & Abramson, 1984), a forced-choice instrument developed to measure positive and negative explanatory style in children. The questionnaire was composed of 48 items of hypothetically good or bad events involving the child, followed by two possible explanations. For each of the 24 positive events and 24 negative events, one of the permanent, personal or pervasive explanatory dimensions was varied while the other two were held constant, so that 16 items measured each of the three dimensions, with eight being negative and eight being positive. The CASQ was scored by assigning one to each internal or stable or global response and a zero to each external or unstable or specific response. Scales were formed by summing the three scores across the appropriate questions for each of the three dimensions, for composite positive (CASQCP) and composite negative (CASQCN) events separately (Peterson, Maier & Seligman, 1993).

The Children's Depression Inventory

Students' self-reported depression was measured with the Children's Depression Inventory (CDI; Kovacs, 1992) developed in 1977 as a self-rating symptom orientated scale for school-aged children and adolescents aged from 7 years to 17 years. The questionnaire consisted of 27 items covering a range of depression symptoms including disturbed mood, hedonic capacity, vegetative functions, self-evaluation and interpersonal behaviours presented in relevant contexts. For this study, the questionnaire comprised 26 items as Item 9 concerning suicide ideation was omitted. For each of the 26 items, students rated one of three sentences that described them best for the previous two weeks. The ratings ranging from an absence of the symptom scored as 0, through a mild symptom scored as 1, to a definite symptom scored as 2.

Procedure

The CASQ was administered to students in their schools on the two occasions by either a male or female researcher. On the second occasion the CDI was given after the CASQ.

Results

Rasch Scaling of the Instruments

The questionnaires and student data were analysed with the Rasch scaling procedure, to overcome any sample-item interdependence problems and to bring them to common interval scales. Omitted responses could also be allowed for in appropriate ways in the scoring of the attitude data with this procedure. The final Rasch scaled instruments were composed of only those items that met the requirements of item response theory.
For the CASQ the 24 positive items (CASQCP) and the 24 negative items (CASQCN) were analysed separately. The results indicated that as all of the items on the CASQCP and CASQCN scales fitted the Rasch model, the scales could be considered independently (Yates, 1998a; Yates and Afrassa, 1994; Yates, Keeves & Afrassa, 1998). Student scores were estimated concurrently for both the CASQCP and CASQCN scales. Of the 26 items in The Children's Depression Inventory that were administered to students, 20 met the requirements of the Rasch model (Yates, 1997; 1998a; 1998b). These 20 items were used for the estimation of student scores.

Table 2 Interclass (r) and intraclass(rho) correlations between the 1993 and 1995 measures of the CASQCP, CASQCN N = 243 rho r CASQCP 0.30 0.35 CASQCN 0.32 0.32

Stability of the CASQCP and CASQCN scales

In the measurement of any human characteristic over time, some variability is expected to occur both in relation to measurement error and to factors such as learning (Keeves, 1994). Interclass and intraclass correlations, shown in Table 2, indicated that both of the CASQ measures were moderately stable over the three year period.

The Development of Optimism (CASQCP) and Pessimism (CASQCN)

Significant correlations between the separate positive and negative CASQ measures were found over time as shown in Table 3. Subject scores on the 1993 CASQCP were significantly correlated at a moderate level with the 1995 CASQCP scores (r = 0.35, p < 0.001), while the 1993 CASQCN similarly was correlated at a moderate but significant level (r = 0.32, p < 0.001) with the 1995 CASQCN. These significant correlations between the 1993 CASQCP and CASQCN and their respective counterparts in 1995 were not unexpected, since they represent indices of stability across time. The 1993 CASQCP was correlated negatively with the 1995 CASQCN (r = -0.15, p < 0.05), but a significant relationship was not evident between the two scales in either 1993 or 1995. The 1993 CASQCP and 1995 CASQCN scales were negatively correlated because the CASQCN is negatively scored.

Table 3 Correlations between the CASQCP and CASQCN in 1993 and 1995 Variable N = 243 2 3 4 5 6 1 993 CASQCP • 0.35*** -0.15* -0.15* 0.13* 2 1993 CASQCN - • 0.32*** • - 0.19** 3 1995 CASQCP - • • • • • 4 1995 CASQCN - • • • -0.19** 5 1993 Year level - • 6 Gender - * p < 0.5, ** p < 0.01, *** p < 0.001, • correlation not significant With respect to Year level and gender, the most significant correlation which was negative (r = -0.19, p < 0.01) was found between gender and the 1993 and 1995 CASQCN, with the correlations indicating that boys (coded as 1) were more pessimistic than girls (coded as 2). While gender correlated positively with the CASQCP in 1993 (r = 0.13, p < 0.05), this relationship did not hold for 1995, suggesting that gender was a stronger variable for younger children. While gender was thus a significant variable for both the CASQCP and CASQCN for students of primary school age, their actual Year level was only weakly related to the 1993 CASQCP (r = 0.15, p <0.05), but not the CASQCN.

Table 4 Comparison of mean CASQCP scores for males and females by Year level Year 3 Year 4 Year 5 Year 6 Year 7 Year 8 Year 9 Male CASQCP93 1.35 -0.01 -0.05 0.18 -0.04 Female CASQCP93 0.43 0.47 0.11 0.26 0.41 Male CASQCP95 0.68 -0.07 -0.24 -0.06 -0.07 Female CASQCP95 0.45 -0.05 -0.24 -0.03 0.1

Figure 1 Comparison of mean CASQCP scores for males and females by Year level

The Development of Optimistic Explanatory Style
Gender differences in the mean logit values for the 1993 and 1995 CASQCP scores for each Year level presented in Table 4 are plotted in Figure 1. In the Rasch scaling of the CASQ, the responses of 18 Year 3 students from the second school were combined with the Year 4 data as the sample was too small for independent analysis. These younger students had stronger ratings in both the 1993 and 1995 CASQCP scale. This cohort effect which was not evident for any other Year level, was most marked for the males. The trends for the CASQCP as shown in Figure 1, indicated a reduction in optimism in relation to Year level over time.

Year level was found to be a significant variable with the unique sum of squares analysis of variance (ANOVA), as presented in Table 5. The interaction effect between the 1993 Year level and gender in Table 5 suggested that while gender was not a significant factor when considered alone, it nevertheless had an influence on the CASQCP for 1993. With direct entry multiple regression a slightly different pattern emerged as shown in Table 6. Year level was a significant predictor of the 1993 CASQCP but not for 1995. Gender was a significant predictor only of the 1993 CASQCP measure. These differences indicate the existence of a non-linear relationship between Year level and CASQCP as presented in Figure 1.

Table 5 Analysis of variance: 1993 CASQCP by 1993 Year level and gender

<table>
<thead>
<tr>
<th>Source</th>
<th>Sum of Squares</th>
<th>DF</th>
<th>Mean Squares</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1993 Year level</td>
<td>9.71</td>
<td>4</td>
<td>2.43</td>
<td>5.82</td>
<td>0.000</td>
</tr>
<tr>
<td>Gender</td>
<td>0.11</td>
<td>1</td>
<td>0.11</td>
<td>0.25</td>
<td>NS</td>
</tr>
<tr>
<td>Interaction</td>
<td>7.73</td>
<td>4</td>
<td>1.93</td>
<td>4.64</td>
<td>0.001</td>
</tr>
<tr>
<td>Residual</td>
<td>97.11</td>
<td>233</td>
<td>0.42</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>118.36</td>
<td>242</td>
<td>0.49</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 6 Regression analysis: Predicting the 1993 CASQCP and 1995 CASQCP by Year level and gender

<table>
<thead>
<tr>
<th>Variable</th>
<th>N = 243</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>r</td>
</tr>
<tr>
<td></td>
<td>Beta</td>
</tr>
<tr>
<td></td>
<td>t</td>
</tr>
</tbody>
</table>

Significance of t: 1993 Year level

Gender -0.15
-0.13 -0.15
-0.13 -2.35
2.05 0.000
0.01 Multiple R = 0.20
R square = 0.04 F = 4.94

Significance of F = 0.008 1995 CASQCP Variable N = 243 r Beta t Significance of t: 1993 Year level
Gender -0.09
0.03 -0.09
0.02 -1.37
0.38 NS
NS Multiple R = 0.09
R square = 0.01 F = 1.01
Significance of F = 0.36 NS = Not Significant

Table 7 Comparison of the mean CASQCN scores for males and females in each Year level
Year 3 Year 4 Year 5 Year 6 Year 7 Year 8 Year 9 Male CASQCN93 -1.25 -1.12 -1.01 -0.99
-0.89 Female CASQCN93 -1.57 -1.19 -1.34 -1.53 -1.12 Male CASQCN95 -1.56 -1.15 -1.09 -
0.94 -0.95 Female CASQCN95 -1.24 -1.36 -1.21 -1.57 -1.31

Figure 2 Comparison of mean CASQCN scores for males and females by Year level

The Development of Pessimistic Explanatory Style

The mean logit values for the CASQCN scores for each Year level for both 1993 and 1995
for males and females presented in Table 7 are plotted in Figure 2. The scores for males on
this negative scale indicated that they were more pessimistic in both 1993 and 1995, a
significant effect confirmed by sequential sums of squares ANOVA presented in Table 8,
and direct entry multiple regression shown in Table 9. In light of the slight item bias evident
for males in the CASQCN (Yates, 1998a; Yates & Afrassa, 1994), this level of pessimism
may be slightly under reported. The Year level of the students was not a significant variable.

Summary of the Development of Optimism and Pessimism

While moderately significant correlations between the separate measures of the CASQCP
and CASQCN over time were found together with a weak, negative correlation between the
1993 CASQCP and the 1995 CASQCN, the two variables correlated in 1993 (r = -0.11) and
in 1995 (r = -0.11). This confirmed the findings of the previous research, in which the
CASQCP and CASQCN tended to be negatively correlated (Nolen-Hoeksema et al., 1992).
While these earlier findings were sample dependent, the Rasch scaled scores used in this
study are sample independent and psychometrically stronger.

Table 8 Analysis of variance: CASQCN by 1993 Year level and gender

1993 CASQCN Source Sum of Squares DF Mean Squares F Sig. F 1993 Year level 2.18 4
0.54 0.88 NS Gender 5.54 1 5.54 9.00 0.003 Interaction 1.81 4 0.45 0.73 NS Residual 143.5
233 0.62 Total 153.0 242 0.63 1995 CASQCN Source Sum of Squares DF Mean Squares F
Sig. F 1993 Year level 2.09 4 0.52 0.94 NS Gender 5.27 1 5.27 9.45 0.002 Interaction 4.04 4
1.01 1.81 NS Residual 129.93 233 0.56 Total 141.33 242 0.58

Table 9 Regression analysis: Predicting the 1993 CASQCN and 1995 CASQCN by Year
level and gender 1993 CASQCN

Variable N = 243
Students' gender and Year level had variable effects on the CASQCP and CASQCN measures. In general, the students' Year level was a significant factor only for the CASQCP. The significant correlation between the students' Year level and the CASQCP measure was evident in the multiple regression analysis for 1993, but with the ANOVA it was found to be a significant variable for both 1993 and 1995. Inspection of the mean CASQCP scores in Table 4 and Figure 1 indicated that the trend for a decrease in the optimism scores was most evident in Years 6 and 7, confirming the earlier finding of Nolen-Hoeksema et al. (1991) that students' explanatory style for positive events became more maladaptive with time. The tendency for this decrease to occur in early adolescence had been noted also in earlier research (Nolen-Hoeksema et al., 1992), although it had been reported as an increased rate of pessimism in terms of a composite CASQ score.

Gender correlated with the CASQCP in 1993 and the CASQCN in both years, a pattern that was also evident with the multiple regression analyses. However, while gender was not a significant variable with the ANOVA for the CASQCP in either 1993 or 1995, it was significant for the CASQCN. The trend for males to have higher scores on the CASQCN in 1993 was in keeping with previous studies (Nolen-Hoeksema et al., 1986; 1991; 1992). Males have been generally found to be more pessimistic than females over time, particularly
in relation to the CASQCN measure (Nolen-Hoeksema et al., 1992). However, in contrast to the finding that males became more optimistic between the ages of 13 and 15 (Nolen-Hoeksema & Girgus, 1995), there was no difference between males and females at Year 8 although there was a slight trend for females in Year 9 to show an increase in their CASQCP scores as presented in Table 4 and Figure 1.

The Children's Depression Inventory

The Rasch scaled case estimate scores ranged from -5.28 to 1.13 with a mean of -2.30 and a standard deviation of 1.21. The means and standard deviations for Years 5 to 9 overall and for males and females separately are presented in Table 10 and Figure 3. These data show that females reported less depression than the males at each Year level, although at the Year 9 level this difference is very slight.

<table>
<thead>
<tr>
<th>Year</th>
<th>Combined</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Combined</td>
<td>18 1.23</td>
<td>-2.49</td>
</tr>
<tr>
<td>6</td>
<td>Combined</td>
<td>62 1.30</td>
<td>-2.39</td>
</tr>
<tr>
<td>7</td>
<td>Combined</td>
<td>43 0.98</td>
<td>-2.01</td>
</tr>
<tr>
<td>8</td>
<td>Combined</td>
<td>66 1.35</td>
<td>-2.57</td>
</tr>
<tr>
<td>9</td>
<td>Combined</td>
<td>54 1.01</td>
<td>-2.03</td>
</tr>
</tbody>
</table>

The Relationship between Explanatory Style and Depression.

As both sets of CDI and CASQ scores had been placed on separate Rasch scaled logit scales, the relationships between them could be directly compared across time. With the exception of the 1993 CASQCP which did not correlate with depression, significant correlations between the separate CASQ measures were found with the 1995 measure of depression. Both of the proximal measures of the 1995 CASQ, presented in Table 12, were stronger than the more distal measure of the 1993 CASQCN. While the significant negative correlation of -0.21 (p < 0.001) between the concurrent measures of the CASQCP and depression was stronger than the relationship for the 1993 CASQCN (r = 0.18), it was not quite as strong as that between the 1995 CASQCN and the CDI (r = 0.33, p < 0.001), although the differences discussed are not significant. With direct entry multiple regression the concurrent measures of the CASQ were better predictors of depression with both 1995 measures significant. These results are presented in Table 13 for the CASQCP scores, Table 14 for the CASQCN scores, Table 15 for the 1993 CASQCP and CASQCN and Table 16 for the 1995 CASQCP and CASQCN. Of the 1993 CASQ measures, the negative scores were predictive of depression two years later but only when analysed with the CASQCP (see Table 6.14) suggesting that the proximal measure of the CASQCN had a stronger influence.

<table>
<thead>
<tr>
<th>Year</th>
<th>Combined</th>
<th>Male</th>
<th>Female</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>5</td>
<td>Mean</td>
<td>2.49</td>
<td>-2.68</td>
</tr>
<tr>
<td>6</td>
<td>Mean</td>
<td>1.38 -2.48</td>
<td>Female 28 1.22 -2.29</td>
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<td>7</td>
<td>Mean</td>
<td>0.98 -2.01</td>
<td>Male 22 1.11 -2.20</td>
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<td>8</td>
<td>Mean</td>
<td>1.35 -2.57</td>
<td>Male 38 1.34 -2.23</td>
</tr>
<tr>
<td>9</td>
<td>Mean</td>
<td>1.01 -2.03</td>
<td>Male 30 1.01 -2.19</td>
</tr>
</tbody>
</table>

Table 12 Correlations between CASQCP and CASQCN in 1993 and 1995 and self reported depression 2 3 4 5 1 1993 CASQCP • 0.35*** -0.15* • 2 1993 CASQCN • 0.32*** 0.18** 3 1995 CASQCP • -0.21*** 4 1995 CASQCN 0.33*** 5 1995 self reported depression - * p < 0.5, ** p < 0.01, *** p < 0.001, • correlation not significant
Table 13 Regression analysis: Predicting depression by 1993 and 1995 CASQCP

<table>
<thead>
<tr>
<th>Depression</th>
<th>Variable N = 243</th>
</tr>
</thead>
<tbody>
<tr>
<td>r</td>
<td>Beta</td>
</tr>
<tr>
<td>t</td>
<td>Significance of t 1993 CASQCP</td>
</tr>
<tr>
<td>1993 CASQCP</td>
<td>0.10</td>
</tr>
<tr>
<td>1995 CASQCP</td>
<td>-0.21 -0.02</td>
</tr>
<tr>
<td></td>
<td>-0.20 -0.43</td>
</tr>
<tr>
<td></td>
<td>-3.01 NS</td>
</tr>
<tr>
<td></td>
<td>0.003 Multiple R = 0.21</td>
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<tr>
<td>R square</td>
<td>0.05 F = 5.77</td>
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<tr>
<td>Significance of F</td>
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</table>

Table 14 Regression analysis: Predicting depression by 1993 and 1995 CASQCN

<table>
<thead>
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<th>Depression</th>
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</tr>
</thead>
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<td>Beta</td>
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<tr>
<td>t</td>
<td>Significance of t 1993 CASQCN</td>
</tr>
<tr>
<td>1993 CASQCN</td>
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<td>1995 CASQCN</td>
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<tr>
<td></td>
<td>0.31 1.32</td>
</tr>
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<td></td>
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<td>0.00 Multiple R = 0.34</td>
</tr>
<tr>
<td>R square</td>
<td>0.12 F = 15.96</td>
</tr>
</tbody>
</table>
Significance of F = 0.00

Table 15 Regression analysis: predicting depression by 1993 CASQCP and CASQCN Depression

Variable N = 243

r
Beta
t
Significance of t 1993 CASQCP

1993 CASQCN -0.10
0.18 -0.08
0.19 -1.27
-2.73 NS
0.007 Multiple R = 0.20

R square = 0.04 F = 4.96
Significance of F = 0.008

Table 16 Regression analysis: predicting depression by 1995 CASQCP and CASQCN Depression

Variable N = 243 r Beta t Significance of t 1995 CASQCP

1995 CASQCN -0.21
0.33 -0.18
0.31 -2.94
5.20 0.004
0.000 Multiple R = 0.38

R square = 0.14 F = 19.85
Significance of F = 0.00

Summary of the Results

1 The CASQCP and CASQCN each form separate scales.
2 Both explanatory style scales are moderately stable over the three years.

3 While explanatory style develops when students are in primary school, older students with more pessimistic explanatory style are at greater risk of depression.

4 While age is not an important variable in the development of explanatory style, males are consistently more pessimistic than females.

5 Explanatory style is related to concurrent measures of depression.

Discussion

While the CASQCP and CASQCN measures were moderately stable, the relationships between them across time and in relation to depression have yielded some interesting results. The 1993 measures of the CASQCP and CASQCN were moderately correlated with their counterparts in 1995, but a significant correlation between the two scales was not evident except for the 1993 CASQCP with the 1995 CASQCN. In general, there was a decrease in optimism and an increase in pessimism which was more evident for males than females.

While Year level was a significant variable in both 1993 and 1995, it was only strongly predictive of the CASQCP in 1993 when the students were in primary school suggesting that once optimism was established, it did not change on entry to adolescence. Year level did not influence the CASQCN in either year. Gender was strongly predictive of the CASQCP scale only in 1993, but for the CASQCN it exerted an influence in both 1993 and 1995. Males were more pessimistic than females in 1993 and this pattern did not change in 1995.

While depression was clearly related to both of the concurrent measures of explanatory style, the 1993 CASQCN was significantly predictive of subsequent depression. This latter finding substantiated previous studies in which pessimistic explanatory style constituted a risk factor for the development of depression (Nolen-Hoeksema et al., 1986; 1991; 1992). The previous findings that older students were more likely to report depression was affirmed by this study, although the expectation that females would show greater levels of self-reported depression (Nolen-Hoeksema & Girgus, 1995) was not supported.

Educational implications

The impetus for this study initially came from a primary school principal who was interested in factors influencing students’ achievement in mathematics. Perceptions of success and failure in the classroom affect both teachers and students alike. Seligman (1990) has described explanatory style as an entrenched habit of thinking that develops in childhood and through which all experiences are filtered. Students bring to the classroom a rich range of experiences which influence how they account for their achievements. While teachers have been exhorted to provide successful learning experiences for their students (Berliner, 1987), the attributions that students make for their successes and failures are equally important. In particular, pessimistic students who believe that their failures are likely to be long lasting, to pervade all aspects of their work and to be due to their own ineptitudes need to be identified as early as possible in their primary school years, so that their trajectory towards depression and poorer achievement can be interrupted and reversed. Intervention studies have been conducted for adolescents (Peterson, 1988; Jaycox, Reivich, Gillham & Seligman, 1995) and college students (DeRubeis & Hollon 1995). This study would suggest that such interventions should begin when students are in primary schools and should target
attributions in specific subject areas, particularly as attributions have been found to be subject specific (Marsh, 1986). Furthermore, teachers need to be cognisant of the attributions that they make about students' work, particularly in relation to failures.

Suggestions for further studies

It would be advantageous for future studies to be conducted with a simple random sample, to reduce the sampling errors and problems of analysis associated within traditional cluster samples. It would also be useful for the data to be collected on more than two occasions, with depression measured at each data collection point. Not only would multiple measurements be more likely to capture students prone to depressive episodes (Nolen-Hoeksema et al. 1992), but it would also be possible to estimate the stability of depression over time.

This study focussed on the development of explanatory style in students during the primary and lower secondary school years, but little is known about its development in younger children at either the preschool or Junior Primary school levels. Peterson and Bossio (1991) have postulated that through their very early experiences babies as young as 6 months may be acquiring optimistic or pessimistic outlooks on life, but these assertions have yet to be substantiated. Furthermore, while development has been conceptualised within a Piagetian theoretical framework, studies have yet to address directly the relationship between students' explanatory style and their Piagetian stage of operation. Success in an academic milieu entails hundreds of hours of sustained practice. It is the factors both within and outside of the classroom which influence students' time on task that are crucial. Future research could be directed at the measurement of optimism and pessimism as it is operationalised in the regular classroom, particularly during the primary school years. Interviews with teachers, students and their peers could not only be used to investigate their own explanatory styles but also that of each other. Such data would shed light on some of the factors that influence children's explanatory style and of the role of teachers in its development.

As the majority of studies of optimism and pessimism have been conducted in the United States of America since the 1970s, very little is known about the cultural relativity of the construct of explanatory style. Salili (1996) has asserted that there is overwhelming evidence from cross cultural studies that causal attributions for achievement are mediated by cultural factors. Students from East Asian countries have been found to attribute their success in school to effort, rather than ability (On, 1996). It would therefore be of interest to replicate this study within an Asian country or with students who have been educated within a Confucian Heritage Culture. A major study should also be undertaken in examining the explanatory style of Australia's indigenous aboriginal students, and the impact of their notions of causality on their educational attitudes and achievement.
References


Acknowledgments

Deepfelt thanks are extended to Professor Keeves for his invaluable guidance.

The research was supported by a Flinders University Research Board Establishment Grant