

## Resilience and Academic Achievement among Adolescents

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This investigation is an attempt to study resilience in adolescents preparing for Engineering/Medical Entrance Examinations. It is a part of another research investigation on resilience in which 200 adolescents (mean age=18.36) experiencing high academic adversity were chosen from a larger group of 566. This was done by selection of those adolescents who scored above Q3 on the Academic Adversity Scale, developed during the research work. In the present investigation, the resilience of these 200 adolescents was assessed through administration of the Mampane Resilience Scale. The sample was divided into high resilience (HR) and low resilience (LR) groups through a median split of the resilience scores. The academic performance of HR and LR groups as well as HR males and HR females was compared. Finally an attempt was made to find out if resilience scores could predict academic success; the criteria for success being selection to one's target institute for higher education. The results revealed that individuals reporting high resilience showed better academic performance as compared to those perceiving themselves to be low on resilience. Males scored higher on resilience and performed better in competitive examinations than females did. A major finding of this study was that the chances of HR adolescents being successful in competitive examinations was found to be 120% greater than that of LR adolescents. Future researches are required to understand better, the role of resilience in academic performance which in turn may help adolescents to navigate through important educational transitional points in their lives.

**Keywords:** Resilience, Academic Adversity, Academic Achievement, Adolescents

Adolescence is a period when an individuals seek to establish an identity for themselves through the achievement of academic and career goals (Erikson, 1968; Havighurst, 1972; Herr, Cramer, & Niles, 2004). It is also the time when one becomes aware of the importance of doing well academically and also of how our exam-orientated society looks upon those who do not do well (Ren, 2007). For those aspiring to secure admission into Engineering or Medical colleges of good repute in India, the competition is growing more difficult with time. According to a poll by the October 2008 issue of Outlook, a popular Indian magazine, the most coveted career

options today are computer engineering and medicine. This fact is reflected in the number of students who appear for the entrance examinations to these courses after a year or two of grueling coaching sessions. About 3.2 lakh students across the country appeared for the Indian Institute of Technology (IIT) Entrance Examination in 2008, registering an increase of 70,000 students from the previous year (Jebaraj, 2008).

A survey conducted in New Delhi under "Social Mental Health Programme" revealed that 70% students appearing for the Board Examination are under stress. The NCERT

names it the “Exam ka Bhoot”<sup>1)</sup> syndrome (Menon, 2007). The severity of stress can also be inferred from its effect. March to July is the time when these examinations are held and also the sad consequences for those who cannot cope with it come to the fore. In March 2008 alone, 150 students ended their lives across India (Mittal, 2008).

Not all students faced with such challenging circumstances are able to perform well. Martin and Marsh (2003) cited that the phenomenon of resilience could be used to explain why some students are debilitated by setbacks, poor performance, and study pressure while others exhibit competence, under the very same circumstances.

Two basic assumptions underlying resilience research are: exposure to some adversity or challenge and, the demonstration of competent performance in the face of such challenge (Masten, Best, & Garmezy, 1990; Masten & Coatsworth, 1998; Rutter, 1990, Werner & Smith, 1982). Masten (2001) referred to resilience as manifested competence. Cefai (2004) agreed that common processes operate in both resilience and competence development. The criteria for competence in resilience researches have been set in accordance with the adversity and sample in question. For instance, longitudinal studies have generally used developmental tasks as a marker of competence (Werner & Smith, 1982).

One of the most prominent developmental outcomes of competence through childhood and adolescence is academic achievement (Masten & Coatsworth, 1998). Some investigators have treated academic achievement as an outcome of resilience in their studies (Leontopoulou, 2006; Morales, 2008a; Morales, 2008b). Leontopoulou (2006) explained that the rationale for using academic achievement as a criteria for competence was that, at the “particular

transitional period examined, academic achievement may reinforce feelings of success on the major challenge of university entry, rather than mirror adaptation itself” (p. 98).

Investigations have reported significant differences among resilient and non-resilient students’ academic performance. For instance, a study on 36 Hispanic youth by Gordon (1996) revealed that the resilient individuals excelled academically because they had more faith in their cognitive abilities than their non-resilient counterparts. They believed that they could understand the material presented in class and that they did well on homework and tests. About 78% of the resilient students in Waxman, Huang, and Padrón’s (1997) study indicated that they would graduate from high school, compared to only 43% of the non-resilient students. Similarly, over 90% of the resilient students indicated that they would graduate from college compared to only about 46% of the non-resilient students. In an examination of competent outcomes in late adolescence, Masten et al., (1999) followed a sample of 114 females and 90 males recruited in elementary school, for over 10 years. They found that the performance of resilient adolescents (high adversity, adequate competence) differed markedly from their high adversity, maladaptive peers who had few resources and showed high negative emotionality. Waxman, Huang, and Wang’s (1997) and Read’s (1999) respective studies, both conducted on 4th and 5th-grade classes re-affirmed that resilient students were much more successful in classrooms than non-resilient ones. These results were supported by Gizir (2004) who cited that that resilient children and adolescents were more likely do better in school academically and score higher on educational achievement and scholastic aptitude tests than non-resilient children. However, Nettles, Mucherach, and Jones (2000) in their study on 4<sup>th</sup> and 5<sup>th</sup> graders (N=75) concluded that students’

perceptions of stressful life events did not have a significant effect on achievement. Similar results were reported by Somchit and Sriyaporn (2004).

In their attempt to understand the role of resilience in academic performance, investigators have unearthed factors that are common to both. Culpepper (2004) in studying successful women graduates academic resilience and Phasha (2009) investigating the educational implications of childhood sexual abuse in 22 participants concluded that qualities such as strong self efficacy, determination, and motivation were not only effective in building resilience but were also instrumental in helping the individual to overcome the roadblocks along the academic journey. In other words, the reason resilient individuals are able to perform well is that the qualities that boost resilience, have been observed to enhance learning as well. For instance, academic achievement maybe related to resilience, as low self-esteem has been found to interfere with good academic learning (Clemes & Bean, 1990). Internal locus of control is supposed to be a predictor of achievement as well as resilience (Leontopoulou, 2006). That is, resilient qualities may help students to do better in academics.

It maybe thus deduced on the basis of available literature that resilient individuals maybe expected to show better academic performance as compared to those low on resilience.

#### **Objectives:**

1. To assess gender differences in resilience and academic achievement.
2. To assess academic achievement of high and low resilience groups.
3. To predict selection into target institutes through resilience scores.

#### **Hypotheses:**

On the basis of literature reviewed and the objectives for the present study, the following hypotheses were formulated:

1. Females will report higher level of resilience as compared to males.

2. HR adolescents will attain higher academic scores as compared to LR adolescents.

3. HR males will attain better academic scores as compared to HR females.

4. HR adolescents will have a better chance of being selected to their target institutes as compared to LR adolescents.

### **Method**

#### **Sample:**

The initial sample consisted of 566 students preparing for Engineering and Medical Entrance Examinations, belonging to the age range 17-20 randomly selected from various coaching centers in the city of Varanasi. The educational level of 57% of fathers of the adolescents was post-graduation and that of 58% of the mothers was below graduation. Furthermore, the fathers of 68% of the adolescents were holding jobs in private or public sector companies and 25% were self-employed (business, agriculture). 73% of the mothers were home-makers while 16% were teachers. The final sample selected from the group of 566 comprised of 200 adolescents (mean age=18.36).

#### **Tools:**

*The Academic Adversity Scale:* It was developed during a related research investigation for the purpose of identifying students who experience high academic adversity, in the course of preparing for Engineering/ Medical Entrance Examinations. The statements were kept short, simple and easy to understand. The scale consists of 11-items related to academic factors that the individual might perceive to be an obstacle on the way to achieving academic success. Alpha coefficient was calculated to be 0.71.

*The Resilience Scale:* It was originally developed by Mampane (2005) for the purpose of identifying resilient and non-

resilient adolescents. The 25 items in this scale are based on the following resilience factors: commitment, future aspirations, problem-solving, role models, self-awareness, sense of control and support. The statements reflect descriptions of behaviour that relate to activities, events and characteristics assumed relevant and applicable to an adolescent's life. The reliability of the Resilience Scale was established at an alpha value of 0.82 for the present sample. A record of the marks obtained by the students in their 10<sup>th</sup> and 12<sup>th</sup> standard final examinations was gathered through the Personal data Schedule (PDS). Information about the outcome of Engineering/Medical Entrance Examination was obtained from their respective coaching institutes.

### Results and Discussion

A comparison of the resilience scores of the HR and LR groups revealed that they differed significantly, with the former scoring higher than the latter. This difference maybe observed in Table 1.

**Table 1. Mean, SD and t-values obtained on Resilience Scores among HR (n=115) and LR (n=53) adolescents Resilience Scores**

Group	M	SD	t value
HR Adolescents	72.74	3.78	9.88**
LR Adolescents	81.30	7.29	

\*\* p<.01

**Table 2: Mean, SD and t values obtained on the Resilience Scale by Male (N=138) and Female (N=62) Adolescents**

Group	Mean	SD	t value
Males	78.44	5.26	3.07**
Females	75.90	4.96	

\*\* p< .01

A perusal of Table 2 reveals a significant gender difference on resilience scores, with males reporting better resilience scores than females. The obtained findings lead to the

rejection of Hypothesis 1. The results found here are also inconsistent with some of the earliest studies where being female was considered to be a protective factor in resilience (Garmezy, 1985; Rutter, 1985). But being born female is the opposite of being born male which is a risk factor, and as yet there is no evidence of a buffering effect; also, being female entails less exposure to violence, less impulsiveness and less audacity (Office of the Surgeon General, 2001, Chapter 4). Rew and Horner (2003) and Ahern (2006) also confirm that gender is a risk factor in resilience. The present study supports Werner and Smith's (1989) longitudinal study, which found that girls were less resilient than boys between ages 11 and 20. The findings here could also be explained by the fact that almost all of the studies that found females to be more resilient than males, considered developmental tasks and long term achievement goals over the years through adolescence to adulthood, as markers of competence for assessing resilience. Contrarily in this study, the dimensions of the Resilience Scale focused on factors such as social competence, problem-solving skills, autonomy, and a sense of purpose. Considering the sociocultural environment here, it maybe noted that these attributes are more encouraged in males than females, by both society as well as females themselves. Generally, academic aspirations especially in the engineering and medical fields are stronger in males than females. This may explain why males have scored higher in resilience than females. Besides, the findings here could have been influenced by low representation of females in the final high adversity sample.

The academic performance of HR and LR groups and; HR males and HR females was considered next. This is presented in Tables 3 and 4 below. An examination of Table 3 reveals that in both 10<sup>th</sup> and 12<sup>th</sup> Standards, HR adolescents have registered

higher means as compared to LR adolescents. In addition to this, 53% of HR adolescents have achieved success in the competitive examinations as compared to a mere 6% in the LR group. Thus the former have shown better academic performance as compared to the latter. This confirms Hypothesis 2.

Table 4, reveals that in both 10<sup>th</sup> and 12<sup>th</sup> standard board examination, HR females have registered slightly higher percentage means as compared to HR males. However, in competitive examinations, 38% of HR males were found to have achieved success as compared to a 23% of HR females. This supports Hypothesis 3 partially.

Although HR females showed slightly better performance than HR males in board examinations, when the criteria of selection to a reputed Engineering/Medical Institute was considered, the outcome was better for HR males than HR females. These results can also be viewed in the light of past investigations. Even as some researchers have cited biological reasons (Levin, 1988) to explain women's poor performance in science subjects; some have raised questions on whether this difference is a fact or an artifact (Benbow & Stanley, 1980). Santos, Ursini, Ramirez and Sanchez (2006)

reported no significant differences on mathematical ability between 12-13 year old male and female students (N=1056) but found that students (both boys and girls) with masculine traits do better. Spelke (2005) noted that men and women develop equal talent for mathematics and science. However, researchers did agree that this difference in performance was somewhat increased by environmental influences. Murphy, Steele, and Gross (2007) argued that the features and organization of any setting; Math, Science and Engineering environments for example, themselves play a significant role in contributing to this gender gap. She contended that situational cues (for instance, being outnumbered) may contribute to a decrease in women's performance expectations, as well as their actual performance. This helps to explain not just poor performance but also poor representation of women in these fields as compared to men. Given that of all the students admitted to B. Tech. or B. E. in India in 2001, a mere 22% were women (Banerjee & Muley, 2007); the male: female ratio thus appears to be skewed in favor of men (Joseph, 2005).

Logistic regression analysis was used to predict the success of adolescents (the criterion for success being selection to one's

**Table 3. Academic Performance of HR and LR groups in 10<sup>th</sup> and 12<sup>th</sup> Standard and Competitive Examinations**

Acad. Perf. Groups	10 <sup>th</sup> Std. Scores			12 <sup>th</sup> Std. Scores			% of Successful Candidates in Competitive Exam.
	M	SD	t	M	SD	t	
HR adol.	76.36	8.74	3.61**	79.45	7.7	4.43**	53%
LR adol.	71.93	8.35		72.6	8.62		6%

\*\* p < .01

**Table 4. Academic Performance of HR males and HR females in 10<sup>th</sup> and 12<sup>th</sup> Standard and Competitive Examinations**

Acad. Perf. Groups	10 <sup>th</sup> Std. Scores			12 <sup>th</sup> Std. Scores			% of Successful Candidates in Competitive Exam.
	M	SD	t	M	SD	t	
HR males	75.58	8.79	1.62	78.69	7.82	1.81	38%
HR females	78.56	8.35		81.62	7.03		23%

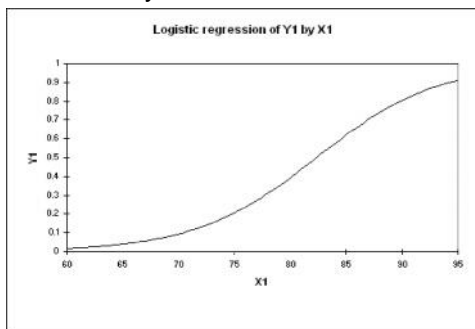
\* p < .05, \*\* p < .01

**Table 5: Classification Table for the Estimation Sample Showing Odds Ratio**

Y1	0	1	Total	% correct	Odds Ratio
0	116	18	134	86.57%	1.202
1	50	16	66	24.24%	at 95% confidence interval
Total	166	34	200	66.00%	

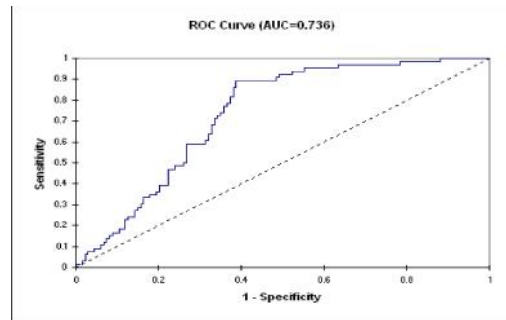
target institute for higher education) on the basis of their resilience scores. The categorical independent variables on Y1 axis were 'selected' (1) and 'not-selected' (0), while the dependent variable, resilience was represented by continuous scores on X1.

Campbell, 1993). Thus it maybe derived that the resilience test is close to being a good discrimination test (0.74) for successful and unsuccessful adolescents, the criterion for success being selection to one's target institute.



**Figure 1. Logistic Regression of Y1 by X1**

An examination of Figure 1 reveals that with increase in resilience scores, the probability of the adolescent of being selected to the target institute increases. The impact of the predictor variable is further explained in terms of odds ratio, which estimates the odds of occurrence of the 'event.'



**Figure 2. ROC curve**

Table 5 above shows the odds ratio to be 1.202 which indicates that the odds for a positive outcome that is, getting selected to the target institute is 1.202 times or 120% higher in HR adolescents as compared to LR adolescents. Finally, AUC (area under curve) was used as a summary means of the ROC curve to assess the overall performance of The Resilience Scale in terms of its accuracy in being able to discriminate between cases and non-cases of successful adolescents.

The results of the logistic regression are similar to that of prior investigations. Saiduddin (2003) investigated the relationship between school achievement (SAT Science score) and the scores on resiliency. The four subscales of the resiliency measure were positive attitude, independence, goal, and empathy. The results indicated that the Goal-subscale was strongly positively associated with achievement. A significant correlation was also found between Positive Attitude Subscale and achievement. The researcher explained that resilient individuals have the ability to cope with their problems and focus on the future, and for this they prepare to attain the skills necessary to accomplish their goal. Nota, Soresi and Zimmerman (2004) in studying 81 Italian students during the final years of high school and their subsequent academic achievement and resilience in pursuing higher education found "clear longitudinal evidence of resilience on the part of these students" (p. 214) in predicting high

Figure 2 shows the AUC value to be 0.74. An ROC plot with perfect discrimination passes through the upper left corner (100% specificity, 100% sensitivity); thus closer the ROC plot is to the upper left corner, higher is the overall accuracy of the test (Zweig &

school grades in Italian, technical studies and mathematics. The investigators add that the students' use of organizing and transforming strategies predicted their intentions to attend college and their success on a later nationwide diploma test.

Thus it maybe summarized that in the present study, males were found to report significantly greater resilience as compared to females. Individuals reporting high resilience showed better academic performance as compared to those perceiving themselves to be low on resilience. A major finding of this study was that the chances of HR adolescents being successful in competitive examinations was found to be 120% greater than that of LR adolescents. Normative stressors such as those met at educational transition points have the potential to induce a certain level of adversity in the lives of late adolescents (Zautra, Guarnaccia, Reich, & Dohrenwend, 1988; Leontopoulou, 2006). However, resilience can assist with the successful adaptation from high school to college (Hall, Spruill, & Webster, 2002; Hudson, 2007) as during times of transition, stressors tend to be the greatest and one requires increased ability to cope (Stewart, Reid, & Mangham, 1997).

In a recently concluded resilience project, Davidson (2008) found that the ways in which resilient people frame the difficulties and challenges they face, were reflected in their ability to set boundaries, articulate needs and desires and to have goals, for instance trying to be a role model or building a career in a structured way.

Future researches conducted on a larger sample may provide a better insight into the role of resilience in the educational success of adolescents; and this information maybe utilized in helping individuals at important educational transitional point in their lives to perform better by helping them to enhance their resilience.

Note: "Bhoot" means ghost in Hindi. "Exam ka Bhoot" implies that the situation is perceived as frightful.

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