

Chapter 5

Bullying behaviour II

Factor analysis and standardized score techniques were used to identify bullying outcome, its prevalence of bullying behaviour, and its risk factors in logistic regression model is analyzed in this chapter. The results from this chapter also appear in Laeheim et al (2009).

5.1 Identifying bullying outcome

The second techniques for identifying bullying outcome in this study is using statistical method; factor analysis and standardized score as follows.

The first method involved an exploratory factor analyses using maximum likelihood method with varimax rotation, eigenvalue greater than one, and item loadings greater than 0.30 (Hair et al, 1998) as described in Chapter 2, equation (2.3). Factor analysis resulted in the identification of four types of bullying: a serious physical bullying factor comprising 'kick', 'hit', and 'bite', a minor physical bullying factor comprising 'push', 'throw something at', 'beat', 'pinch' and 'scold', a psychological bullying by maligning a parent factor comprising 'insult parent's occupation', and 'insult parent's name', and a psychological bullying by maligning the student factor comprising 'insult students appearance' and 'insult students economic status', as listed in Table 5.1.

Bullying behaviour categories	Factor loading			
	Serious physical bullying	Minor Physical bullying	Psychological bullying (Maligning parent)	Psychological bullying (Maligning student)
Kick	0.822			
Hit	0.825			
Bite	0.380			
Pinch		0.783		
Beat		0.587		
Throw something at		0.507		
Push		0.458		
Scold/ name-calling		0.366		
Insult parent's occupation			0.878	
Insult parent's name			0.399	
Insult economic status				0.765
Insult appearance				0.448
Eigenvalue	1.85	1.77	1.21	1.01
Variance explained	15.4%	14.7%	10.1%	8.4%

Table 5.1: Factor loading scores for each type of bullying

In the second method, the new scores for four types of bullying were calculated by using discrete scores to compare with the criteria that were adapted from a Likert rating scale: loadings 0.00-0.25 scored as 0, 0.26-0.50 scored as 1, 0.51-0.75 scored as 2, and 0.76-1.00 scored as 3. The resulting new scores were thus as follows: kick, hit, and bite: 3, 3 and 1, respectively; push, throw something at, beat, pinch and scold: 3, 2, 2, 1 and 1, respectively; insult parent's occupation: 3 and insult parent's name: 1; and insulting students appearance is 3 and insulting students economic status: 1. The resulting new scores are listed in Table 5.2.

Bullying behaviour categories	New scores			
	Serious physical bullying	minor Physical bullying	Psychological bullying (Maligning parent)	Psychological bullying (Maligning student)
Kick	3			
Hit	3			
Bite	1			
Pinch		3		
Beat		2		
Throw something at		2		
Push		1		
Scold/ name-calling		1		
Insult parent's occupation			3	
Insult parent's name			1	
Insult economic status				3
Insult appearance				1

Table 5.2: Resulting new scores for each type of bullying

In the third method, the total scores for each type of bullying were calculated by using new scores for four types of bullying. The resulting total scores are thus as follows:

serious physical bullying (scores 0-7): $(3 \times \text{hit}) + (3 \times \text{kick}) + \text{bite}$; minor physical bullying (scores 0-9): $(3 \times \text{pinch}) + (2 \times \text{beat}) + (2 \times \text{throw something at}) + \text{push} + \text{scold}$; psychological bullying by maligning a parent (scores 0-4): $(3 \times \text{insult parent's occupations}) + \text{insult parent's names}$; and psychological bullying by maligning the student (scores 0-4): $(3 \times \text{insult students economic status}) + \text{insult students appearance}$.

In the fourth method, the bullying scores were analyzed by combining the total scores for each type of bullying: serious physical bullying (scores 0-7) + minor physical bullying (scores 0-9) + psychological bullying by maligning a parent (scores 0-4) + psychological bullying by maligning the student.

The fifth method, transform the bullying scores into Z-scores (standardized to a mean of 0 and a standard deviation of 1).

Finally, the students were identified into two categories for bullying, 'bullied' or 'not bullied'. The students who had a standardized score greater than 1 were identified as a bully (Scholte et al, 2007; Gini, 2008). After identified these categories, it was found that 301 (20.9%) students could be identified as a bully in the past year.

5.2 Associations between bullying and risk factors

The associations between the outcome and the eight study determinants are shown in Table 5.3. Since all of the variables are categorical, Pearson's chi-squared test is used to assess the statistical significance of the association in each case as described in Chapter 2, equation (2.7) and (2.10). Results show that school type, gender, age group, religion, parental physical abuse, and cartoon type were strongly associated with bullying.

Determinants	Bullied behaviour		Chi-squared	p-value
	Not bullied (1,139)	Had bullied (301)		
School type			3.9	0.049*
Private	78.2	21.8		
Public	80.0	20.0		
School location			0.7	0.399
Urban	82.5	17.5		
Rural	77.8	22.2		
Gender			31.1	0.000**
Female	84.5	15.5		
Male	72.4	27.6		
Age group			10.3	0.006**
8 yrs or less	82.9	17.1		
9-10 yrs	79.6	20.4		
11 yrs or more	74.4	25.6		
Religion			12.7	0.000**
Muslim	82.6	17.4		
Non-Muslim	75.0	25.0		
Parental physical abuse			213.5	0.000**
Not witnessed	87.0	13.0		
Witnessed	48.1	51.9		
Cartoon type preference			66.9	0.000**
Comedy	86.5	13.5		
Action	64.5	35.5		
Mystery	83.0	17.0		
Number of close friends			5.9	0.051
2 persons or less	80.6	19.4		
3-5 persons	80.7	19.3		
6 persons or more	74.7	25.3		

* p-value < 0.05

** p-value < 0.01

Table 5.3: Associations between bullying and study determinants

Odds ratio plots of bullying categorized by six different risk factors are shown in Figures 5.1–5.6.

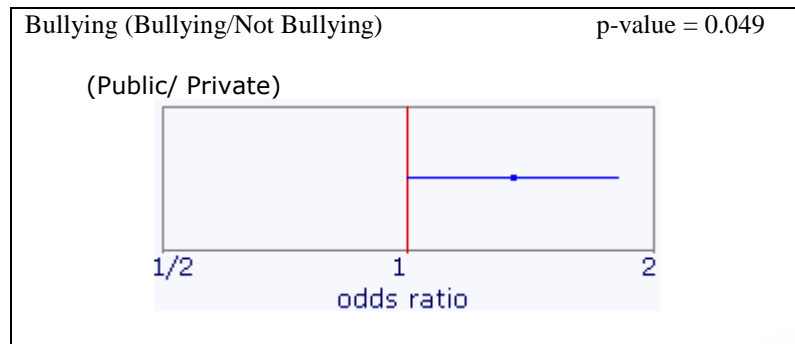


Figure 5.1: Odds ratio of bullying by school type

Figure 5.1 shows the odds ratio plot of bullying for the student's school type. The students from public schools reported bullying others significantly more often than did students from private schools (OR 1.35, 95% CI 1.01-1.82).

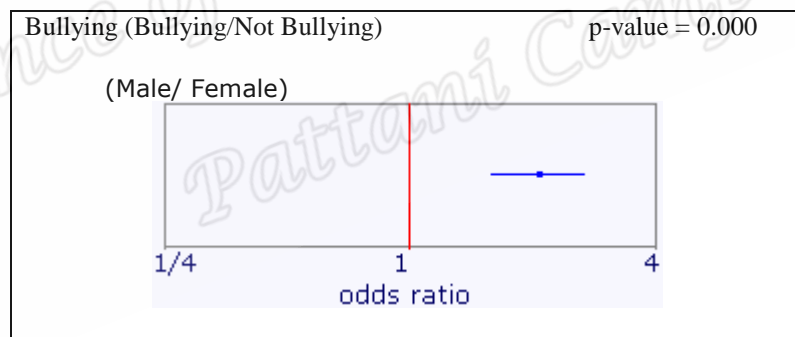


Figure 5.2: Odds ratio of bullying by gender

Figure 5.2 shows the odds ratio plot of bullying for the student's gender. More males than females reported that they bullying others (OR 2.07, 95% CI 1.59-2.69).

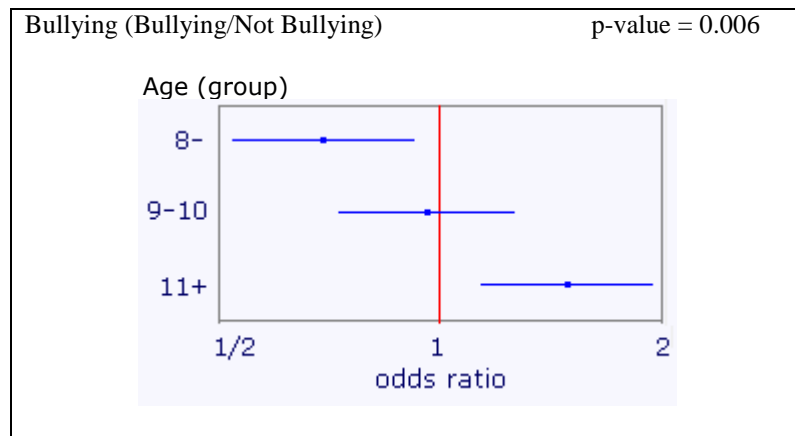


Figure 5.3: Odds ratio of bullying by age group

Figure 5.3 shows the odds ratio plot of bullying for the student's age (group). The students aged 11 years or more (older students) were more likely to bully others than students aged 9-10 years and 8 years or less (younger students), (OR 1.49, 95% CI 1.13-1.95).

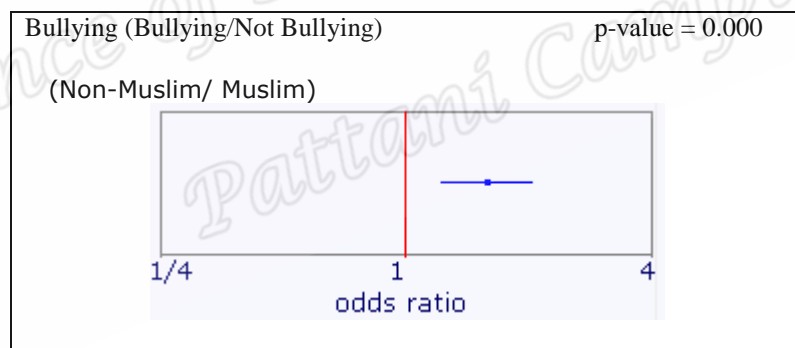


Figure 5.4: Odds ratio of bullying by religion

Figure 5.4 shows the odds ratio plot of bullying for the student's religion. Non-Muslim students were more likely to bully others than were Muslim students (OR 1.59, 95% CI 1.22-2.06).

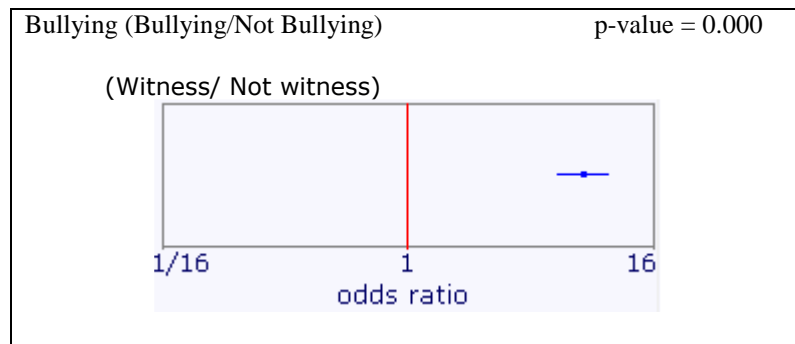


Figure 5.5: Odds ratio of bullying by parental physical abuse

Figure 5.5 shows the odds ratio plot of bullying for the student's witnessing parental physical abuse. The students who had witnessed physical abuse between their parents were more likely to be a bully than did those who had never witnessed physical abuse between their parents (OR 7.22, 95% CI 5.39-9.67).

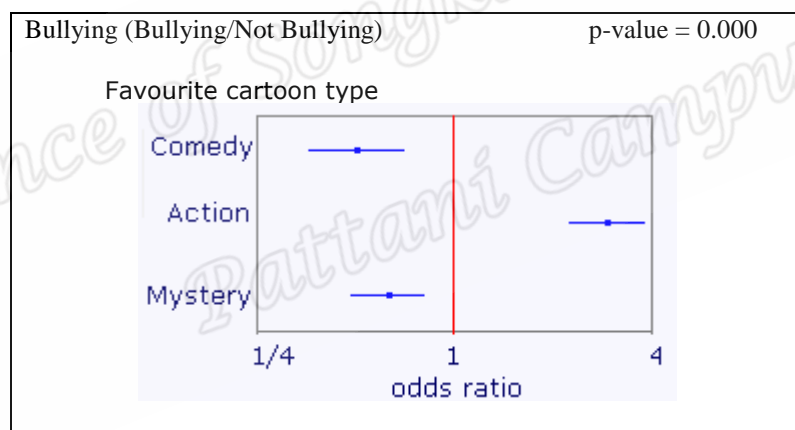


Figure 5.6: Odds ratio of bullying by cartoon type

Figure 5.6 shows the odds ratio plot of bullying for the student's preferred cartoons, action type. The students who preferred action cartoons tended to bully more than students who preferred mystery or comedy cartoons (OR 2.93, 95% CI 5.39-9.67).

5.3 Logistic regression analysis of bullying

The results from fitting the logistic regression model with all study variables and final models which examining the association between the bullying and risk factors are shows in Table 5.4-5.5. The logistic regression model as described in Chapter 2, equation (2.14) and (2.15).

Determinant	OR	(95% CI)	p-value	L-R test p-value
School type				0.742
Private				
Public	1.06	(0.76,1.48)	0.742	
School location				0.699
Urban				
Rural	1.06	(0.79,1.42)	0.699	
Gender				0.000
Female				
Male	1.85	(1.38,2.48)	0.000	
Age group				0.003
8 yrs or less				
9-10 yrs	1.25	(0.87,1.79)	0.224	
11 yrs or more	1.85	(1.29,2.64)	0.001	
Religion				0.001
Muslim				
Non-Muslim	1.67	(1.25,2.24)	0.001	
Parental physical abuse				0.000
Not witnessed				
Witnessed	7.38	(5.43,10.02)	0.000	
Cartoon type preference				0.001
Comedy				
Action	2.86	(1.91,4.29)	0.000	
Mystery	1.3	(0.88,1.92)	0.192	
Number of close friends				0.042
2 persons or less				
3-5 persons	1.12	(0.79,1.58)	0.522	
6 persons or more	1.29	(0.89,1.88)	0.183	

r-sq: 0.271 df: 1248 deviance: 1201.5 p-value: 0.000

Table 5.4: Model of association between bullying and study risk factors

Table 5.4 shows the results after fitting a logistic regression model with all study variables to the outcome. The fitted model initially contained additive effects for school type, school location, gender, age group, religion, parental physical abuse, cartoon type and number of close friends. The r-squared for this model was 27.1%, and gave a residual deviance of 1201.5 with 1248 degrees of freedom ($p=0.000$).

Determinant	OR	(95% CI)	p-value
Age group			0.002
8 yrs or less			
9-10 yrs	1.24	(0.87,1.78)	0.238
11 yrs or more	1.81	(1.27,2.58)	0.001
Parental physical abuse			0.000
Not witnessed			
Witnessed	7.60	(5.60,10.31)	0.000
Cartoon type preference			0.000
Comedy	0		
Action	2.87	(1.91,4.30)	0.000
Mystery	1.30	(0.88,1.92)	0.181
Religion			0.001
Muslim	0		
Non-Muslim	1.69	(1.26,2.25)	0.001
Gender			0.000
Female	0		
Male	1.82	(1.36,2.44)	0.000

r-sq: 0.269 df: 1432 deviance: 1203.8 p-value: 0.000

Table 5.5: Reduced model of association between bullying and risk factors

Table 5.5 shows the results of the logistic regression analysis after omitting determinants with p-values more than 0.05 using backward elimination. In this reduced model the five factors least significantly associated with the bullying are omitted.

The smallest p-values indicate the factors most strongly associated with the bullying. These include parental physical abuse and cartoon type. When comparing the deviance from the models shown in Tables 5.6 and 5.7, it was found that the difference between the deviances is 2.3, and the number of parameters omitted is 7, corresponding to a p-value of less than 0.001.

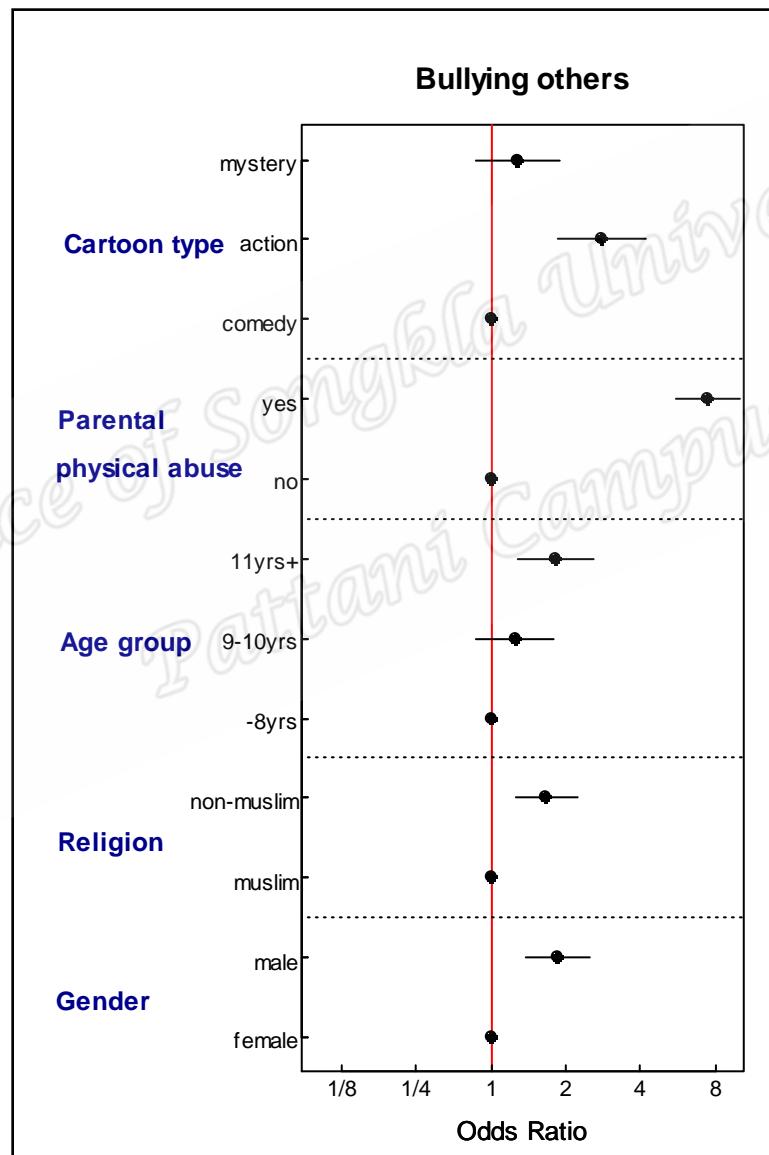


Figure 5.7: Risk factors of bullying in logistic regression; final model

Figure 5.5 shows the odds ratio plot of the results from fitting the final logistic regression model. It was found that witnessing parental physical abuse was clearly the most strongly associated determinant for bullying others. Students having witnessed parental physical abuse were more likely 7.60 times to bully others than were those who had never witnessed parental physical abuse (95% CI 3.40-5.89). Preference for action cartoons was also a major risk factor for bullying others; students who preferred action cartoons tended to bully more than did students who preferred comedy and mystery cartoons (OR 2.87, 95% CI 1.91-4.30). Among the age groups studied, older students (11+ years) were more likely to be a bully than did younger students (8 years or less); 1.81 times (95% CI 1.27-2.58). Males were 1.82 times (95% CI 1.27-2.28) and Non-Muslim students were 1.69 times (95% CI 1.26-2.25) more likely to have reported having bullied others than were females and Muslim students, respectively.