

Sources of Perceived Stress among Junior High School Students: Cross-cultural Comparison between Japan and England

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Abstract

To measure the sources of perceived, school-related stress among junior school students, the 40 items "Students Stress Inventory" (SSI) constructed by Alban Metcalfe, R. J. et al. was translated into Japanese and administered to 351 students. The responses to the inventory, in the form of a 4-point scale (range 0 - 3), were analysed for the principal component, using a formula by Shiba (1981). The data were compared with those by Alban Metcalfe, R. J. et al. The seven factors were identified by the Varimax solution and these factors were interpreted such as Factor 1; Self-image and relationship with "significant" adults, Factor 2; Relationship with friends and perspectives on future, Factor 3; School organization and function, Factor 4; Relationship with teachers, Factor 5; Learning tasks, Factor 6; Bullying and Factor 7; Achievement. These results were discussed from the stand-point of cultural background of the subjects.

There seems to be no universally accepted definition for the word "stress". Ann Masten¹⁾ defines stress as "the existence of unequilibrium between the demands made from environment stress is multidimensional in nature and not exclusively related to one pressure²⁾. It may mean that not only the organism's capacity but also life events and coping behaviors of an individual in everyday life would be associated with subsequent stress. The sources of stress take up many topics for discussion such as physical, chemical, biological, psychological and socioeconomic/cultural sources³⁾.

This study is concerned with the life phase of adolescence, that is a state of rapidly and radically changing condition. Especially, junior high school students in the industrialized countries are under the psycho-social pressure in which they have to face choices of schools and/or careers⁴⁾. The purpose of this study is to measure sources of perceived, school-related stress among normal high school students.

Subjects and Method

Subjects were 351 junior high school students. They were drawn from the sample of 1343 adolescents aged 13- 15 years who were born in 1971 - 73 and have been followed by the authors in a longitudinal study at K Public Health Center in an urban com-

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munity of Tokyo since 3 months of age^{5) - 10)}. At the time of present study, they were enrolled in 15 junior high schools, in each of which total numbers of students ranged from 150 to 1200. Forty-five percent of the parents were junior high school graduates, another 45 percent high school graduates, and 5 percent college graduates. Five percent of the fathers had administrative and professional occupation and the rest were clerical, semi-skilled, un-skilled or service workers.

The forty-item "Students Stress Inventory" (SSI) constructed by R. J. Alban Metcalfe, et al.¹¹⁾ was translated into Japanese and administered to 351 students. Because of the socio-cultural difference between Japan and England, three original items such as "expose of school holidays abroad", "help with choice of career" and "cost of school uniform" had to be changed. Instead of these items, "travel in holidays", "make choice of career" and "way of making friends" were introduced. The responses to the inventory, which were in the form of a four point scale (range: 0 - 3), were analysed for principal components, using a formula by Shiba¹²⁾. Then these data were compared with those by Alban Metcalfe et al.¹¹⁾ In order to test the reliability, Cronbach's alpha reliability-coefficient were calculated.

Results

The results of comparison between Tokyo (T) group (Japan) and Yorkshire & the Home Counties (Y. H. C.) group (England) were as follows.

1. Mean scores on individual items

Table 1 shows means and standard deviations of T group compared with that of Y. H. C. group. Significant differences between the two groups were found in 27 items. In all the items except for one "time taken to travel to school" in Y. H. C. group yielded higher scores than in T group.

Mean scores of each item ranged from 1.11 (S. D.; 1.00 "understanding questions in examination and tests") to 0.30 (S. D.; 0.69 "the number of pupils in my school"). As mean scores of each item in Y. H. C. group ranged from 2.04 to 0.48, the highest score of 1.11 in T group was about one half of that in Y. H. C. group (2.04). Two items of the highest score in Y. H. C. group were "parent made redundant" and "few suitable jobs for school leavers". These were quite different from that in T group such as "understanding questions in examination and tests."

2. Factor analysis

Table 2 indicates the seven factors which were identified by Varimax solution and compared with those by Alban Metcalfe, R. J. et al. in England. Also, table 3 shows item loadings by Varimax solution. In determining the seven factors, according to the formula recommended by Shiba¹²⁾, items that had loadings greater than 0.4 were used.

The seven Varimax factors would be interpreted as following. The first factor could be concerned with relationships with "significant" adults, namely parents and teachers. All items except for one — "petty rules and regulations at school", were related with parents and teachers whom students might themselves largely be concerned with. These items may also be interpreted as constructing new self-image in the pro-

Table 1. Means and Standard Deviations of the Stress Score between
T Group (Japan) and Y. H. C. Group (England)

Item	T group(N=351)		Y.H.C.group(N=661)	
	M	SD	M	SD
older children bully young ones**	0.68	0.86	1.19	0.77
too much uninteresting homework**	0.66	0.90	1.02	0.91
teachers who talk at pupils rather than to them*	0.90	1.06	1.05	0.90
homework deadlines too rigid**	0.56	0.81	1.23	0.91
no place in school to do homework or private study*	0.57	0.93	0.81	0.92
teachers who are too strict**	0.67	0.90	1.49	0.93
understanding questions in examinations and tests**	1.11	1.00	1.67	0.96
time taken to travel to school*	0.60	0.93	0.48	0.79
few suitable jobs for school leavers**	0.61	0.92	2.04	0.95
parents made redundant*	0.78	0.97	2.04	1.04
being treated like young children**	0.59	0.87	1.57	0.95
getting along with teachers**	0.66	0.86	0.91	0.96
losing friends on transfer to upper school*	0.87	0.97	1.48	1.03
making new friends in upper school**	0.61	0.83	0.98	0.94
punishment for lateness**	0.31	0.72	1.13	1.00
progress reports and exam reports to parents*	0.77	0.99	1.58	1.05
being ridiculed for poor work*	0.35	0.76	1.62	0.97
confidentiality of information given to teachers**	0.56	0.90	1.36	0.98
little knowledge of standards required by teacher**	0.71	0.91	1.22	0.82
lack of insufficient time in school for private study**	0.55	0.86	0.85	0.87
high level of noise in the school**	0.65	0.93	0.91	0.94
personal problems*	0.81	1.03	1.55	1.03
parents over anxious about my school work**	1.01	1.03	1.32	0.99
consequences of letting down my parents**	0.72	0.92	1.64	0.98
conflicting attitudes to life between pupils and parents**	0.63	0.88	1.20	0.99
conflicting attitudes to life between parents and school**	0.44	0.76	1.06	0.92
help with choice of career**	0.89	0.93	1.19	1.03

T - test ** P < 0.01 * P < 0.05

cess of change from children to adult.

High scores in Factor 2 were found in such items concerned with friendship and future as "making new friends in upper class", "getting along with friends", "help with choice of career" and "few suitable jobs for school leavers". Two items — "personal problems" and "confidentiality of information given to teachers" may also be related with friendship in adolescence. Thus, Factor 2 may be interpreted as "Relationship with friends and perspectives on future".

High scores in Factor 3 were found in items such as "no place in school to do homework or private study", "the number of pupils in my school", "formal teaching method" and "lack of/insufficient time in school for private study", etc. Factor 3 could thus be

Table 2. Sources of Stress Identified in Seven Factors Compared with English Subjects

Loading	Source of Stress	T group	Loading	Source of Stress
	Factor 1 <i>Self-image and relationship with significant' adults</i>			Factor 1 <i>Self-image and relationships with significant' adults</i>
0.68	parents over anxious about my school work		0.63	conflicting attitudes to life between parents and school
0.63	parents mede redundant		0.56	conflicting attitudes to life between pupils and parent
0.61	conflicting attitudes to life between pulils and parent		0.54	consequences of letting down parents
0.52	progress reports and exam reports to parents		0.54	personal porblems
0.51	petty rules and regulations at school		0.52	parents over-anxious school work
0.51	consequences of letting down my parents		0.40	little knowledge of standards required by teacher
0.48	conflicting attitudes to life between parents and school		0.38	being ridiculed for poor work
0.44	little knowledge of standards required by teacher		0.35	confidentiality of information given to teacher
0.43	being teated like young children		0.34	progress reports and exam reports to parents
	Factor 2 <i>Relationship with friends and perspectives on future</i>		0.31	when friends repeatedly get higher marks for their work
0.62	making new friends in upper school			Factor 2 <i>School organization: formal</i>
0.56	personal problems		0.50	too much uninteresting homework
0.53	getting along with friends		0.47	homework deadlines too rigid
0.49	losing friends on transfer to upper school		0.46	teachers who are too strict
0.46	confidentiality of information given to teachers		0.44	punishment for lateness
0.43	help with choice of career		0.40	formal teaching methods
0.42	few suitable jobs for school leavers		0.31	petty rules and regulations at school
	Factor 3 <i>School organization and function</i>			Factor 3 <i>School organization: informal</i>
0.55	no place in school to do homework or private study		0.52	high level of noise in the school
0.52	the number of pupils in my school		0.47	heachers who are too easy going
0.52	formal teaching method		0.43	the number of pupils in the school
0.46	high level of noise in the school		0.39	older children bully younger ones
0.43	lack of / insufficient time in school for private study		0.38	time taken to travel to school
0.42	some pupils being set homework and others not		0.30	locker/cloakroom accommodation
0.41	little knowledge of standards required by the teacher			Factor 4 <i>Puills perspectives' on schooling</i>
	Factor 4 <i>Relationship with teachers</i>		0.54	getting along with teachers
0.70	teachers who talk at pupils rather than to them		0.51	understanding questions in examination and tests
0.58	teachers who are too easy-going		0.43	help with choice of career
0.56	getting along with teachers			Factor 5 <i>Transition into adolescence</i>
0.56	teachers who are too strict		0.49	being treated like youg children
0.43	system of grades for good work		0.42	teachers who talk at pupils rather than to them
0.43	system of grades for bad work		0.36	petty rules and regulations at school
	Factor 5 <i>learning tasks</i>		0.31	few suitable jobs for school leavers
0.65	too many compulsory subjects on time-table		0.30	parents made redundant
0.59	too much uninteresting home work			Factor 6 <i>Transfer between schools</i>
0.57	home work deadline too rigid		0.70	losing friends on transfer to upper schools
	Factor 6 <i>Bully</i>		0.55	making new friends in upper school
0.42	being ridiculed for poor work			Factor 7 <i>Evaluation</i>
0.40	older children bully younger ones		0.40	system of grades for bad work
	Factor 7 <i>Achievement</i>		0.44	system of grades for good work
0.61	system of grades for bad work		0.38	progress reports and exam reports to parents
0.54	understanding questions in examination and tests			Factor 8 <i>Private study facilities</i>
0.45	when friends repeatedly get high marks for their work		0.61	lack of / insufficient time in school for private study
			0.45	no place in school to do homework or private study
				Factor 9 <i>Financial considerations</i>
			0.43	cost of school uniform
			0.40	parents made redundant
				Factor 10 <i>Punishment for lateness</i>
			0.33	punishment for lateness

Table 3. Items loadings by Varimax solution

Item	1 因子	2 因子	3 因子	4 因子	5 因子	6 因子	7 因子
1 the number of pupils in my school	0.075498	0.119334	-0.517418	-0.079262	0.187706	-0.028494	-0.018482
2 older children bully young ones	0.097978	-0.271807	-0.180989	-0.180989	0.115641	-0.403390	-0.141428
3 too many compulsory subjects on time—table	0.238228	0.060840	-0.137417	-0.182459	0.650906	0.028883	-0.135005
4 too much uninteresting homework	0.174895	0.096506	-0.103418	-0.184758	0.590286	-0.160597	-0.133818
5 teachers who talk at pupils rather than to them	0.152134	0.078175	-0.066092	-0.702754	0.130943	-0.176767	-0.123787
6 some pupils being set homework and others not	0.113712	0.101225	-0.425162	-0.89649	0.189738	-0.137816	-0.131400
7 homework deadlines too rigid	0.206530	0.039573	-0.149671	-0.220509	0.189738	-0.137816	-0.130192
8 no place in school to do homework or private study	0.172343	0.124699	-0.556708	-0.151645	0.069108	-0.214943	-0.084410
9 teachers are too easy—going	0.087597	0.051635	-0.274044	-0.584748	0.018725	0.016564	-0.076565
10 teachers are too strict	0.248977	0.150325	-0.051503	-0.552433	0.347921	-0.042869	-0.141943
11 understanding questions in examinations and tests	0.282312	0.270208	-0.112606	-0.165902	0.251045	-0.011516	-0.545770
12 system of grades for bad work	0.221906	0.516727	-0.135857	-0.16963	0.146952	-0.402176	-0.610195
13 system of grades for good work	0.329576	0.047310	-0.387756	-0.428547	0.16410	0.092895	-0.303815
14 expense of school holidays for travel	0.106376	0.156137	-0.363528	0.108444	0.196771	-0.120915	0.050180
15 choice of career	0.135304	0.428522	-0.361559	-0.110087	0.113034	-0.018196	-0.209287
16 time taken to travel to school	0.294836	0.191512	-0.141754	-0.147174	0.386712	0.120259	0.139561
17 locker/cloakroom accommodation	0.214373	0.168034	-0.397653	-0.271903	0.195617	-0.011916	0.097209
18 few suitable jobs for school leavers	0.274204	0.414331	-0.147502	-0.078256	0.158201	-0.199045	-0.077052
19 parents made redundant	0.630797	0.078675	-0.038688	-0.129805	0.205888	-0.116002	-0.069976
20 petty rules and regulations at school	0.510420	0.097078	-0.127546	-0.344138	0.285988	0.096080	-0.083752
21 being treated like young children	0.434606	0.121205	-0.153455	-0.214801	0.037409	-0.232411	-0.030697
22 getting along with teachers	0.200681	0.326152	-0.200020	-0.563346	0.118250	0.070514	-0.051656
23 getting along with friends	0.139813	0.534065	-0.201519	-0.178872	0.032826	-0.092989	-0.156582
24 losing friends on transfer to upper school	0.103362	0.494443	-0.071123	0.018498	0.061913	-0.070078	-0.274759
25 make new friends in upper school	0.128928	0.628110	-0.215212	-0.056363	0.136421	0.014847	-0.147331
26 relevance (usefulness?) of subjects studied at school	0.336856	0.353628	-0.353036	-0.128270	0.356937	0.143645	-0.080117
27 formal teaching methods	0.227243	0.261174	-0.494739	-0.263458	0.267750	0.097965	-0.240854
28 punishment for lateness	0.309702	0.046219	-0.109098	-0.245348	0.197053	-0.314354	-0.062343
29 progress reports and exam reports to parents	0.527313	0.258471	-0.038084	-0.177987	0.190895	-0.026116	-0.319517
30 being ridiculed for poor work	0.206268	0.135226	-0.037794	-0.122216	0.192694	-0.417355	-0.342460
31 confidentiality of information given to teachers	0.398172	0.455649	0.003619	-0.385786	0.038837	-0.145352	-0.115326
32 little knowledge of standards required by teacher	0.427348	0.161566	-0.439913	-0.288397	0.196178	-0.015405	-0.186603
33 lack of/sufficient time in school for private study	0.158279	0.296105	-0.436633	-0.190211	0.022359	-0.049369	-0.216655
34 high level of noise in the school	0.156354	0.09107	-0.460581	-0.149508	0.030453	-0.084438	-0.168167
35 personal problems	0.341100	0.563260	-0.051304	-0.310212	0.020356	-0.052881	-0.155491
36 parents over anxious about my school work	0.68018	0.113491	-0.171825	-0.069989	0.173382	-0.042555	-0.203456
37 consequences of letting down my parents	0.504066	0.201202	-0.141163	-0.284936	0.141113	-0.023062	-0.262543
38 conflicting attitudes to life between pupils and parents	0.604678	0.272388	-0.253279	-0.140187	0.140187	-0.041612	-0.127554
39 conflicting attitudes to life between parents and school	0.477711	0.244575	-0.220735	-0.290347	0.105290	-0.149358	-0.033593
40 when friends repeatedly get high marks for their work	0.271982	0.321653	-0.170683	-0.145974	0.129193	-0.091540	-0.446611

Table 4. Cronbach's alpha reliability coefficients for the student stress inventory and subscale

Scale	N. of Items	Alpha coefficients
Whole Inventory	40	0.94
Subscale 1 (Self-image and relationship with significant adults)	9	0.87
Subscale 2 (Relationship with friends and future)	7	0.80
Subscale 3 (School organization and function)	7	0.80
Subscale 4 (Relationship with teachers)	5	0.81
Subscale 5 (School tasks)	3	0.77
Subscale 6 (Bully)	2	0.99
Subscale 7 (achievement)	3	0.76

Table 5. Product-moment correlation coefficients

	Total Stress	Subscale 1	Subscale 2	Subscale 3	Subscale 4	Subscale 5	Subscale 6	Subscale 7
Subscale 1 (Self-image and relationship with significant adults)	0.88**							
Subscale 2 (Relationship with friends and future)	0.80**	0.63**						
Subscale 3 (School organization and function)	0.81**	0.65**	0.58**					
Subscale 4 (Relationship with teachers)	0.78**	0.68**	0.52**	0.58**				
Subscale 5 (School tasks)	0.67**	0.55**	0.37**	0.48**	0.50**			
Subscale 6 (Bully)	0.60**	0.45**	0.45**	0.40**	0.43**	0.61**		
Subscale 7 (achievement)	0.75**	0.61**	0.63**	0.54**	0.52**	0.46**	0.51**	

** $P < 0.001$

interpreted as "School organization and function". The sources of stress identified with high scores in Factor 4 were all concerned with teachers. It may be suggested that Factor 4 could be interpreted as "Relationship with teachers" who are representatives of authority figures.

Factor 5, which gives high scores in items such as "too many compulsory subjects on

time-table", "too much uninteresting home work" and "home work deadline too rigid" could be interpreted as "Leaning tasks". Factor 6, being related with being ridiculed and bully, would be interpreted as "Bully", and Factor 7 as "Achievement".

3. Internal reliability and relationships between subscales

Table 4 shows Chronbach's alpha reliability coefficients which were calculated for the inventory as a whole as well as for 7 subscales. Also, table 5 indicates product-moment correlation coefficients which were calculated between total stress score and subscale scores.

For the inventory as a whole and for the subscales, the alpha coefficients were greater than 0.76, which suggest acceptable level of internal consistency for a testing instrument (table 4). Also, all 7 subscales were significantly correlated with total stress score ($P < 0.001$ in all subscales) (table 5).

Discussion

There are only a few empirical studies on stress of daily life in childhood and/or adolescence, though stressful life situations such as hospitalization, separation from the parents and conflict of sibling-ribalry which resulted in medical treatment were well studied.^{13),14)} In this study, perceived stress of junior high school students was analysed for principal components and seven factors were identified. These factors were interpreted as: Factor 1; self-image and relationship with "significant" adults, Factor 2; relationship with friends and perspectives on future, Factor 3; school organization and function, Factor 4; relationship with teachers, Factor 5; learning task, Factor 6; bully and Factor 7; achievement.

When these data were compared with those by Alban Metcalfe, et al.¹¹⁾ in England, differences as well as similarities are found. On factor analysis, structural differences were suggested between two countries because in England the results of factor analysis were such as Factor 1; self-image and relationships with "significant" others, Factor 2; school organization; formal, Factor 3; school organization; informal, Factor 4; pupil's perspectives on schooling, Factor 5; transition into adolescence, Factor 6; transfer between schools, Factor 7; evaluation, Factor 8; private study facilities, Factor 9; financial considerations and Factor 10; punishment for lateness.

According to E. Erikson,¹⁵⁾ the developmental tasks for adolescence is establishment of identity that is an inner sense of uniqueness and continuity and an outer sociopolitical stance. In puberty, biological revolution, new social pressure to growing up and higher cognitive ability to consider alternatives combine and force the adolescent to ask "Who am I?" to himself. In the urgent process of modelling and remodelling the self-image, the teenager must build two bridges; one between the person she or he has become as a result of childhood experiences and the person she or he promises to be as an adult; and the other between private image of herself or himself and what other people see and expect from her or him. The sources of stress during the adolescence were common in spite of socio-cultural differences between two countries.

However, there were difference in the degree and the content of perceived stress between the subjects in two industrialized countries. The results of higher mean scores

in 26 items in English subjects may suggest the differences in stress tolerance and moral attitudes. Also, the results of factor analysis on Japanese subjects showed the significant characteristics in relation with the others and suggested that responses of Japanese subjects were more homogeneous and more group-oriented whereas responses of English subjects were more individually oriented. The responses of Japanese subjects are focussed on parents in the relationships with "significant" adults (factor 1), on friends in the relationship with friends (factor 2), and on teachers in the relationships with teachers (factor 4). Thus, Japanese subjects seemed to make stereotyped responses to parents, friends and teachers. On the other hand, the responses in English subjects in relation with friends or teachers were not limited to single factors but dispersed among different ones, which suggest the English subjects are answering the questionnaire based on more individualized personal experiences. Such a tendency of stereotyped responses in Japanese subjects was also found in items on a school (factor 3), on learning tasks (factor 5), on bully (factor 6) and on achievement (factor 7). On the other hand, responses on a school in English subjects were dispersed among several factors suggesting that they seem to have more variety of perception on a school, although they may feel stress under the school regulations. These results support previous findings¹⁶⁾⁻¹⁸⁾ that personal relationship with others including parent-child relationship of Japanese adolescent were different from that of the Westerners; that Japanese are more group-oriented and Westerners are more individually oriented; and that cooperative values in Japanese high school and college students are high.

Reliability coefficients for SSI (40 items) as the whole was as high as $r=0.94$ and that for subscales ranged from $r=0.37 - 0.67$. These results may suggest that stress was derived from independent factors and were essentially multifasic structures.

Summary

The "Students Stress Inventory" was administered to 351 Japanese junior high school students. The responses to the inventory were analysed for principal components and the results were compared with those in junior high school students in England. Modelling and remodelling a new self concept in junior high school students seemed to contribute to stress in adolescence period in both countries. However, the results of higher mean scores of 26 items of the stress score in English subjects and the results of factor analysis on Japanese subjects suggested that responses of Japanese subjects were more homogeneous and more group-oriented whereas responses of English subjects were more individual-oriented.

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