Australian Journal of Educational & Developmental Psychology Vol. 5, 2005, pp 40-54

Incongruity as a Universal Component of Humor Appreciation: Some Hong Kong Data

Maria P. Y. Chik[1]
Department of Education Studies
Hong Kong Baptist University

Geoffrey N. Molloy & C. S. Benjamin Leung

Institute of Human Development & Counselling
Faculty of Education, Monash University

ABSTRACT

The development of a humor measure was described in a brief report in this journal. In that report, a series of suitable congruous and incongruous pictures were developed with a community sample of children. The findings of that study were consistent with those reported by others (Chik, 2001; Masten, 1989; Schultz, 1972), indicating that incongruity is an essential component of humor appreciation. With a larger (n=140) and more representative sample, we embarked on a follow-up validation study. The findings of the present study provide further support for the universality of the incongruity as an essential component of humor appreciation across age and cultures.

INTRODUCTION

For centuries, humans have been fascinated by the ubiquity of humor in all cultures. The search for the universal elements of humor appreciation has not been particularly fruitful and, in consequence, several theories related to humor appreciation have been posited. Among the most influential theories of humor, three main theoretical perspectives can be identified, namely, those focusing on arousal, incongruity, and superiority theories (Martin, 1998). This classification scheme parallels Eysenck's (1942) affective, cognitive, and conative theories component of humor. These three theoretical perspectives differ in their emphasis on the various psychological dimensions of humor, and each provides some insight into the nature of humor. The various theoretical approaches have dealt with the nature and values of humor. Because each of these

[1] Contact details
Maria P. Y. Chik, PhD
Department of Education Studies
Hong Kong Baptist University
Kowloon Tong, Kowloon
Hong Kong SAR
pychik@hkbu.edu.hk
Telephone: 852+ 3411 7213
Facsimile: 852+ 3411 7894

aspects has its specific role to play in humor appreciation, no single theory can adequately explain what constitutes humor or the experience of mirth. With the exception of the cognitive theories, however, most of the empirical findings have been based primarily on research with adults (Bergen 1998; McGhee 1971a). More research is therefore needed to ascertain both the nature of humor and its appreciation in children.

In an early study submitted to this journal, the procedure of developing a pool of suitable congruous and incongruous pictures as a measure of humor appreciation in primary school children was described. The methodologies used in that study formed the basis for the present follow-up study with a larger and more representative sample.

METHOD

Participants

A convenience sample of 140 children attending either Grade 3 or Grade 6 at primary schools in Hong Kong participated in the study. The children were from middle to low socioeconomic background. There were 71 third graders (boys = 40, girls = 31) and 69 sixth graders (boys = 42, girls = 27).

School children in Hong Kong are mostly taught using a traditional educational approach with restricted seating arrangements in a class size of 40 and with a class teacher throughout the school year (September - July). Most lessons are conducted in the same classroom except for physical activities, music, arts or crafts. While the class teacher is in charge of a few subjects and classroom management, other teachers come to the classroom to teach other subjects.

The study commenced following ethical approval from committees of Hong Kong Baptist and Monash Universities, authorization from the school principal and consent from the parents or guardians of the participating children. Meetings and letters of invitation with an enclosed consent form were taken home by the school children to their parents or guardians. The invitation letter provided an overview of the study as well as the assurance that participation was voluntary and that children could leave the study at any time.

Materials and Measures

The materials and measures used in this study consisted of a computer program of congruous and incongruous pictures installed in three computer notebooks for the experiment on humor appreciation, a roster sheet of participants, two types of response sheets (for subjective and behavioral responses) and three video cameras.

Humor appreciation was examined by exploring the effects of incongruity upon children's responses to pictures in the form of their subjective ratings and their behavioral responses to both incongruous and congruous (control) pictures. The variable "incongruity" was operationalized by the presence of a simple visual incompatible characteristic in the picture of a Hong Kong celebrity. For example, one of the incongruous pictures portrayed a celebrity appearing much heavier in body weight (incongruous) than their appearance suggested in the veridical picture (congruous). Under the incongruous condition, the image of a celebrity was modified to yield three variants or incongruities, namely weight, dressing, and gender. Under the congruous condition, the veridical image of the celebrity was used. Altogether, four congruous and 12 incongruous pictures of four Hong Kong celebrities (2 males and 2 females) were programmed into a computer. These pictures had been pilot tested and were found to be the suitable humor stimuli for primary school-aged children (Chik, 2001).

Humor appreciation is operationally defined as the funniness reported as well as the smiles and laughter expressed in response to the presentation of congruous or incongruous stimuli. Children's subjective responses to perception of the funniness of pictures were rated on a four-point response format: 1 = not funny at all, 2 = a little funny, 3 = funny, 4 = very funny. While similar to the rating scale used in the pilot study the present study used a slightly modified even-

number response scale to rule out the option of a neutral 'fence-sitting' response. The rating criteria were modified to better differentiate the level of funniness (discarded "extremely not funny" was changed to include "a little funny"). The resulting subjective ratings of humor appreciation were obtained by averaging, separately, the total ratings of funniness for congruous or incongruous pictures. On the other hand, children's behavioral responses to the funny pictures, in the form of smiles or laughter expressed, were rated by independent judges. Two judges who were university graduates were briefed on scoring criteria before they independently rated children's videotaped behavioral responses on a standard coding form. As with the children's self-rating form, the five-point rating scale previously used in the pilot study was substituted by a modified rating scale in the main study with a four-point response format. Mirth ratings were: 1 = no or negative response, 2 = slight smile with lips almost closed, 3 = open-mouth smile, 4 = laughter with vocalization. Each child was observed for 30 seconds. The resulting behavioral responses to humor appreciation were obtained by averaging the sum of the highest level of observed mirth to each congruous or incongruous picture within the 30 second time frame.

Procedure

This study was conducted during the last week of the school year (September-July) when school children were finished with the final examination and were participating in extracurricular activities in school. The administrators arrived at the school assembly hall and set up the computer notebooks to conduct the 15-minute humor experiment with each student. Since three individual sessions (3 children altogether) were conducted simultaneously, the overall amount of time spent for the humor experiment for each class took half a day. As four classes (2 classes in both morning and afternoon sessions) were involved in this study, two days were required to finish this humor study. Using the roster provided by the school authority, three children were released each time from the classroom and were led to the school hall by an administrator. On their way to the hall, the administrator provided the three participants with the instructions (given in Cantonese dialect).

> Someone will show you a computer software program. You need not worry even if you have never used a computer before. A tutor will teach you how to use it. All you have to do is to follow the instructions and the steps shown to you. (translated from the original Chinese version)

When the children arrived at the hall, each participant was met by a tutor and led to an enclosed partition to work on a computer without interference from other children. Instructions and practice trials were given until the participant knew how to work with the computer notebook. Then the tutor left the participant alone to work on the software program on humor appreciation. The facial expressions of each participant were recorded throughout the process by a video camera discreetly placed nearby, unnoticed by the participants. After the 15-minute humor experiment was over, the participants were debriefed. They were asked not to inform other pupils of the details of the humor study until one week later. They were then brought back to their classroom. Three other participants were then led to the hall to take part in the humor experiment. The procedures were repeated until all the children in the class had participated in the humor study.

RESULTS

Inter-rater Reliability

Since two judges had independently rated participants' videotaped behavioral responses to pictures to produce two sets of behavioral ratings for each participant, inter-rater reliability data

for the behavioral (mirth) ratings were obtained from the two sets of scores gathered from the two judges to find out the inter-rater consistency.

The four-point mirth scale was used for the 140 children, each of whom had rated 16 pictures. Therefore, there were altogether 2240 behavioral observations to be rated by each judge for comparison. Similar to the findings in the pilot study, the behavioral ratings of humor appreciation that are in agreement between the two scorers calculated by the formula [agreements / (agreements + disagreement) x 100] comprised 82% of these 2240 observations. Among all the pictures, the range of agreement was from 76 to 89 percent. An additional 14% of the judgments agreed within one level leaving four percent disagreements of two or more levels. In sum, the inter-rater correlation for mirth scores (behavioral ratings) was again found to be satisfactory, in fact, yielded identical values and consistent with the pilot study (Chik, 2001).

Internal Consistency Reliability

Similar to the findings in the previous study (Chik, 2001), the overall internal consistency of the scale (4 congruous pictures and 12 incongruous pictures) that measured children's humor appreciation in terms of Cronbach's alphas were high in both subjective ratings ($\alpha = .83$) and behavioral ratings ($\alpha = .82$). When internal consistency was separately examined for congruous and incongruous pictures, Cronbach's alphas for the subjective and behavioral ratings of all congruous pictures were .61 and .53 and those for all incongruous pictures were .86 and .79 respectively. While there was a lower homogeneity in congruous pictures, as occurred in the pilot study, given the small number of congruous pictures, the internal consistency of the congruous pictures in the behavioral ratings had increased from $\alpha = .43$ in the pilot to $\alpha = .53$ in this study.

Table 1: Internal Consistency of the Humor Appreciation Measures by Sex and Grade

	Measures					
	Subjective ratings			Behavioral ratings		
Conditions	All	Grade 3	Grade 6	All	Grade 3	Grade 6
Composite	.83	.82	.85	.82	.84	.80
Congruity	.61	.61	.60	.53	.65	.31
Incongruity	.86	.85	.87	.79	.79	.80
Boys						
Composite	.83	.83	.83	.83	.82	.85
Congruity	.58	.51	.65	.48	.58	.38
Incongruity	.86	.85	.87	.81	.79	.83
Girls						
Composite	.81	.79	.85	.86	.87	.65
Congruity	.67	.70	.52	.61	.74	-.09
Incongruity	.84	.84	.84	.76	.81	.69

In sum, the reliability coefficients (alphas) revealed that the combined scale of the four congruous pictures has moderate internal consistency (above .50) and that of the 12 incongruous pictures has high internal consistency (above .80) in both subjective and behavioral ratings (see Table 1). The combined scale of the 16 pictures (4 congruous and 12 incongruous pictures) was α = .83 and .82 respectively for subjective and behavioral ratings. The results in this study mirrored those obtained in the pilot study (Chik, 2001).

Factor Analysis

With respect to the subjective ratings of humor appreciation of pictures (stimulus elicited), principal components factor analysis with Varimax rotation revealed two factors with eigenvalues greater than one, accounting for 46.85% of the total variance (see Table 2). Factor I (incongruity) and Factor II (congruity) explained 31.53% and 15.32% of the variance respectively. The pattern of Factor II (congruity) was less distinctive than that in the pilot study (Chik, 2001) since two incongruous scores (i.e. weight) were also highly loaded on Factor II (congruity).

Table 2: Factor Loadings of Two Factor Solution for the Subjective Ratings of Humor Appreciation Measure

	Factor	
Factor/Pictorial Stimulus	I	II
Incongruity		
Incongruous Gender to Male 2	.80	
Incongruous Gender to Female 2	.78	
Incongruous Dressing to Female 2	.78	
Incongruous Gender to Male 1	.77	
Incongruous Weight to Female 1	.71	
Incongruous Dressing to Male 2	.70	
Incongruous Dressing to Male 1	.69	
Incongruous Gender to Female 1	.68	
Incongruous Dressing to Female 1	.61	
Incongruous Weight to Female 2	.33	.32
Congruity		
Original Photo of Male 2		.73
Original Photo of Male 1		.71
Incongruous Weight to Male 2		.68
Original Photo of Female 2		.62
Original Photo of Female 1		.54
Incongruous Weight to Male 1		.45
Eigenvalue	5.04	2.45
Variance explained (%)	31.53	15.32

Extraction Method: Principal Components

Rotation Method: Varimax

Note. Factor loadings less than .30 are not presented

When examined further, these previously laminated incongruous pictorial stimuli (weight) resembled more closely the congruous pictorial stimuli (veridical) after they were scanned and then presented on the monitor for this study. With the elimination of the incongruous weight scores, principal component factor analysis with varimax revealed a clearer two-factor pattern, namely incongruity and congruity, with eigenvalues greater than one that accounted for 52.71% of the total variance (see Table 3). Factor I (incongruity) and Factor II (congruity) explained 36.68% and 16.03% of the variance respectively.

With respect to the behavioral ratings of humor appreciation to pictures (stimulus elicited), principal components factor analysis with oblimin revealed the two proposed orthogonal factors with eigenvalues greater than one that accounted for 38.72% of the total variance (see Table 4). Factor I (incongruity) and Factor II (congruity) explained 28.61% and 10.11% of the variance respectively.

While the cross loading of scores reflected the moderate relationship between incongruity and congruity, the two-factor solution was clear, especially after the incongruous weight scores were eliminated from the analysis (see Table 5). The total variance accounted for was 44.08% with Factor I (incongruity) and Factor II (congruity) explaining 31.06% and 12.02% of the variance respectively.

Table 3: Factor Loadings of Two Factor Solution for the Subjective Ratings of Humor Appreciation Measures (without Weight Items)

	Factor	
Factor/Pictorial Stimulus	I	II
Incongruity		
Incongruous Gender to Male 2	.80	
Incongruous Gender to Female 2	.77	
Incongruous Gender to Male 1	.77	
Incongruous Dressing to Female 2	.77	
Incongruous Dressing to Male 2	.74	
Incongruous Dressing to Male 1	.72	
Incongruous Gender to Female 1	.66	
Incongruous Dressing to Female 1	.64	
Congruity		
Original Photo of Male 2		.71
Original Photo of Male 1		.71
Original Photo of Female 2		.65
Original Photo of Female 1		.63
Eigenvalue	4.40	1.92
Variance explained (%)	36.68	16.03

Extraction Method: Principal Components

Rotation Method: Varimax

Note. Factor loadings less than .30 are not presented

Table 4: Factor Loadings of Two Factor Solution for the Behavioral Ratings of Humor Appreciation Measure

	Factor	
Factor/Pictorial Stimulus	I	II
Incongruous Gender to Male 2	.93	
Incongruous Gender to Female 2	.77	
Incongruous Gender to Male 1	.72	
Incongruous Dressing to Male 2	.52	
Incongruous Weight to Male 2	.40	
Incongruous Dressing to Male 1	.40	
Incongruous Gender to Female 1	.38	.31
Incongruous Weight to Male 1	.35	.33
Incongruous Weight to Female 2		.72
Original Photo of Female 2		.70
Original Photo of Male 2		.66
Original Photo of Female 1		.54
Incongruous Weight to Female 1		.51
Incongruous Dressing to Female 2		.42
Original Photo of Male 1		.41
Incongruous Dressing to Female 1		.34
Eigenvalue	4.58	1.62
Variance explained (%)	28.61	10.11

Extraction Method: Principal Components

Rotation Method: Oblimin

Note. Factor loadings less than .30 are not presented

Relations between Subjective and Behavioral Ratings

When correlation between children's subjective and behavioral ratings of congruous and incongruous pictures was examined (see Table 6), significant correlations were found between children's subjective and behavioral ratings in all pictures combined ($r = .17$, $p < .05$) as well as to both congruous ($r = .21$, $p < .05$) and incongruous pictures ($r = .18$, $p < .05$).

When considered separately by sex, significant correlations were found between boys' self-reports and their behavioral responses to all pictures combined ($r = .27$, $p < .05$) as well as to both congruous ($r = .34$, $p < .01$) and incongruous pictures ($r = .26$, $p < .05$). On the other hand, no significance was shown between girls' self-reports and their behavioral responses to pictures.

Table 5: Factor Loadings of Two Factor Solution for the Behavioral Ratings of Humor Appreciation Measures (without Weight Items)

	Factor	
Factor/Pictorial stimulus	I	II
Incongruous Gender to Male 2	.86	
Incongruous Gender to Female 2	.78	
Incongruous Gender to Male 1	.70	
Incongruous Dressing to Male 2	.63	
Incongruous Dressing to Female 1	.41	
Incongruous Gender to Female 1	.37	.36
Incongruous Dressing to Male 1	.37	.35
Original Photo of Female 2		.72
Original Photo of Male 2		.67
Incongruous Dressing to Female 2		.57
Original Photo of Male 1		.51
Original Photo of Female 1	.32	.44
Eigenvalue	3.73	1.44
Variance explained (%)	31.06	12.02

Extraction Method: Principal Components

Rotation Method: Oblimin

Note. Factor loadings less than .30 are not presented

Comparisons of Experimental and Control Stimuli

Since the incongruous pictures were modified with the goal of quantifying humor appreciation, an important verification of the success of this manipulation lies in the comparison of mean responses to incongruous pictures (experimental) with mean responses to congruous pictures (control). One-tailed paired t-tests were conducted to test the hypothesis that the incongruous picture (experimental) means were higher than the congruous picture (control) means. These analyses, experimental (incongruous) versus control (congruous) picture comparisons revealed substantial and significant mean differences revealing consistency with the results obtained in the pilot study (Chik, 2001).

For the subjective ratings of humor appreciation (stimulus elicited), one-tailed paired t-test revealed that the rating of incongruous pictures (M = 2.63, SD = .82) was significantly higher than the rating of congruous pictures (M = 1.70, SD = .58), $t(139) = 11.04$, $p < .001$. Similar t-test results were revealed in grade 3 and grade 6 as well as among boys and girls (see Table 7 for details).

Table 6: Intercorrelations between Subjective and Behavioral Ratings of Humor Appreciation Measure

	Behavioral ratings		
Conditions	Composite	Congruity	Incongruity
Subjective ratings			
		All	
Composite	.17 *	.09	.17 *
Congruity	.06	.21 *	.00
Incongruity	.16	.03	.18 *
		Boys	
Composite	.27 *	.17	.27 *
Congruity	.18	.34 **	.09
Incongruity	.23 *	.07	.26 *
		Girls	
Composite	.03	.03	.03
Congruity	-.10	.04	-.14
Incongruity	.08	-.02	.09
		Grade 3	
Composite	.15	.10	.14

Table 7: Comparison of Means of the Subjective Ratings of Humor Appreciation with Incongruity by Sex and Grade

	Subjective ratings								
	All			Boys			Girls		
Conditions	*M*	*SD*	*t* [a]	*M*	*SD*	*t* [a]	*M*	*SD*	*t* [a]
	(N = 140)			(N =82)			(N = 58)		
			11.04 ***			7.17 ***			8.88 ***
Congruity	1.70	.58		1.66	.56		1.75	.61	
Incongruity	2.63	.82		2.46	.84		2.85	.74	
Grade 3	(N = 71)			(N = 40)			(N = 31)		
			7.21 ***			5.51 ***			4.61 ***
Congruity	1.80	.61		1.73	.55		1.89	.68	
Incongruity	2.70	.84		2.61	.88		2.82	.80	
Grade 6	(N = 69)			(N = 42)			(N = 27)		
			8.47 ***			4.61 ***			10.35 ***
Congruity	1.59	.54		1.60	.57		1.58	.48	
Incongruity	2.55	.79		2.33	.79		2.89	.67	

For the behavioral ratings, one-tailed paired t-test revealed that the behavioral response to incongruous pictures (M = 1.38, SD = .45) was significantly higher than the behavioral response to congruous pictures (M = 1.17, SD = .34), $r(139) = 5.97$, $p < .001$. Similar t-test results were revealed when sex and grade were considered (see Table 8 for details).

Table 8: Comparison of Means of the Behavioral Ratings of Humor Appreciation with Incongruity by Sex and grade

	Behavioral ratings								
	All			Boys			Girls		
Conditions	*M*	*SD*	*t* [a]	*M*	*SD*	*t* [a]	*M*	*SD*	*t* [a]
	(*N* = 140)			(*N* = 82)			(*N* = 58)		
			5.97 ***			4.20 ***			4.33 ***
Congruity	1.17	.34		1.19	.35		1.13	.33	
Incongruity	1.38	.45		1.40	.49		1.35	.39	
Grade 3	(*N* = 71)			(*N* = 40)			(*N* = 31)		
			3.70 ***			2.81 **			2.52 *
Congruity	1.20	.38		1.21	.37		1.18	.41	
Incongruity	1.37	.43		1.42	.47		1.31	.37	
Grade 6	(*N* = 69)			(*N* = 42)			(*N* = 27)		
			4.70 ***			3.09 **			3.36 **
Congruity	1.13	.29		1.17	.34		1.07	.19	
Incongruity	1.39	.47		1.38	.52		1.39	.40	

Note. [a] represents the comparison between means of congruous and incongruous pictures

* $p < .05$. ** $p < .01$. *** $p < .001$. (one-tailed)

When the subjective and behavioral ratings of humor appreciation were separately compared between boys and girls by independent sample t-tests, significant difference was found in the subjective ratings; no significance was shown in their behavioral responses in humor appreciation (see Table 9). Specifically, girls (M= 2.85, SD = .74) in comparison to boys, rated incongruous pictures to be significantly funnier than boys did (M = 2.46, SD = .84), $t(138) = 2.84$, $p < .01$. Besides, girls' ratings to all pictures combined (M= 2.48, SD = .53) in comparison to boys, were also significantly higher than boys' (M = 2.20, SD = .59), $t(138) = 2.96$, $p < .01$

Two-way analyses of variance (sex by grade) were employed separately to subjective and behavioral ratings of humor appreciation. Regarding subjective ratings of picture appreciation, significant sex difference in incongruous pictures was revealed with no interaction effect (see Table 10).

Table 9: Comparison of Means of Humor Appreciation Scores by Sex and Grade

	Sex					Grade				
	Boys		Girls			Grade 3		Grade 6		
	M	*SD*	*M*	*SD*	*t* [a]	*M*	*SD*	*M*	*SD*	*t* [a]
	(N = 82)		*(N = 58)*			*(N = 71)*		*(N = 69)*		
Subjective ratings										
Composite	2.20	.59	2.48	.53	-2.96 **	2.40	.59	2.23	.57	1.73
Congruity	1.66	.56	1.75	.61	-.84	1.80	.61	1.59	.54	2.07 *
Incongruity	2.46	.84	2.85	.74	-2.84 **	2.70	.84	2.55	.79	1.11
Behavioral ratings										
Composite	1.33	.40	1.28	.32	.85	1.31	.37	1.30	.37	.17
Congruity	1.19	.35	1.13	.33	1.07	1.20	.38	1.13	.29	1.09
Incongruity	1.40	.49	1.35	.38	.63	1.37	.43	1.39	.47	-.21

Note. [a] represents the comparison between scores by sex and grade (2-tailed)

*p<.05. **p<.01. ***p<.001.

Table 10: Univariate Analysis of Variance of the Subjective Ratings of Humor Appreciation by Sex and Grade

	Incongruity				Congruity			
	M	*SD*	*F*		*M*	*SD*	*F*	
Sex			8.01	**			.53	
Boys	2.46	.84			1.66	.56		
Girls	2.85	.74			1.75	.61		
Grade			.60				4.64	*
3	2.70	.84			1.80	.61		
6	2.55	.79			1.59	.54		
Sex x Grade			1.59				.82	

* $p < .05$. ** $p < .01$. *** $p < .001$.

Specifically, significant main effect in sex for incongruous humor appreciation $F(1,136) = 8.01$, $p < .01$ showed that girls' mean score of subjective ratings of incongruous picture appreciation (2.85) was significantly higher than that of boys (2.46). For the behavioral ratings of picture appreciation, however, no significance was shown when two-way analysis of variance (sex by grade) was conducted to the incongruous or incongruous picture (see Table 11).

For the control stimuli, the congruous pictures, significant grade difference was shown in the subjective ratings of congruous pictures by independent sample t-test. Specifically, third graders ($M = 1.80$, $SD = .61$) rated congruous pictures to be significantly funnier than sixth graders did ($M = 1.59$, $SD = .54$), $t(138) = 2.07$, $p < .05$ (see Table 20). Moreover, when two-way analysis of variance (grade by sex) was conducted, a significant main effect in grade for congruous pictures $F(1,136) = 4.64$, $p < .05$ showed that third graders' mean score of the subjective ratings of

congruous pictures (1.80) was significantly higher than that of the sixth graders (1.59) (see Table 10).

In sum, parallel to the previous results obtained in the pilot study (Chik, 2001; Chik, Leung & Molloy, 2005), humor appreciation, as indexed by incongruous pictures were responded to with higher ratings than congruous pictures in both funniness ratings (subjective ratings) and mirth expression (behavioral ratings). Consistent with the pilot findings, girls gave higher funniness ratings (subjective ratings) than boys to both incongruous pictures and all pictures combined (i.e. congruous and incongruous) and no sex difference was shown in mirth expression (behavioral ratings) in incongruous pictures. Third graders, compared to sixth graders, gave higher ratings to congruous pictures.

Table 11: Univariate Analysis of Variance of the Behavioral Ratings of Humor Appreciation by Sex and Grade

		Incongruity			Congruity		
		M	*SD*	*F*	*M*	*SD*	*F*
Sex				.35			1.29
	Boys	1.40	.49		1.19	.35	
	Girls	1.35	.39		1.13	.33	
Grade				.10			1.48
	3	1.37	.43		1.20	.38	
	6	1.39	.47		1.13	.29	
Sex x Grade				.57			.29

* $p < .05$. ** $p < .01$. *** $p < .001$.

DISCUSSION AND CONCLUSION

The present investigation sought to examine incongruity as a universal component of humor appreciation by replicating earlier research on children's humor appreciation in a different cultural context. Generally, the results are consistent with those reported with children from different cultural milieus (Chik, 2001; Chik, Leung & Molloy, 2005; Masten, 1986).

Humor appreciation was assessed in the form of both children's subjective and behavioral responses to pictures. Subjective responses were children's funniness ratings of the pictures while behavioral responses were children's mirth expression to the pictures as rated by independent judges. Analyses of these data generally confirm those reported earlier by the American investigators (Masten, 1986; Shultz, 1972) and clearly support the universality of incongruity as a crucial component of humor appreciation. Thus incongruous pictures, as an index of humor appreciation (stimulus elicited), were rated as funnier than congruous pictures in both self-reports (funniness ratings) and independent judgment (mirth expression). This was demonstrated by one-tailed paired t-tests consistently indicating that incongruous pictures resulted in higher funniness ratings than congruous pictures with respect to both subjective ($p < .001$) and behavioral measures ($p < .001$). Moreover, this pattern was consistent for the independent variables of grade level and sex ($p < .001$).

Associations between the subjective and behavioral ratings of children's humor appreciation revealed that children's self-reports to congruous and incongruous pictures correlated positively

and significantly ($p < .05$) with that of their mirth expression. For boys, higher inter-correlations were shown ($p < .05$ to $p < .01$). Although these measures of association indicate a statistically significant link between the two measures, the relationship is not strong in terms of predictive power. In fact, the magnitude of association between subjective and behavioral responses in humor appreciation coincides quite nicely with the results of the classic study on attitudes and behaviors (LaPiere, 1938; see also Fazio, 1989; Fazio & Roskos-Ewoldsen, 1994) where a sizable gap was found between people's attitudes and their actual behaviors. In other words, there is not always a close correspondence between what people say and do.

When sex differences in humor appreciation, as indexed by responses to incongruous pictures were examined, girls rated incongruous pictures as significantly funnier. This observation is noteworthy since the pattern was shown in the analyses of two independent samples (pilot and present studies). The literature on sex differences in children's humor appreciation provides no clear direction on this issue (hence the no-difference prediction). Some laboratory studies of children's humor appreciation have reported sex comparisons in funniness ratings or mirth expression (e.g. Brodzinsky & Rightmyer, 1980; McGhee, 1976b). For example, Prentice and Fathman (1975), Rothbart (1976) and Zigler, Levine, and Gould (1967) reported that boys and girls do not differ in their humor appreciation as measured by both the funniness ratings and mirth expression to cartoons. On this subject, other researchers have documented that boys express more mirth in humor appreciation than girls (Foot, Chapman & Smith, 1980; Masten, 1989; McGhee, 1976b). The present results, with respect to sex differences in behavioral responses, are at variance with studies reporting directional differences and more in line with the 'no-difference' studies (Prentice & Fathman, 1975; Rothbart, 1976; Zigler, Levine, & Gould, 1967).

Consistent with earlier reports using similar test materials, the present findings revealed no between grade differences in humor appreciation indexed by incongruous pictures. For instance, McGhee (1971 b; 1971c) reported no age differences in either funniness ratings or mirth expression of humor appreciation. This finding, however, should not imply that there are no developmental differences in humor appreciation among children of different age levels. McGhee (1976a) acknowledged that his no-difference findings with respect to age and humor appreciation are likely to represent an artefact of measurement (McGhee, 1971b; 1971c). In other words, his reported results pertaining to humor appreciation were based on relatively simple humor stimuli and a restricted sample. When the sample included college students or when the humor stimuli were more cognitively demanding, a significant positive relation was shown between cognitive development and humor appreciation in both funniness ratings and mirth expression to jokes. Masten's (1986, 1989) findings with school children aged 10 to 14 revealed an age decline in funniness ratings of cartoons but no such trend in mirth expression. On other measures her results showed that humor comprehension and creation increased with age and intellectual ability, as estimated by the Wechsler Intelligence Scale for Children – Revised (WISC-R).

Directions for Further Research

Although the current results have replicated and extended the work of previous investigators in Europe and North America, future studies might develop and incorporate test materials that could sample aspects of humor across age to examine developmental changes in variables such as humor appreciation, expression, production, presentation, modality and content. Although the present study incorporated a two-factor (age x sex) design, it was not specifically constructed to test for differences between these variables. Nevertheless sex differences were noted on the funniness ratings of picture appreciation although no developmental differences were demonstrated. It is likely that this developmental invariance was due to the limitation of measurement for a particular type of humor (i.e. simple complexity invariant visual incongruity). To examine sex and developmental changes would require the development of materials of increasing cognitive complexity and variety of content. Development of such testing materials

may reveal differences associated with, say, sex and cognitive development (intellectual ability).

The present study sampled only a limited or operationally defined component of humor. In reality, humor is such a broad concept that it defies definition. For instance, humor encompasses a mixture of types, content, modalities and functions. Given this complexity, further research might examine other forms of measurement tapping developmental trends in children's information processing strategies (Molloy, Das, & Pierce, 1990). Some measures could be presented in various modes (e.g. visual, auditory or narrative) and carry different content (e.g. aggressive, nonsense). Through the interplay of testing materials and mode of presentation the investigation of humor can be broadened. Besides the appreciation of humor, other aspects of humor, for example, its comprehension and creation, might be incorporated into the humor research. The potential role of the various aspects of children's humor in creativity, play, interpersonal relations, emotional, cognitive and social development remains virtually unchartered.

In sum, the pattern of children's responses in the present study was congruent with those reported previously with children from different cultural settings. In relation to children's humor appreciation, the property of *incongruity* was shown to be indispensable. Future research might incorporate test materials that sample or identify developmental and cultural differences in areas such as types of humor, humor comprehension, production, modes of presentation and content.

REFERENCES

Bergen, D. (1998). Development of the sense of humor. In W. Ruch (Ed.), *The sense of humor: Explorations of a personality characteristic*. Berlin: Mouton de Gruyter.

Brodzinsky, D. M., & Rightmyer, J., (1980) Individual differences in children's humour development. In P. E. McG hee & A. J. Chapman (Eds.), *Children's humour*, (pp. 181-212). Chichester: John Wiley & Sons.

Chik, P. Y. M. (2001). *Some correlates of children's humor.* Unpublished doctoral dissertation, Monash University, Clayton, Victoria, Australia.

Chik, P. Y. M., Leung, C. S. B., & Molloy, G. N. (2005). Development of a measure of humour appreciation. *Australian Journal of Educational & Developmental Psychology, 5*, 26-31.

Eysenck, H. J. (1942). The appreciation of humour: An experimental and theoretical study. *British Journal of Psychology, 32*, 295-309.

Fazio, R. H. (1989). On the power and functionality of attitudes: The role of attitude accessibility. In A. R. Pratkanis, S. J. Breckler, & A. G. Greenwald (Eds.), Attitude structure and function (pp. 153-179). Hillsdale, NJ: Erlbaum.

Fazio, R. H., & Roskos-Ewoldsen, D. R. (1994). Acting as we feel: When and how attitudes guide behavior. In S. Shavitt & T. C. Brock (Eds.), *Persuasion: Psychological insights and perspectives* (pp. 71-93). Needham Heights, MA: Allyn & Bacon.

Foot, H. C., Chapman, A. J., & Smith, J. R. (Eds.). (1980). *Friendship and social relations in children*. New Brunswick, NJ: Transaction Publishers.

Lapiere, R. T. (1938). The sociological significance of measurable attitudes. *American Sociological Review, 3*, 175-182.

Martin, R. A. (1998). Approaches to the sense of humor: A historical review. In W. Ruch (Ed.), *The sense of humor: Explorations of a personality characteristic. Humor research: 3* (pp. 15-60). Berlin, Germany: Walter de Gruyter & Co.

Masten, A. S. (1986). Humor and competence in school-aged children. *Child Development, 57*(2), 461-473.

Masten, A. S. (1989). Humor appreciation in children: Individual differences and response sets. *Humor: International Journal of Humor Research, 2*(4), 365-384.

McGhee, P. E. (1971a). Cognitive development and children's comprehension of humor. *Child Development, 42*(1), 123-138.
McGhee, P. E. (1971b). Development of the humor response: A review of the literature. *Psychological Bulletin, 76*(5), 328-348.
McGhee, P. E. (1971c). The role of operational thinking in children's comprehension and appreciation of humor. *Child Development, 42*(3), 733-744.
McGhee, P. E. (1976a). Children's appreciation of humor: A test of the cognitive congruency principle. *Child Development, 47*(2), 420-426.
McGhee, P. E. (1976b). Sex differences in children's humor. *Journal of Communication, 26*(3), 176-189.
Molloy, G. N., Das, J. P., & Pierce, C. M. (1990). Some developmental trends in children's information-processing strategies. *Psychological Reports, 66*(2), 443-448.
Prentice, N. M., & Fathman, R. E. (1975). Joking riddles: A developmental index of children's humor. *Developmental Psychology, 11*(2), 210-216.
Rothbart, M. K. (1976). Incongruity, problem-solving and laughter. In A. J. Chapman & H. C. Foot (Eds.), *Humor and laughter: Theory, research, and applications* (pp. 37-54). New Brunswick, NJ: Transaction Publishers.
Shultz, T. R. (1972). The role of incongruity and resolution in children's appreciation of cartoon humor. *Journal of Experimental Child Psychology, 13*(3), 456-477.
Zigler, E., Levine, J., & Gould, L. (1967). Cognitive Challenge as a Factor in Children's Humor Appreciation. *Journal of Personality & Social Psychology, 6*(3), 332-336.

BIOGRAPHICAL NOTES

Maria P. Y. Chik, PhD, is an Assistant Professor at Hong Kong Baptist University. She received her Ph.D. from Monash University, Australia. She supervises and teaches psychology and teacher-education subjects in the undergraduate and postgraduate levels. Her research interests include children's sense of humour, adaptation, psychosocial well-being and parent-teacher education.

*Benjamin Leun*g is a Ph.D. scholarship research student at Monash University, Australia. He completed his undergraduate study from Hong Kong (BA in History) and graduate studies from USA (MA in TESL; MA in Communication). He is currently researching the relationship between humour appreciation, sense of humour, personality, and psychological well-being.

Geoffrey N. Molloy, RFD, PhD, MAPS, is a registered psychologist and teacher. He graduated from The Universities of Melbourne and Alberta and has published more than 70 refereed scholarly papers in international journals He has held full-time academic appointments in Canada, Asia and The University of Melbourne (Academic Fellow, Psychology)