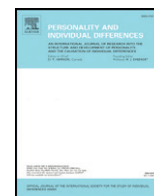


Contents lists available at [ScienceDirect](http://ScienceDirect.com)

Personality and Individual Differences

journal homepage: www.elsevier.com/locate/paid

Children's humor types and psychosocial adjustment



Claire L. Fox ^{a,*}, Simon C. Hunter ^{b,c}, Siân E. Jones ^d

^a School of Psychology, Keele University, UK

^b School of Psychological Sciences and Health, University of Strathclyde, Glasgow, UK

^c University of Western Australia, Perth, Australia

^d Department of Psychology, Goldsmiths College, University of London, UK

ARTICLE INFO

Article history:

Received 24 July 2015

Received in revised form 21 September 2015

Accepted 28 September 2015

Available online 22 October 2015

Keywords:

Humor styles

Cluster analysis

Children

Types

Psychosocial adjustment

ABSTRACT

Attempting to understand how humor styles relate to psychological adjustment by correlating these two constructs fails to address the emerging understanding that individuals use combinations of humor styles, and that different combinations may be differentially associated with psychosocial adjustment. Indeed *humor types* have been identified in adult samples (Galloway, 2010; Leist & Müller, 2013). The main aim of the study was to explore whether similar humor types are evident at a younger age and whether these types can be distinguished in terms of children's psychological and social well-being. Participants were 1234 adolescents (52% female) aged 11–13 years, drawn from six secondary schools in England. Self-reports of humor styles and psychosocial adjustment were collected at two time points, 6 months apart. A cluster analysis was performed using the child humor styles scores at Time 1. Four humor types were identified: 'Interpersonal Humorists' (high on aggressive and affiliative humor, low on self-defeating and self-enhancing humor), 'Self-Defeaters' (high self-defeating humor, low on the other three), 'Humor Endorsers' (high on all four humor styles), and 'Adaptive Humorists' (high on self-enhancing and affiliative humor, but low on aggressive and self-defeating humor). 'Self-Defeaters' scored highest in terms of maladjustment across all of the outcomes measured. Our analyses support the presence of distinctive humor types in childhood and indicate that these are related to psychosocial adjustment.

© 2015 The Authors. Published by Elsevier Ltd. This is an open access article under the CC BY license (<http://creativecommons.org/licenses/by/4.0/>).

1. Introduction

Over the past two decades, there has been a steady accumulation of research on the topic of humor. Far less research has focused on the social/emotional functions of humor in children or the way that these functions develop through childhood/adolescence (Martin, 2007). It is recognised that among children and adults, there are *four* main types of humor style, and these reflect the use of humor in everyday life (Fox, Dean, & Lyford, 2013; Martin, Puhlik-Doris, Larsen, Gray, & Weir, 2003). *Self-enhancing humor* is the ability to maintain a humorous perspective in the face of stress and adversity; it is closely aligned to coping humor (e.g. 'My humorous outlook on life keeps me from getting too upset or depressed about things'). *Aggressive humor* also enhances the self, at least in the short-term, but is done at the expense of others (e.g. 'If someone makes a mistake I often tease them about it'). *Affiliative humor* enhances one's relationships with others and reduces interpersonal tensions (e.g. 'I enjoy making people laugh'). Finally, *self-defeating humor*, largely untapped by previous humor scales, is used to enhance one's relationships with others, but at the expense of the

self (e.g. 'I often try to make people like or accept me more by saying something funny about my own weaknesses, blunders and faults').

The ability to distinguish between different components of humor has brought with it a clearer picture of the relationships between humor and adjustment. This is evidenced by the stronger correlations between humor and psycho-social adjustment which are reported when using the adult Humor Styles Questionnaire (HSQ) as compared to previous research using unidimensional measures (Martin et al., 2003). Among adults, affiliative and self-enhancing humor are negatively correlated with anxiety, depression, and suicidal ideation, and positively correlated with self-esteem and life satisfaction. In contrast, self-defeating humor is associated with high levels of anxiety, depression, and suicidal ideation, and lower self-esteem and lower life satisfaction (Dyck & Holtzman, 2013; Kuiper, Grimshaw, Leite, & Kirsh, 2004; Martin et al., 2003; Tucker et al., 2013). Aggressive and self-defeating humor styles are both associated with hostility and aggression (Martin et al., 2003). In addition, aggressive humor is not associated with psychological adjustment but is strongly negatively correlated with social adjustment measures (Yip & Martin, 2006).

Whether such associations can be generalised to adolescent populations is not yet clear, and data relating to this would clarify the ways in which humor as a coping strategy develops across the lifespan. Using a

* Corresponding author at: School of Psychology, Keele University, Staffs ST5 5BG, UK.
E-mail address: c.fox@keele.ac.uk (C.L. Fox).

series of studies, the HSQ was adapted for use with children and young people aged 11–16 years (Fox et al., 2013). An adaptation of the HSQ was needed to enable the examination of all four styles of humor styles in children and adolescents. The HSQ could not be used in its adult form as prior administration with adolescents aged 12–15 (Erickson & Feldstein, 2007) demonstrated unsatisfactory internal reliability for the two maladaptive sub-scales ($\alpha = .65$ and $.58$). When used with 11–16 year olds, there were acceptable levels of reliability for all four sub-scales (all $\alpha > .70$), and both principal components analysis and confirmatory factor analysis identified a clear four-factor structure. In addition, it was found that affiliative humor was positively correlated with global self-worth and self-perceived social competence, and negatively correlated with anxiety and depressive symptoms. Conversely, self-defeating humor was negatively correlated with global self-worth and self-perceived social competence, and positively correlated with anxiety and depressive symptoms.

In a more recent longitudinal study using the child HSQ, self-defeating humor was associated with an increase in depressive symptoms and loneliness and a decrease in self-esteem. In addition, depressive symptoms predicted an increase in the use of self-defeating humor over time, thus suggesting a bi-directional relationship. Self-esteem was associated with an increase in the use of affiliative humor over the school year but not vice-versa (Fox, Hunter, & Jones, unpublished manuscript). This was the first study to examine the longitudinal relationships between the four humor styles and aspects of psychosocial adjustment. While such studies can be more difficult to implement, it is important that they are utilised more frequently so that we can better understand the development of humor and its potential negative consequences. Indeed, it could be that particular styles of humor (e.g. adaptive) lead to improved psychological adjustment or that better mental health and well-being facilitates the greater use of adaptive styles of humor.

More recently researchers have begun to consider the combination of humor styles characteristic of any given person (Galloway, 2010; Leist & Müller, 2013). These analyses, it is believed, can extend knowledge about the four humor styles beyond what we already know from examining them individually. By identifying different humor types or profiles, new associations might emerge and advance understanding of the four humor styles and the ways in which they are related to psychological well-being. Indeed, as stated by Martin et al. (2003), the four humor styles are closely interrelated, but not equally adaptive for well-being.

Using a sample of 318 Australian adults, Galloway (2010) identified four clusters: 1) Those who scored above average on all four humor styles; 2) Those who scored below average on all four; 3) Those who scored above average on the adaptive humor styles and below average on the maladaptive humor styles, and 4) Those who scored above average on the maladaptive humor styles and below average on the adaptive humor styles. Differences between the groups were identified, for example, those in Cluster 1 scored above average for extroversion and openness and below average for conscientiousness and agreeableness. Cluster 3 scored highest for self-esteem and agreeableness, and those in Cluster 4 were below average for self-esteem, extroversion, openness, and agreeableness. However, the study was limited by the small sample size and the cross-sectional nature of the design.

A similar study by Leist and Müller (2013) with a German sample identified three, not four clusters: 1) Those who scored above average on all four; 2) Those who scored below average on all four, and 3) Those who scored above average on the adaptive humor styles and below average on the maladaptive humor styles. Those in the third cluster reported higher self-esteem in comparison to the other two clusters. In addition, those in Cluster 2 reported poorer life satisfaction in comparison to the other two clusters. The same limitations that apply to Galloway's study (2010) apply here, namely, the small sample size ($N = 348$) and the lack of longitudinal data. Moreover the sample was two-thirds female, which is potentially problematic given that gender differences in the four

humor styles have been consistently identified (Fox et al., 2013; Führ, 2002; Martin et al., 2003; Saraglou & Scariot, 2002).

Thus, the main aim of the current study was to identify humor types in children and improve on some of the limitations identified in previous studies, by using a large sample size and a longitudinal design (drawing on the same data set as used by Fox et al., unpublished manuscript). Differences between the humor types were examined based on measures of psychosocial adjustment: depressive symptoms, loneliness and self-esteem. As well as looking at cross-sectional associations we used residual scores to compare the clusters in relation to changes in adjustment across time. We also looked at the distribution of gender across the clusters.

2. Method

2.1. Participants

We recruited 1234 pupils aged 11–13 years (school years 7 and 8; 680 children aged 11–12 years, and 554 children aged 12–13 years), from six state secondary schools in the Midlands, UK. In terms of gender, 599 participants were male and 620 female (with missing data for 15 participants). The mean age of the sample at Time 1 was 11.68 years ($SD = 0.64$). The ethnic composition of each school ($M = 93\%$ white) was a reflection of the region in which the research was located; the sampling strategy took into account both rural/urban and SES profile to achieve a range of schools representative of the area from which they were recruited. Parents or carers of all children in the relevant year group at each school were invited to allow their child to participate, using the opt-out method of consent. Pupils who did not participate in the first session of data collection at Time 1 were not permitted to take part in the second session of data collection at Time 1. Across the time points of the study, the participation rate ranged from 70% to 85% of eligible young people registered in the schools.

Participant recruitment and data collection were conducted during school hours. Participants assented to take part in the study during class time. Classes varied in size from 10 to 31 with a modal class size of 24 pupils. Participants who were not taking part completed an alternative activity.

2.2. Materials

Students completed an answer booklet at each session in which they recorded their name, age, school class, gender and ethnicity, prior to completion of the measures pertinent to that session.

2.2.1. Humor styles

Participants completed the self-report child Humor Styles Questionnaire (child HSQ; Fox et al., 2013), which is an adapted version of the adult HSQ (Martin et al., 2003). Using a 4-point response scale (1 = *strongly disagree* to 4 = *strongly agree*), participants rated their agreement with the 24 statements. There are six items per sub-scale with four sub-scales in total: Self-Defeating (e.g. 'I often put myself down when I am making jokes or trying to be funny'), Aggressive (e.g. 'When I tell jokes I'm not worried if it will upset other people'), Affiliative (e.g. 'I don't have to try very hard to make people laugh – I seem to be a naturally funny person') and Self-Enhancing (e.g. 'I find that laughing and joking are good ways to cope with problems'). When used with 11–16 year olds, Fox et al. (2013) found acceptable levels of internal reliability for all four sub-scales (all $\alpha > .70$), and confirmatory factor analysis identified a very clear four-factor structure. The child HSQ also has acceptable levels of test re-test reliability (r_s range from $.65$ to $.75$ across one week). For the present study, reliability coefficients were all above $.70$, apart from aggressive humor at Time 1 (Time 1: $\alpha_{aggressive} = .66$; $\alpha_{self-defeating} = .73$; $\alpha_{self-enhancing} = .75$, $\alpha_{affiliative} = .85$; Time 2: $\alpha_{aggressive} = .71$; $\alpha_{self-defeating} = .81$; $\alpha_{self-enhancing} = .82$, $\alpha_{affiliative} = .88$). In addition, the four-factor structure was

Table 1
Descriptive statistics for humor styles and psychosocial adjustment at Time 1 and Time 2.

	Mean(SD)	N	Min	Max
1. T1 Agg	2.10(0.49)	1184	1	4
2. T2 Agg	2.15(0.49)	990	1	3.83
3. T1 SEn	2.65(0.53)	1187	1	4
4. T2 SEn	2.62(0.57)	987	1	4
5. T1 SD	2.06(0.54)	1173	1	4
6. T2 SD	1.95(0.58)	990	1	4
7. T1 Aff	2.94 (0.57)	1188	1	4
8. T2 Aff	2.96(0.57)	991	1	4
9. T1 SEs	29.00(5.39)	1146	10	40
10. T2 SEs	29.68(5.55)	958	10	40
11. T1 Dep	3.16(3.54)	1103	0	20
12. T2 Dep	3.11(3.68)	937	0	20
13. T1 Lone	1.78(0.91)	1215	1	5
14. T2 Lone	1.69(0.85)	1015	1	5

SD = self-defeating humor. Ag = aggressive humor. Aff = affiliative humor. SEn = self enhancing humor. Dep = depressive symptoms. SEs = self-esteem. Lone = loneliness. T1 = Time 1. T2 = Time 2.

confirmed. Mean scores were calculated for each sub-scale, with higher scores reflecting greater use of that form of humor.

2.2.2. Depressive symptoms

The 10-item, self-report Children's Depression Inventory – Short Form (Kovacs & Beck, 1977) for ages 7–17 years was administered. For each symptom, participants are required to indicate which of three items best describes them over the preceding two weeks, and responses were scored from 0 (no symptom), 1 (mild symptom), or 2 (moderate/severe symptom). An example item is: "I am sad once in a while", "I am sad many times", and "I am sad all the time." Sum scores were then calculated, with higher scores reflecting the presence of greater symptomatology. This measure showed acceptable internal consistency with the current sample ($\alpha = .86$, and $\alpha = .88$, at T1 and T2 respectively).

2.2.3. Loneliness

This was assessed using the four-item, self-report Loneliness and Social Satisfaction scale (Asher, Hymel, & Renshaw, 1984; Rotenberg, Boulton, & Fox, 2005). A 5-point Likert scale ranging from 1 = *not at all true* to 5 = *really true* was used and a mean score was calculated such that higher scores reflected greater loneliness. An example item is 'I am lonely.' In the current study, this measure showed acceptable internal consistency ($\alpha = .86$, and $\alpha = .88$, at T1 and T2 respectively).

Table 2
Intercorrelations for psychosocial adjustment and humor styles at Time 1 and Time 2.

	Correlations													
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
1. T1 Agg	–													
2. T2 Agg	.50***	–												
3. T1 SEn	.03	.02	–											
4. T2 SEn	–.01	.01	.51***	–										
5. T1 SD	.14***	.15**	.09**	–.05	–									
6. T2 SD	.07*	.20***	.04	.02	.55***	–								
7. T1 Aff	.13***	.13***	.36***	.21***	–.16***	–.19***	–							
8. T2 Aff	.11**	.14***	.22***	.29***	–.15**	–.29***	.63***	–						
9. T1 SEs	–.06*	–.04*	.23***	.17***	–.42***	–.37***	.32***	.31***	–					
10. T2 SEs	–.01	–.06*	.11***	.20***	–.36***	–.54***	.24***	.35***	.61***	–				
11. T1 Dep	–.02	.00	–.23***	–.21***	.40***	.40***	–.31***	–.29***	–.71***	–.52***	–			
12. T2 Dep	.04	.01	–.13***	–.29***	.35***	.54***	–.25***	–.36***	–.52***	–.77***	.59***	–		
13. T1 Lone	–.07*	.03	–.15***	–.16***	.39***	.37***	–.33***	–.31***	–.61***	–.44***	.72***	.56***	–	
14. T2 Lone	–.07*	–.04	–.12***	–.22***	.34***	.53***	–.28***	–.37***	–.44***	–.67***	.51***	.78***	.54***	–

SD = self-defeating humor. Ag = aggressive humor. Aff = affiliative humor. SEn = self enhancing humor. Dep = depressive symptoms. SEs = self-esteem. Lone = loneliness. T1 = Time 1. T2 = Time 2.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

2.2.4. Self-esteem

Rosenberg's (1965) 10-item, self-report self-esteem measure for adolescents and adults was used with participants judging each item on a 4-point scale from 1 = *strongly disagree* to 4 = *strongly agree*. An example item is "I am able to do things as well as most people". With the current sample, reliability coefficients were $\alpha = .87$ and $\alpha = .89$ at T1 and T2 respectively. Sum scores were calculated with higher scores reflecting higher self-esteem.

2.3. Procedure

Prior to data collection, the study was approved by the relevant University Ethics Committee. Data collection took place in the Fall (Time 1) and Summer (Time 2) terms of the school year, in school classrooms with a class teacher present. Data collection took approximately half an hour. A range of other variables were measured but are not the central focus of this paper. Sessions began with the researchers introducing themselves and explaining the measures that would be collected that day, and explaining the confidential nature of the questionnaires. Pupils were asked to complete the questionnaire booklets in silence; they were asked to keep their answers private and not look at what other children were doing. Following data collection pupils were thanked and fully debriefed as to the aims and purpose of the study.

3. Results

3.1. Descriptive statistics and intercorrelations

Descriptive statistics for all the Time 1 and Time 2 variables can be seen in Table 1. Table 2 shows the intercorrelations for all the T1 and T2 variables. As might be expected there are significant correlations between the four humor styles and depression, loneliness and self-esteem, at Time 1 and Time 2 and from Time 1 to Time 2. For example, the adaptive styles of humor (affiliative, self-enhancing) are positively correlated with self-esteem and negatively correlated with depression and loneliness. In contrast, self-defeating humor is negatively correlated with self-esteem and positively correlated with depression and loneliness.

3.2. Cluster analysis

We decided to use a series of K-mean cluster analyses as used by Galloway (2010) with an adult sample. When using cluster analysis, the investigator typically has to decide how many clusters to extract

Table 3
Mean Z-standardised humor styles for the four humor types at T1 and T2.

	Clusters			
	1	2	3	4
<i>Time 1</i>				
Ns (%) Total N = 1108	314(28%)	190(17%)	248(22%)	356(32%)
Aff T1	0.14	−1.50	0.54	0.29
SD T1	−0.34	0.57	0.81	−0.55
SEn T1	−0.58	−0.73	0.89	0.30
Agg T1	0.66	−0.24	0.62	−0.84
<i>Time 2</i>				
Ns (%) Total N = 948	177(19%)	195(21%)	341(36%)	235(25%)
Aff T2	0.42	−1.18	0.42	0.14
SD T2	−0.48	0.95	0.29	−0.86
SEn T2	−0.86	−0.58	0.77	0.07
Agg T2	0.75	−0.03	0.35	−1.06

Ag = aggressive humor. SEn = self enhancing humor. Aff = affiliative humor. SD = self-defeating humor.

from the data. A degree of trial and error is often used to identify the most optimal solution. Normally this is done taking into account the interpretability and parsimony of the different solutions being considered. First, the child HSQ scores were transformed to Z scores to help with the interpretation of the results. A series of K-mean cluster analyses were conducted with the four-cluster solution being the one considered the most appropriate. The Z-scores for the four humor styles within the four clusters can be seen in Table 3 and in Fig. 1. The first cluster, which we have called the 'Interpersonal Humorists' includes those who scored above average on aggressive and affiliative humor, but below average on the other two humor styles. Cluster 2 represents the 'Self-Defeaters' who scored high on this style of humor, but low on the other three. Thirdly, the 'Humor Endorsers' scored above average on all four humor styles, and finally, the 'Adaptive Humorists' scored high on the two adaptive styles of humor, but low on aggressive and self-defeating humor. These clusters were replicated when performing a cluster analysis on the Time 2 data (see Table 3).

3.3. Group differences

A Chi-square analysis to test for gender differences across the four clusters was significant ($\chi^2 = 35.30$, $df = 3$, $p < .001$). The percentage of males and females in Clusters 1 and 2 were roughly equivalent. However, there were more males than females in Cluster 3 ('Humor Endorsers') and more females than males in Cluster 4 ('Adaptive Humorists') (Table 4).

A series of one-way ANOVAs tested for differences between the groups in terms of the measures of psychosocial adjustment at Time 1 and using standardised residual change scores from Time 1 to Time 2 (by regressing the T2 scores on respective T1 scores). Table 5 shows that the main differences were between Cluster 3 (the 'Self-Defeaters') and the other three clusters. Those in Cluster 3 scored highest for depressive symptoms, loneliness, self-esteem and change in loneliness, compared to the other three clusters. In addition, those in Cluster 3 showed a greater change in depressive symptoms, in comparison to the 'Interpersonal Humorists' (Cluster 1) and the 'Adaptive Humorists' (Cluster 4). For the self-esteem change scores there were no differences between the four clusters. When looking at the cross-sectional data only, some other group differences emerged. The 'Adaptive Humorists' (Cluster 1) scored highest for self-esteem in comparison to the 'Self-Defeaters' (as above) but also in comparison to the 'Interpersonal Humorists' (Cluster 1) and the 'Humor Endorsers' (Cluster 3). There was also a significant difference in depressive symptoms between the 'Adaptive Humorists' and the 'Humor Endorsers'. For loneliness, the 'Humor Endorsers' (Cluster 3) reported significantly less loneliness than the Self-Defeaters (Cluster 2), but significantly more loneliness than the 'Adaptive Humorists' (Cluster 4) and the 'Interpersonal Humorists' (Cluster 1) (Table 5).

4. Discussion

This is the first study to identify humor types using a large sample of adolescents and a longitudinal design. It builds on the research by Galloway (2010) and Leist and Müller (2013) who were the first to explore combinations of humor styles with adult samples. In the same way, the current study extends knowledge beyond what we already know about humor styles from examination of simple correlations between the four humor styles and measures of psychosocial adjustment. Indeed, our findings suggest that simple correlations can be misleading. Of note is that self-defeating humor, when used in combination with other humor styles, is not necessarily maladaptive.

Of all the clusters identified, those in Cluster 2 (the 'Self-Defeaters') scored highest in terms of psychosocial maladjustment. They scored highest for depressive symptoms, loneliness, self-esteem and change in loneliness, compared to the other three clusters. For change in depressive symptoms, the 'Self-Defeaters' scored the highest in comparison to the 'Interpersonal Humorists' (Cluster 1) and the 'Adaptive Humorists' (Cluster 4). However, there was no difference between the 'Self-Defeaters' and the 'Humor Endorsers' (Cluster 3), who appeared to show no change. In contrast, those in Cluster 4 (the 'Adaptive Humorists') scored highest for self-esteem in comparison to the three other clusters. They were also less lonely than the 'Self-Defeaters' and the

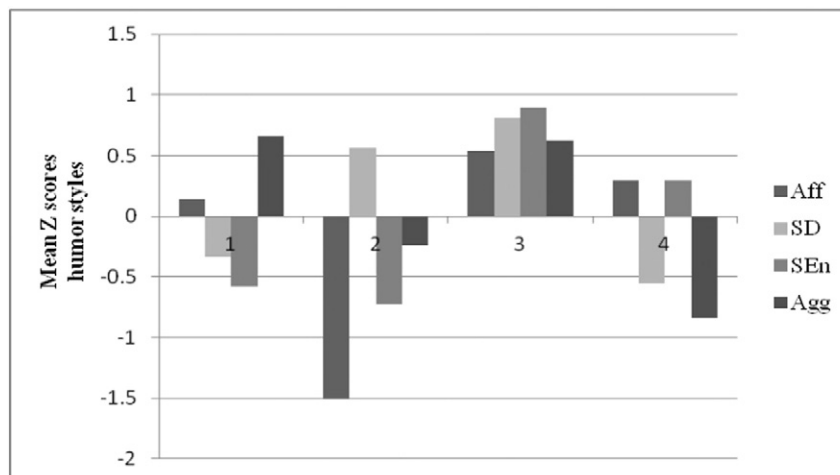


Fig. 1. Mean Z-score humor styles for the four clusters at T1. 1 = Interpersonal Humorists, 2 = Self-Defeaters, 3 = Humor Endorsers, 4 = Adaptive Humorists.

Table 4
Number (and %) of males and females in each cluster at T1.

Clusters	1	2	3	4	Total
Females	149(48.4)	100(53.2)	90(36.9)	216(61.2)	555
Males	159(51.6)	88(46.8)	154(63.1)	137(38.8)	538
Total	308	188	244	353	1093

1 = Interpersonal Humorists, 2 = Self-Defeaters, 3 = Humor Endorsers, 4 = Adaptive Humorists

'Humor Endorsers'; these two groups were also more lonely than the 'Interpersonal Humorists'. This suggests that the negative effects of using self-defeating humor can be offset to some extent when it is used in combination with other humor styles, but not always. Future research could examine a wider range of adjustment variables over time to explore the similarities and differences between these two groups. Crucially though, the 'Humor Endorsers' were not found to be more maladjusted than the 'Adaptive Humorists' and the 'Interpersonal Humorists' when examining change in adjustment *across time*. However, future studies could extend this research to see whether any differences do emerge over a longer period of time.

In the same way it would be interesting to examine the 'Interpersonal Humorists' over a longer time period. Our findings seem to suggest that aggressive humor is not typically used in isolation, and when it is used with affiliative humor, it could be viewed as adaptive, at least for the protagonist. The 'Interpersonal Humorists' were less lonely in comparison to the 'Self-Defeaters' and 'Humor Endorsers', although this effect disappeared when we looked at the data across time. Dyck and Holtzman (2013) noted that of all the four humor styles, aggressive humor has the weakest and most inconsistent findings, with many studies that have used the adult HSQ failing to find significant associations between aggressive humor and measures of psychological adjustment. As argued by Martin (2007), over the long-term, aggressive humor may be detrimental to the self because it tends to alienate others. Studies over a longer time-frame may be able to identify significant associations between aggressive humor types and psychosocial maladjustment.

There are some similarities between these findings and those of Galloway (2010) and Leist and Müller (2013). Similar to the present study, both studies identified a group scoring high on all four humor styles and a group who scored above average on the adaptive humor styles, but below average on the maladaptive humor styles. However, these previous studies also identified a group who scored low on all four. In addition, Galloway (2010) identified a group who scored above average on the maladaptive humor styles and below average on the adaptive humor styles. In contrast, for the present study, aggressive humor and affiliative humor were combined, leaving a group of children who scored high on self-defeating humor and low on the other three

Table 5
Descriptive statistics for psychosocial adjustment by humor type at T1.

	1	2	3	4	F(df)
Dep T1	2.59 _a	5.97 _{abc}	3.31 _{bd}	2.06 _{cd}	58.98 (3995)***
Lone T1	1.55 _{ad}	2.48 _{abc}	1.84 _{bde}	1.56 _{ce}	58.17 (31,092)***
SEs T1	29.22 _{ad}	25.36 _{abc}	28.55 _{be}	31.02 _{cde}	51.28 (31,045)***
Dep change	-.16 _a	.22 _{ab}	.02	-.07 _b	4.36 (3759)**
Lone change	-.10 _a	.30 _{abc}	.03 _b	-.10 _c	6.89 (3896)***
SEs change	.05	-.12	-.03	.05	1.09 (3816)

Means in a row sharing a subscript are significantly different. Dep = depressive symptoms. Lone = loneliness. SEs = self-esteem. T1 = Time 1. Change = residualised change scores from T1 to T2. 1 = Interpersonal Humorists, 2 = Self-Defeaters, 3 = Humor Endorsers, 4 = Adaptive Humorists.

** $p < .01$.

*** $p < .001$.

humor styles. This may be due to the difference in age between the samples, the different cultures and/or it may cast some doubt on the findings of these previous studies which drew on relatively small samples of participants (300–400).

There is a need to replicate these humor types using similar samples but in different contexts and countries. The adult HSQ has received cross-cultural validation among European (Saraglou & Scariot, 2002), Chinese (Chen & Martin, 2007) and Arabic samples (Kazarian & Martin, 2004). It demonstrates good psychometric properties and the findings provide support for the four-factor structure. In addition, there is cross-cultural stability in terms of the associations between the four humor styles and measures of psychosocial adjustment; gender differences are also consistent. However, there are differences when looking at the interrelations between the sub-scales. Unlike with North American samples (Martin et al., 2003), there is typically no correlation between affiliative and aggressive humor in other cultures (Chen & Martin, 2007; Kazarian & Martin, 2004; Saraglou & Scariot, 2002). Given that Cluster 1 with the current sample includes those who scored high on affiliative and aggressive humor, it is important that these types are investigated further in other cultures.

One of the main limitations of the study is the use of self-reports to measure humor styles and children's psychosocial adjustment, which raises the possibility that many of the associations were confounded by shared method variance. Further research should consider gathering data on children's adjustment from different sources, such as teachers and parents. There is also a need to examine associations between humor types and a wider range of adjustment variables. However, it is not clear that shared method variance necessarily leads to inflated estimates (Conway & Lance, 2010). In addition, the use of humor types to some extent does guard against this claim though because we are not examining simple correlations between positive/negative humor styles and positive/negative aspects of psychosocial adjustment; instead we are looking at differences between humor types, which involve combinations of adaptive and maladaptive humor styles.

A potential useful way forward would be to test some of these hypotheses experimentally, similar to the studies by Kuiper, Kirsh, and Leite (2010) and Ziegler-Hill, Besser, and Jett (2013). For example, Ziegler-Hill et al. (2013) provided evidence that adult targets displaying the more benign styles of humor are perceived more positively by others. Similarly, Kuiper et al. (2010) found that both adolescents and adults are less willing to continue an interaction with someone displaying maladaptive humor (i.e. aggressive or self-defeating humor). For example, it would be useful to know how others perceive those who use all four styles of humor, in comparison to those who use only self-defeating humor. Results from an experimental approach such as this could advance our understanding, possibly identifying perceived motives behind the different uses of humor.

In conclusion, the current study has extended knowledge beyond what we already know about the simple correlations between the four humor styles and aspects of psychosocial adjustment in children. Furthermore, it is the first study to examine differences in humor types *across time*. The findings suggest that the negative effects of self-defeating humor could be offset if it is used in combination with other humor styles. However, further research is needed to examine children's humor types in other cultures as well as differences between humor types over a longer period of time.

Acknowledgements

We are grateful to Sirandou Saidy Khan, Hayley Gilman, Lucy James and Katie Wright-Bevans who provided invaluable assistance with data collection and inputting, to the children who took part in this research, and to the school, teachers, and parents who allowed them to do so. This research was supported by a grant from the Economic and Social Research Council (REF: RES-062-23-2647).

References

- Asher, S. R., Hymel, S., & Renshaw, P. D. (1984). Loneliness in children. *Child Development*, 55, 1456–1464.
- Chen, S. T., & Martin, R. A. (2007). A comparison of humor styles, coping humor and mental health between Chinese and Canadian university students. *HUMOR: International Journal of Humor Research*, 20, 215–234.
- Conway, J. M., & Lance, C. E. (2010). What reviewers should expect from authors regarding common method bias in organizational research. *Journal of Business and Psychology*, 25, 325–334.
- Dyck, K. T. H., & Holtzman, S. (2013). Understanding humor styles and well-being: The importance of social relationships and gender. *Personality and Individual Differences*, 55, 53–58.
- Erickson, S. J., & Feldstein, S. W. (2007). Adolescent humor and its relationships to coping, defense strategies, psychological distress and well-being. *Child Psychiatry and Human Development*, 37, 255–271.
- Fox, C. L., Dean, S., & Lyford, K. (2013). Development of a humor styles questionnaire for children and young people. *Humor: International Journal of Humor Research*, 26, 295–319.
- Fox, C. L., Hunter, S. C., & Jones, S. E. (2015). *Reciprocity between humor styles and psychosocial adjustment in children*. Unpublished manuscript.
- Führ, M. (2002). Coping humor in early adolescence. *Humor: International Journal of Humor Research*, 15, 283–304.
- Galloway, G. (2010). Individual differences in personal humor styles: Identification of prominent patterns and their associates. *Personality and Individual Differences*, 48, 563–567.
- Kazarian, S. S., & Martin, R. A. (2004). Humor styles, personality and well-being among Lebanese university students. *European Journal of Personality*, 18, 209–219.
- Kovacs, M., & Beck, A. T. (1977). An empirical clinical approach toward a definition of childhood depression. In J. G. Schulerbrandt, & A. Raskin (Eds.), *Depression in childhood: Diagnosis, treatment and conceptual models*. New York: Raven.
- Kuiper, N. A., Grimshaw, M., Leite, C., & Kirsh, G. A. (2004). Humor is not always the best medicine: Specific components of sense of humor and psychological well-being. *Humor: International Journal of Humor Research*, 17, 135–168.
- Kuiper, N., Kirsh, G., & Leite, C. (2010). Reactions to humorous comments and implicit theories of humor styles. *Europe's Journal of Psychology*, 6, 149–173.
- Leist, A. K., & Müller, D. (2013). Humor types show different patterns of self regulation, self-esteem and well-being. *Journal of Happiness Studies*, 14, 551–569.
- Martin, R. A. (2007). *The psychology of humor: An integrative approach*. Burlington, MA: Elsevier Academic Press.
- Martin, R. A., Puhlik-Doris, P., Larsen, G., Gray, J., & Weir, K. (2003). Individual differences in use of humor and their relation to psychological well-being: Development of the humor styles questionnaire. *Journal of Research in Personality*, 37, 48–75.
- Rosenberg, M. (1965). *Society and the adolescent self-image*. Princeton, NJ: Princeton University Press.
- Rotenberg, K. J., Boulton, M. J., & Fox, C. L. (2005). Cross-sectional and longitudinal relations among children's trust beliefs, internalised maladjustment and social relationships: Are very high as well as very low trusting children at risk? *Journal of Abnormal Child Psychology*, 33, 595–610.
- Saraglou, V., & Scariot, C. (2002). Humor styles questionnaire: Personality and educational correlates in Belgian high school and college students. *European Journal of Personality*, 16, 43–54.
- Tucker, R. P., Wingate, L. R., O'Keefe, V. M. O., Slish, M. L., Judah, M. R., & Rhoades-Kerswill, S. (2013). The moderating effect of humor style on the relationship between interpersonal predictors of suicide and suicidal ideation. *Personality and Individual Differences*, 54, 610–615.
- Yip, J. A., & Martin, R. A. (2006). Sense of humor, emotional intelligence and social competence. *Journal of Research in Personality*, 40, 1202–1208.
- Ziegler-Hill, V., Besser, A., & Jett, S. E. (2013). Laughing at the looking glass: Does humor style serve as an interpersonal signal? *Evolutionary Psychology*, 11, 201–226.