Perfectionism Among Chinese Gifted and Nongifted Students in Hong Kong: The Use of the Revised Almost Perfect Scale

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This study investigated the structure of perfectionism based on the Almost Perfect Scale–Revised with a sample of 320 gifted students aged 7 to 12 and a sample of 882 nongifted students of similar ages in Hong Kong. Multigroup confirmatory factor analyses across the two student groups supported a common three-dimensional model that included constructs of high personal standards, order and organization, and perception of discrepancy between standards and performance. Both a rational approach and an empirical clustering procedure yielded three clusters of students interpreted as unhealthy perfectionists, nonperfectionists, and healthy perfectionists. Unhealthy perfectionists had pervasively high scores on all three dimensions, healthy perfectionists had high scores on standards and order and low scores on discrepancy, and nonperfectionists had pervasively low scores on all three dimensions. Implications of the findings for future research on perfectionism and the promotion of positive perfectionism are discussed.

In gifted education, perfectionism has often been presented as a hallmark or signature characteristic of gifted individuals, suggesting that it could be more prevalent in the gifted population and that more gifted individuals might possess this characteristic than do their nongifted counterparts (see LoCicero & Ashby, 2000; Orange, 1997; Parker & Adkins, 1995; Schuler, 2000; Siegle & Schuler, 2000; Speirs Neumeister, 2004). However, this position has not gone unchallenged, as other researchers have maintained that there was a lack of compelling evidence that perfectionism was higher in samples of gifted individuals (e.g., Parker & Mills, 1996; Parker, Portesova, & Stumpf, 1995), and that perfectionism was not uniquely or universally an identifying characteristic of the gifted and should not be included as a characteristic of giftedness (Mendaglio, 2007). A closer examination of these studies revealed that the somewhat opposing

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or contrasting positions could arise from the use of different measures of perfectionism administered to different samples of gifted individuals of different ages and levels of giftedness, and from a focus on the exclusive emphasis on the negative or maladaptive aspects of perfectionism as opposed to the emphasis on including the positive or adaptive aspects in addition to the negative or maladaptive aspects. Therefore, to address adequately the simple question of whether there are more perfectionists in the gifted population of a specific age range, more rigorous research studies need to be conducted with reliable and valid perfectionism measures that tap both the positive and negative aspects of perfectionism. Moreover, the proportions of perfectionists classified on the basis of these perfectionism measures among gifted individuals need to be compared with those among nongifted individuals.

Historically, perfectionism was examined primarily from a pathological perspective that was rooted in clinical observations and studies that associated perfectionism with a host of physical problems, psychological disorders, and psychiatric conditions (see Shafran & Mansell, 2001). With the view that perfectionism is linked to the pursuit of high and unrealistic goals, which could be destructive (e.g., Pacht, 1984) and compulsive (e.g., Burns, 1983), and to procrastination and a fear of failure (e.g., Adderholdt-Elliot, 1989), it is understandable that gifted education researchers and practitioners may regard perfectionism as a negative characteristic that must be eliminated if gifted students are to function successfully. In this regard, it is also natural that some would argue against including perfectionism as a noteworthy characteristic of giftedness (see Mendaglio, 2007; Schuler, 2000; Siegle & Schuler, 2000).

Interestingly, researchers and educators who include perfectionism as a noteworthy characteristic of giftedness tend to adopt a somewhat different perspective that views perfectionism as a continuum of behaviors and thoughts, with positive or healthy and negative or unhealthy aspects (e.g., Roedell, 1984; Silverman, 1999, 2007), or as comprising separate positive and negative forms (Parker, 2000). Adler (1956) was, perhaps, one of the first to view perfectionism as healthy when the striving for perfection includes social concern along with the maximizing of one's potential. Similarly, Hamachek (1978) distinguished normal from neurotic perfectionism. Whereas normal

perfectionism is characterized by conscientious efforts to strive for excellence on tasks, neurotic perfectionism is characterized by neurotic and obsessive-compulsive behaviors in the pursuit. In their thinking about behaviors, normal perfectionists derive great pleasure from accomplishments and allow themselves to fail and to be imperfect, whereas neurotic perfectionists, with their extremely high standards, are preoccupied with avoiding mistakes, and never feel that their efforts are good enough (Schuler, 2000).

Based on the theorizing that the construct of perfectionism is a unidimensional and primarily negative construct to one that is multidimensional and with positive and negative aspects, the development of perfectionism measures has progressed from unidimensional scales (e.g., Burns, 1983) to multidimensional scales. For example, Hewitt and Flett (1989, 1991) developed the 45-item Multidimensional Perfectionism Scale (HMPS) that assesses self-oriented, other-oriented, and socially prescribed perfectionism. Self-oriented perfectionism focuses on excessively high standards, other-oriented perfectionism examines an individual's expectations of others, and socially prescribed perfectionism addresses the perceptions of standards set by others. Frost, Martin, Lahart, and Rosenblate (1990) emphasized the intrapersonal aspect of perfectionism and developed a 35-item scale, also named the Multidimensional Perfectionism Scale (FMPS), which assesses not only high standards but also the tendencies for overly critical evaluations of one's behaviors, expressed in an overconcern for mistakes and uncertainty regarding actions and beliefs. Although in both the HMPS and the FMPS, the multidimensional nature of the construct is emphasized, the item content of the scales is largely negative. Perhaps, the notable scale that accords an equal emphasis on the pathological as well as the nonpathological aspects of perfectionism is the Positive and Negative Perfectionism Scale (PANPS) developed by Terry-Short, Owens, Slade, and Dewey (1995), which aims to assess perfectionism defined in terms of positive (20 items) and negative (20 items) behavioral consequences or outcomes. More recently, Slaney, Rice, Mobley, Trippi, and Ashby (2001) have more explicitly emphasized the assessment of adaptive and maladaptive perfectionism in their 23-item Almost Perfect Scale-Revised (APS-R). After reviewing extant scales, they arrived at the conclusion that adaptive and maladaptive perfectionism could be distinguished

on three constructs represented by the three subscales in the APS-R, the high personal standards that respondents set for themselves, their need for order and organization, and their perception of the discrepancy between standards and performance. Specifically, according to their theorizing, the level of personal standards could be used to distinguish perfectionists from nonperfectionists, the high standards and organization could be used to define healthy or adaptive perfectionists, and the high standards and discrepancy could be used to define unhealthy or maladaptive perfectionists. Thus, the APS-R appeared to be the scale of choice in examining the issue of prevalence of perfectionism, including positive and negative perfectionism, in the gifted population.

The present study focused on the use of the APS-R with Chinese gifted and nongifted students and aimed to address the issue of the prevalence of perfectionism in a gifted sample as compared with that in a nongifted sample. However, the question remained as to how one should define giftedness for the present study, as it was understood that educators and researchers in gifted education have held different views on how best to conceptualize and define giftedness (see Pfeiffer, 2003; Sternberg & Davidson, 1986, 2005; Winner, 2000). Given the differences, adopting different conceptions or definitions could have important and far-reaching consequences and implications in identification, programming, and criteria for admitting students to programs. Indeed, the complications have even led some scholars to argue that giftedness or being gifted should not be bestowed on children as a result of the identification process, and prefer to call children able learners (e.g., Cox, Daniel, & Boston, 1985) or children displaying gifted behaviors (e.g., Renzulli, 1994).

Despite the controversy, at one time, it seemed pragmatically convenient to associate giftedness with intelligence, and define giftedness as high ability or high intelligence above a certain cut-off score (see Callahan, 1996; Feldhusen, 2003). Subsequently, this once popular conception has been seriously challenged, as theorists have a broader notion of intelligence (e.g., Guilford, 1967), and have distinguished different and distinct human cognitive abilities (e.g., Cattell, 1971; Gardner, 1983, 1999; Sternberg, 1985, 2003a). Further, giftedness could involve more than just high IQ, and could have noncognitive components such as socioemotional competence, creativity, and

motivation (e.g., Renzulli, 1978, 2003; Runco, 1993; Sternberg, 2000a, 2000b, 2003b). Finally, in applying the notion of giftedness across cultures, educators are reminded to take into account the cultural contexts in which giftedness is conceptualized, socialized, and nurtured, and honor different cultural conceptions to make giftedness relevant for children in different cultural settings (Sternberg, 2007; Stevenson, 1998).

In Hong Kong, gifted education, with a brief history of less than 20 years, has been largely modeled after Western practices based on Western conceptions of giftedness (see Chan, 1998). Recognizing the inadequacy of IQ as a unitary measure of giftedness, the Education Commission (1990), in its first official definition of giftedness, defined gifted children as those with exceptional achievement or potential in one or more of six areas. These areas include general intellectual ability, specific academic aptitude, creative or productive thinking, leadership ability, visual and performing arts, and psychomotor ability. This definition is basically an adaptation of the original U.S. Office of Education definition (Marland, 1972), and is consistent with the Chinese multi-talent conception of giftedness as well as the notion of balanced development in *de, zhi, ti, qun,* and *mei* (ethics, intellect, physique, social skills, and esthetics). More recently, the Education Commission (2000), the Curriculum Development Council (2000), and the Education Department (2000) have also interpreted the broadened notion of giftedness based on Gardner's (1983, 1999) notion of multiple intelligences, suggesting that each individual may be gifted or excel in one or more intelligences.

Yet, despite years of advocacy of a broadened notion of giftedness in Hong Kong, there is still no consensus among researchers as to how giftedness should be measured or how gifted students could be identified in Hong Kong. Consequently, researchers might employ, among others, IQ scores, self-report measures, teacher nomination or ratings, and parent nomination or ratings. Although these measures might not yield convergent results, they were often found to be complementary (see Chan, 2000, 2008). Because teacher nomination has been used for admission to government gifted programs over the past 10 years, it was deemed appropriate to use teacher nomination to define giftedness, and contrast gifted and nongifted samples for the present study on perfectionism. Specifically, first, the structures

of perfectionism as assessed by the APS-R for the gifted and nongifted samples were compared to evaluate and support that the APS-R constructs provided a valid basis for comparison. Second, gifted and nongifted students were compared on the APS-R dimensions of perfectionism. Third, students were classified on the basis of the APS-R constructs by a rational approach and a clustering procedure for comparing the proportions of perfectionists, healthy and unhealthy, in the gifted and nongifted samples. In this study, data on self-perceived multiple intelligences were also collected on students to assure that the gifted and nongifted samples did differ on their levels of giftedness, and to explore possible differences in the profiles of multiple intelligences of different perfectionist types.

Method

Participants

Two samples of Hong Kong Chinese students participated voluntarily in this study. Sample A students were 882 students studying in grade 2 to grade 6 in two primary schools. These students (470 boys, 403 girls, and 9 who did not report their gender) were between the ages of 7 and 12 ($M = 10.19$, $SD = 1.08$), and were recruited to participate through school nomination as average-ability students. Sample B students ($n = 320$) were nominated by their schools to participate in different enrichment courses in the summer gifted program provided at the Chinese University of Hong Kong. These students (193 boys and 127 girls) were between the ages of 7 and 12 ($M = 10.25$, $SD = 1.23$), and were selected from a larger group of gifted students to match the Sample A students on age. Like Sample A students, these students were largely in grade 2 to grade 6 (87%), but some students were in grade 7 and grade 8 (13%). In nominating these Sample B students, schools were requested to recommend students who were judged to be either gifted intellectually (e.g., with a high IQ score), or academically (e.g., with outstanding performances in school subjects), or had demonstrated talents in other specific nonacademic areas. In general, Sample B students represented students with gifts or talents in

different domains. For convenience, Sample A and Sample B students were referred to as nongifted and gifted students for comparison.

Measures

Almost Perfect Scale–Revised. The Chinese 23-item APS-R was used in this study. The English version of the scale (Slaney et al., 2001) was first translated into Chinese and back-translated into English by two language teachers. Any discrepancies between the two English versions would suggest that the Chinese version needed to be improved, and differences were resolved through discussion to arrive at a final Chinese version. Throughout the procedure, special care was taken to ensure that the language was simple and could be readily understood by young primary school students. Pilot testing of the draft version with young primary school students lent support to its use. The APS-R can be scored into three subscales: Discrepancy (13 items), High Standards (7 items), and Order (4 items). In completing the Chinese APS-R, participants responded by indicating their agreement to each of the 23 statements using a 5-point scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*).

Slaney and his colleagues (2001) reported good reliability of the APS-R subscales (Cronbach's α = .82 to .93) and good concurrent validity with other perfectionism scales as well as good construct validity in relation to measures of adjustment or well-being. Specifically, the High Standards subscale correlated significantly (p < .05) with HMPS Self-Oriented Perfectionism (r = .55 to .64), with FMPS Personal Standards subscale (r = .64), and with Grade Point Average (r = .34 to .42). The Order subscale correlated significantly (p < .05) with FMPS Organization subscale (r = .88). The Discrepancy subscale correlated significantly (p < .05) with HMPS Self-Oriented Perfectionism (r = .23 to .31) and Socially Prescribed Perfectionism (r = .43 to .45), with FMPS Concerns over Mistakes subscale (r = .55) and Doubts about Actions subscale (r = .62), and with a self-esteem measure (r = -.35 to -.44) and a depression measure (r = .49).

Student Multiple Intelligences Profile. The Student Multiple Intelligences Profile (SMIP-24; Chan, 2001, 2003) is a 24-item Chinese checklist of characteristics and behaviors constructed to reflect perceived strengths in Gardner's (1999) multiple intelligences. The original

21-item SMIP was designed to assess students' seven intelligences (three items for each intelligence): that is, verbal-linguistic, musical, logical-mathematical, visual-spatial, bodily kinesthetic, intrapersonal, and interpersonal intelligences. In the revised SMIP-24, three items have been added to incorporate the addition of naturalist intelligence (see Chan, 2003). Each of the three items for each intelligence was written in Chinese to reflect a different aspect of the intelligence intended to be assessed. In completing SMIP-24, respondents were requested to rate themselves on the 24 items using a 5-point scale ranging from 1 (*least descriptive*) to 5 (*most descriptive*). SMIP-24 can be scored on eight subscales that yield eight scores reflecting the eight intelligences. The instrument has been used in studies with Chinese students, and the subscales have achieved moderate internal consistency, with construct validation using item factor analysis (see Chan, 2001, 2003). A more elaborate description of the development of SMIP, with the items of SMIP in the Chinese Pinyin version, can be found in Chan (2001). The SMIP-24 was used in this study to check on the level of giftedness of the two nominated samples and to provide support to the differentiation of perfectionist types that could be described in relation to different multiple intelligences profiles.

Procedure

Both Sample A and Sample B students participated voluntarily with the consent of their parents in the larger research project of which this study was a part. Sample A students were tested in their own schools while Sample B students were requested to come to the university campus for assessment. All students were tested in groups of 30 to 50. Research assistants of the project were present in the testing sessions to explain verbally any items about which young students might have questions.

Results

Prior to examining whether the three-dimensional structure as assessed by the APS-R could apply to both nongifted and gifted students, the two student groups were first compared on their self-perceived multiple intelligences as indications on their relative

levels of giftedness. Specifically, a multivariate analysis of variance (MANOVA) was performed on the eight intelligences scores using the student group membership as the grouping variable. The MANOVA results indicated that the overall student group main effect was significant, Wilks' $\Lambda = .83$, $F(8, 1193) = 30.43$, $p < .001$, partial $\eta^2 = .169$. Subsequent univariate ANOVA on each of the scale scores was conducted as a follow-up test to the significant MANOVA student group main effect. Using the Bonferroni procedure to adjust for multiple tests, each ANOVA was evaluated at the alpha value of .05/8 or .00625. The results indicated that gifted students scored significantly higher ($p < .001$) than did nongifted students on all multiple intelligences scores, suggesting that there were indeed differences on the levels of giftedness between the two student groups.

To test the hypotheses related to the equivalence of measurement and structure of the APS-R across nongifted (Sample A) and gifted (Sample B) students, the item responses of the students to the APS-R were tabulated for the two samples of students, and analyses were conducted by treating the data of nongifted and gifted students as separate data sets in multigroup confirmatory factor analyses. The findings of invariance of the structure of the APS-R across the two student groups would provide the basis for making meaningful comparison between nongifted and gifted students on their APS-R perfectionism measures.

Exploring the Structure of the 18-Item APS-R

Prior to the testing for invariance of the factorial structure of the APS-R using multigroup confirmatory factor analysis, separate single-group confirmatory factor analysis was conducted for each of the two student groups to provide two three-factor baseline models for comparison with the models tested under multigroup confirmatory factor analyses. All single-group and subsequent multigroup confirmatory factor analyses were conducted using the LISREL 8 program (Jöreskog & Sörbom, 1993). Because the baseline models and the models tested under different equality constraints would be rejected by the chi-square test statistic at a conventional alpha level if a large enough sample was used and accepted if a small enough sample was used, a number of residual-based fit indices and comparison-based

fit indices were employed to help determine whether each of the hypothesized models was well-fitting for these data (e.g., Bentler, 1989; Browne & Cudeck, 1993; Steiger, 1990). Thus, apart from the chi-square statistic, the fit indices used included the Root Mean Squared Error of Approximation (RMSEA), the Standardized Root Mean Square Residual (S-RMR), the Expected Cross-Validation Index (ECVI), the Goodness of Fit Index (GFI), the Non-Normed Fit Index (NNFI), and the Comparative Fit Index (CFI). In general, an adequate to good fit is suggested by RMSEA and S-RMR values below .05 or approaching .05, and by fit index values between .80 to 1.00, and the best fitting model among competing models will be the one with the smallest ECVI value or the greatest likelihood that the model will cross-validate across a similar-sized sample from the same population (see Byrne, 1998; Diamantopoulos & Siguaw, 2000).

Table 1 summarizes the results of the two single-group confirmatory factor analyses. It can be seen that the three-factor model based on past findings (Slaney et al., 2001) provided only a marginally adequate fit to both the data of nongifted and gifted students. An examination of the 2 three-factor solutions revealed that a common set of items might need to be allowed to cross-load on factors other than their respective factors to improve the fit of the data to the model, as reflected in the sizable modification indices. Substantively, on closer examination, these items might also be interpreted somewhat differently from the rest of the items belonging to the same factors. For example, Item 14 was the only item that was not written as a first-person statement. Item 18 referring to trying one's best might be interpreted less as having a high standard than as putting in effort to achieve. The effort interpretation could also be applied to the three other problematic items (Items 3, 7, and 12), considering that other Discrepancy items might be more explicit in stating that discrepancy was perceived even with the best effort. On empirical and substantive grounds, it was deemed appropriate that more well-fitting and adequate index values could be obtained when these five items were omitted from the analysis. Therefore, the single-group confirmatory analyses were repeated with the omission of five items. The results, summarized in Table 1, indicated that the three-factor model provided reasonably adequate fit to both the data of nongifted and gifted

Table 1

Summary of Tests for Invariance of the Structure of the Almost Perfect Scale-Revised Across Chinese Children and Adolescents Using Multigroup Confirmatory Factor Analysis

			Fit Index					
Competing Model	χ^2	df	RMSEA	S-RMR	GFI	NNFI	CFI	ECVI
Single-group analysis								
Nongifted students								
Independence model	21154.94	253	—	—	—	—	—	24.065
Three-factor model	1328.36	227	0.074	0.077	0.884	0.948	0.953	1.619
Gifted students								
Independence model	7778.75	253	—	—	—	—	—	24.529
Three-factor model	897.40	227	0.096	0.099	0.803	0.920	0.929	3.120
Single-group analysis								
Nongifted students								
Independence model	13908.97	153	—	—	—	—	—	15.829
Three-factor model	555.15	132	0.060	0.048	0.935	0.967	0.971	0.719
Gifted students								
Independence model	5475.58	153	—	—	—	—	—	17.278
Three-factor model	379.84	132	0.077	0.062	0.883	0.950	0.957	1.435
Multigroup analysis								
Independence model	19384.55	306	—	—	—	—	—	16.184
Model 1								
Number of factors invariant	934.99	264	0.065	0.048/0.062	0.935/0.883	0.962	0.967	0.909
Model 2								
Pattern of factor loadings held invariant	973.08	279	0.064	0.050/0.072	0.933/0.876	0.962	0.965	0.916
Model 3								
Pattern of factor loadings and factor covariances held invariant	980.32	282	0.064	0.056/0.101	0.933/0.874	0.962	0.965	0.917
Model 4								
Pattern of factor loadings, factor variances and covariances held invariant	996.1	285	0.065	.059/0.113	0.932/0.872	0.961	0.964	0.925

Note. Fit indices are from LISREL analyses (Jöreskog & Sörbom, 1993). χ^2 = Normal Theory Weighted Least Squares χ^2; RMSEA = Root Mean Square Error of Approximation; S-RMR = Standardized Root Mean Square Residual; GFI = Goodness of Fit Index; NNFI = Non-Normed Fit Index; CFI = Comparative Fit Index; ECVI = Expected Cross-Validation Index. All χ^2 values are significant ($p < .05$).

students, suggesting that one could proceed with multigroup confirmatory factor analyses.

Testing the Invariance of the Structure of the 18-Item APS-R

In the present multigroup confirmatory factor analyses, four models (four variations of the hypothesized three-factor model) were considered and successively tested. Model 1 considered that the number of underlying factors was three and was equivalent for nongifted and gifted students. In other words, three factors corresponding to the three dimensions of perfectionism as assessed by the three subscales of the APS-R could be identified for the two groups of students. Model 2 considered that, in addition to the constraint on the number of factors, the pattern of factor loadings was equivalent for the two groups of students. Model 3 considered that, in addition to the Model 2 constraints, the structural relationships among the three dimensions (factor covariances) were equivalent for the two student groups. Finally, in addition to the Model 3 constraints, Model 4 further considered the completely equivalent model that the factor variances in addition to factor covariances were equivalent for the two student groups.

Specifically, Model 1 was the basic model that hypothesized that the structure of the APS-R was best described by a three-factor solution for the two student groups. In this multigroup analysis, the data set for nongifted students was entered first, followed by the data set for gifted students. In this analysis, no equality constraints were specified on the parameters across groups. Rather, the tenability of the hypothesized structure would rest on the values of the fit indices, and an adequate to good fit would suggest that an equivalent number of factors best represented the data across the two student groups. Table 1 summarizes the results of this Model 1 analysis. The fit indices indicated reasonably adequate fit to the data, suggesting that three factors represented adequately the data for the two student groups.

In testing Model 2, the Model 1 multigroup analysis was repeated with additional equality constraints imposed on all factor loadings. In the analysis, the pattern and size of factor loadings of gifted students were constrained to equal to those of the nongifted students. The results of the analysis are also summarized in Table 1. Comparing

Model 2 with Model 1, the difference in chi-squares ($\Delta\chi^2 = 38.09$, $df = 15$) was just statistically significant at $p < .001$. Although this suggested that the more restricted Model 2 was somewhat less tenable, the fit indices did indicate reasonably adequate fit to the data, implying that the 18 items comprising the three APS-R subscales could be conceptualized as measuring the same structure of perfectionism in more or less the same way for the two student groups.

In testing Model 3, the Model 2 multigroup analysis was repeated with further equality constraints on the factor covariances. Thus, Model 3 was more restrictive than Model 2 and Model 1. The results of this analysis are also summarized in Table 1. Comparing this more restricted Model 3 with Model 1, the basic model, the difference in chi-squares ($\Delta\chi^2 = 45.23$, $df = 18$) was significant ($p < .001$), suggesting that Model 3 was again somewhat less tenable. Finally, for completion and comparison, Model 4 with additional equality constraints on the factor variances was also tested. The results of this analysis are also summarized in Table 1. Comparing this most restricted Model 4 with Model 1, the difference in chi-squares ($\Delta\chi^2 = 61.11$, $df = 21$) was significant ($p < .001$), suggesting that the most restricted model was again less tenable.

In examining the fit indices of the four models, it appeared that Model 1 and Model 2 provided reasonably good fit to the data. The findings that Model 3 and Model 4 provided less adequate fit suggested that there might be subtle differences in the factor variances and covariances or in the relationships among the three dimensions of perfectionism between the two student groups. An examination of the two factor covariance matrices further suggested that factor covariances for the gifted students were generally lower than those for the nongifted students. However, a similar pattern of relatively high correlation between the dimension of high standards and that of order and relatively low correlation between the dimension of discrepancy and that of order was observed across the two student groups. Consequently, the common metric standardized solution of perfectionism across the two student groups from Model 2 was regarded as providing a reasonably adequate fit to the data. This common metric standardized solution with the two matrices of factor covariances of the two student groups is shown in Table 2.

Table 2

*Common Metric Completely Standardized Three-Factor Solution of Perfectionism by Multigroup Analysis Across Nongifted (*n *= 882) and Gifted (*n *= 320) Chinese Students*

	Factor		
Almost Perfect Scale-Revised items	1	2	3
1. Feel frustrated because of not meeting goals	58		
2. The best seems never good enough	64		
4. Doing best never seems enough	72		
5. Never satisfied with accomplishments	66		
6. Worry not measuring up to expectations	73		
8. Not satisfied even having done the best	72		
9. Not meeting high standards of performance	60		
10. Not satisfied with performance	62		
11. Hardly feel what has been done is good enough	62		
13. Have high standards for performance		71	
15. Have high expectations		78	
16. Set very high standards		84	
17. Expect the best from self		70	
19. Have strong need to strive for excellence		67	
20. An orderly person			71
21. Neatness is important			77
22. Things should be put in place			73
23. Like to be organized and disciplined			76
Factor Correlation Matrix			
Factor 1 (Discrepancy)	0.94/1.17	0.25	-0.01
Factor 2 (High Standards)	0.43	1.07/0.81	0.46
Factor 3 (Order)	0.25	0.63	1.07/0.82

Note. Decimals on factor loadings are omitted. Lower triangle values in the factor covariance matrix are factor covariances of nongifted students, and upper triangle values are those of gifted students. The first and second values in the diagonal are variances of nongifted students and of gifted students, respectively.

The Three Subscales of Perfectionism

The above model-testing procedures have thus established the viability of the 18-item APS-R for assessing three dimensions of perfectionism for nongifted and gifted students. Table 3 shows the mean scores and the standard deviations of the three subscales of perfectionism together with their measures of internal consistency and their correlations for the total sample and separately for nongifted and gifted students. It can be seen that the coefficients alpha as indices of internal consistency were relatively high, ranging from .83 to .89. The correlations among the three scales were significant ($p < .001$) with the exception of the correlation between Discrepancy and Order for gifted students. The highest correlation was obtained between High Standards and Order for both nongifted and gifted students.

To explore whether there were significant differences between nongifted and gifted students on the three subscales of perfectionism, a MANOVA was conducted using the three scores as dependent variables and the student group membership as the grouping variable. The MANOVA results indicated that the overall student group main effect was significant, Wilks' $\Lambda = .84$, $F(3, 1198) = 77.01$, $p < .001$, partial $\eta^2 = .162$. Subsequent univariate ANOVA on each of the subscale scores was conducted as a follow-up test to the significant MANOVA student group main effect. Using the Bonferroni procedure to adjust for multiple tests, each ANOVA was evaluated at the alpha value of .05/3 or .0167. The results indicated that gifted students scored significantly lower than nongifted students on Discrepancy, $F(1, 1200) = 69.31$, $p < .001$, partial $\eta^2 = .055$, but significantly higher on High Standards, $F(1, 1200) = 78.82$, $p < .001$, partial $\eta^2 = .062$, and on Order, $F(1, 1200) = 52.11$, $p < .001$, partial $\eta^2 = .042$. In general, it was observed that gifted students scored significantly higher than nongifted students on positive dimensions of perfectionism, but scored significantly lower on the negative dimension of perfectionism. However, the question whether there were more perfectionists among gifted students and whether these perfectionists were healthy perfectionists needed to be addressed with a classification of students into perfectionist types.

Table 3

Means, Standard Deviations, and Internal Consistency of Three Scales of Perfectionism

	Item *N*	*M*	*SD*	Cronbach's α	Correlation		
					DK	HS	OD
Total sample (N = 1202)							
Discrepancy (DK)	9	27.36	8.13	0.88	-		
High Standards (HS)	5	17.39	4.82	0.86	0.26*	-	
Order (OD)	4	14.82	3.72	0.84	0.10*	0.54*	-
Nongifted students (n = 882)							
Discrepancy (DK)	9	28.51	7.74	0.86	-		
High Standards (HS)	5	16.67	4.81	0.85	0.38*	-	
Order (OD)	4	14.36	3.77	0.83	0.21*	0.51*	-
Gifted students (n = 320)							
Discrepancy (DK)	9	24.21	8.37	0.89	-		
High Standards (HS)	5	19.36	4.12	0.86	0.21*	-	
Order (OD)	4	16.08	3.29	0.84	-0.02	0.51*	-

*$p < .001$.

The Perfectionist Types

To examine whether students could be classified using the three APS-R constructs of perfectionism into different types, two approaches were used. The first approach was a rational approach generally employed by researchers in studies with the APS-R (Slaney et al., 2001) using median splits on the three scores. Specifically, low scorers on High Standards were classified as nonperfectionists, and high scorers on High Standards as perfectionists could be further divided into adaptive or healthy perfectionists if they were also low scorers on Discrepancy and high scorers on Order, and maladaptive or unhealthy perfectionists if they were also high scorers on Discrepancy irrespective of their scores on Order. For high scorers on High Standards who also scored low on both Discrepancy and Order, they were also classified as adaptive or healthy perfectionists in this scheme. The second approach was an empirical one using clustering procedures as in past studies with the FMPS (e.g., Dixon, Lapsley & Hanchon, 2004; Hawkins, Watt & Sinclair, 2006). Specifically, the k-means iterative partitioning method to yield relative homogeneous clusters of students was employed. The number of clusters was specified to be three to reflect the general past findings of three types of perfectionists and nonperfectionists (nonperfectionists, healthy or adaptive perfectionists, and unhealthy or maladaptive perfectionists) and to correspond with the classification by the rational approach.

In clustering, the mean scores across items of the three subscales were used to provide a common metric and to give equal importance to the three constructs. By specifying three clusters, a three-cluster solution was obtained using the k-means iterative partitioning method that applied the parallel threshold method to select the initial seed point randomly from all observations. The resulting three-cluster solution was interpretable as clusters representing the three perfectionist types as represented in the rational approach, and was thus regarded as a good and adequate representation of the data.

Cluster 1 students (n = 314, 26%) were characterized by high scores on all three APS-R constructs, that is, high on High Standards, Discrepancy, and Order, suggesting that the interpretation of an unhealthy/maladaptive perfectionist type could be appropriate. Cluster 2 students (n = 538, 45%) scored relatively low on all the three

constructs, and could thus be labeled as nonperfectionists. Cluster 3 students (n = 350, 29%) had high scores on High Standards and Order, but low scores on Discrepancy, suggesting that these students could be more adaptive and thus belonged to the healthy perfectionist type.

Table 4 summarizes the classification results by the rational approach and empirical clustering. It can be seen that the rational approach classified about half of the students as perfectionists, which was to be expected because of the median-split method, and there were more perfectionists among the gifted students. For every three perfectionists, there were about two unhealthy perfectionists to one healthy perfectionist among nongifted students, but there were about one unhealthy to two healthy ones among gifted students. This pattern of overrepresentation of perfectionists and especially healthy perfectionists among gifted students was also evident in the classification by clustering. The two classification schemes were by and large convergent, and the concordance rates for perfectionist/nonperfectionist differentiation were above 82% for nongifted and gifted students.

Differentiating Perfectionist Types

Because the rational approach provided support and meaningful interpretation of the perfectionist types of the clustering solution, and the rational approach might yield a different classification with different cut-off scores that defined high and low scorers, it was deemed appropriate to focus on the empirical cluster types in subsequent analyses.

To provide further support to the three-cluster solution, multivariate analyses of variance (MANOVAs) were performed on the three APS-R mean scores across items as dependent variables using cluster membership as the grouping variable. The MANOVA results indicated that the overall cluster type main effect was significant, Wilks' $\Lambda = .19$, $F\,(6, 2394) = 507.27$, $p < .001$, partial $\eta^2 = .560$. Subsequent univariate ANOVA on each of the three APS-R mean scores was conducted as a follow-up test to the significant MANOVA overall cluster main effect. Using the Bonferroni procedure to adjust for multiple tests, each ANOVA was evaluated at the alpha value of .05/3 or .0167. The results indicated significant differences among the three cluster types on all three APS-R constructs: $F\,(2, 1199) = 569.82$, $p < .001$, partial $\eta^2 = .487$ (for High Standards); $F\,(2, 1199) = 599.83$, $p < .001$, partial $\eta^2 = .500$

Table 4

Distribution of Different Types of Perfectionists Among Nongifted and Gifted Students by Rational Approach and Clustering

	Rational Approach		Empirical Clustering		Concordance		Pearson's	Cramer's	
Total sample (N = 1202)	N	%	N	%	N	%	χ^2	V	κ
Nonperfectionists	626	52.1	538	44.8	487	40.5	1304.4	0.737	0.72
Unhealthy perfectionists	313	26.0	314	26.1	262	21.8			
Healthy perfectionists	263	21.9	350	29.1	239	19.9			
Nongifted students (n = 882)									
Nonperfectionists	527	59.8	455	51.6	420	47.6	865.03	0.7	0.69
Unhealthy perfectionists	240	27.2	247	28.0	201	22.8			
Healthy perfectionists	115	13.0	180	20.4	101	11.5			
Gifted students (n = 320)									
Nonperfectionists	99	30.9	83	25.9	67	20.9	360.51	0.751	0.73
Unhealthy perfectionists	73	22.8	67	20.9	61	19.1			
Healthy perfectionists	148	46.3	170	53.1	138	43.1			

Note. Pearson's χ^2, Cramer's V, and the agreement index κ (Kappa) are all significant at $p < .001$.

(for Discrepancy); F (2, 1199) = 546.63, p < .001, partial η^2 = .477 (for Order). Post hoc paired comparisons indicated that the cluster types differed significantly from each other on the constructs. Both healthy and unhealthy perfectionists had high scores on High Standards and Order. Unhealthy perfectionists scored most highly on High Standards and Discrepancy and scored slightly less highly on Order than healthy perfectionists. Nonperfectionists scored the lowest on all subscales except on Discrepancy where healthy perfectionists had the lowest scores. Thus, setting high standards distinguished perfectionists from nonperfectionists, but it was the perception of discrepancy that distinguished healthy and unhealthy perfectionists. The significant group differences are summarized in Table 5.

To provide further support to the differentiation of perfectionist types, it was of interest to examine whether the different types had different profiles of multiple intelligences. Consequently, a MANOVA was conducted using scores on multiple intelligences as dependent variables and cluster membership as the grouping variable. The results indicated that the overall cluster type main effect was significant, Wilks' Λ = .72, F (16, 2384) = 26.54, p < .001, partial η^2 = .151. Subsequent univariate ANOVA on each of the eight scores on multiple intelligences was conducted as a follow-up test to the significant MANOVA overall cluster main effect. Using the Bonferroni procedure to adjust for multiple tests, each ANOVA was evaluated at the alpha value of .05/8 or .00625. The results indicated significant differences (p < .001) among the three cluster types on all eight intelligences constructs: F (2, 1199) = 101.95, partial η^2 = .145 (verbal-linguistic intelligence); F (2, 1199) = 79.48, partial η^2 = .117 (musical intelligence); F (2, 1199) = 84.73, partial η^2 = .124 (logical-mathematical intelligence); F (2, 1199) = 53.17, partial η^2 = .081 (visual-spatial intelligence); F (2, 1199) = 78.99, partial η^2 = .116 (bodily kinesthetic intelligence); F (2, 1199) = 127.82, partial η^2 = .176 (intrapersonal intelligence); F (2, 1199) = 115.38, partial η^2 = .161 (interpersonal intelligence); and F (2, 1199) = 39.77, partial η^2 = .062 (naturalist intelligence). Post-hoc paired comparisons indicated that the nonperfectionists generally scored the lowest on all multiple intelligences, and the healthy perfectionists generally scored the highest. Unhealthy perfectionists generally scored lower or equally highly

Table 5

Means and Standard Deviations Among Cluster Groups on Measures of Perfectionism and Multiple Intelligences

	Unhealthy Perfectionists Cluster 1 (n = 314)		**Nonperfectionists Cluster 2** (n = 538)		**Healthy Perfectionists Cluster 3** (n = 350)		**Significant**
Measures of perfectionism	*M*	*SD*	*M*	*SD*	*M*	*SD*	group difference
Discrepancy	4.05	0.51	2.88	0.72	2.37	0.60	C1 > C2 > C3
High Standards	4.21	0.67	2.74	0.68	3.94	0.70	C1 > C3 > C2
Order	4.21	0.71	2.99	0.74	4.35	0.51	C3, C1 > C2
Multiple intelligences							
Verbal–linguistic	11.3	2.35	9.46	2.35	11.46	2.28	C3, C1 > C2
Musical	10.56	3.01	8.92	2.86	11.32	2.82	C3 > C1 > C2
Logical-mathematical	10.87	2.80	9.12	2.52	11.21	2.46	C3, C1 > C2
Visual-spatial	11.24	2.72	9.71	2.70	11.35	2.54	C3, C1 > C2
Bodily kinesthetic	10.53	2.52	8.78	2.53	10.73	2.62	C3, C1 > C2
Intrapersonal	11.05	2.66	9.61	2.34	12.18	2.16	C3 > C1 > C2
Interpersonal	11.64	2.42	10.28	2.25	12.57	2.08	C3 > C1 > C2
Naturalist	10.98	3.02	9.21	3.08	10.55	3.02	C1, C3 > C2

Note. Scores on measures of perfectionism are mean scores across items and are in the range of 1 to 5. Scores on multiple intelligences are in the range of 3 to 15. The significant group difference is the results from univariate analysis of variance as a follow-up of the multivariate analysis and evaluated with adjustments using Bonferroni procedures at .0167 level of significance for perfectionism, and at .00625 for multiple intelligences.

as the healthy perfectionists on multiple intelligences. The significant group differences are also summarized in Table 5.

Discussion

This study was designed to address the general issue whether perfectionism is more prevalent in the gifted population, or whether there are more perfectionists among the gifted than are in the general population. A closer examination of this general issue has revealed that the issue could be more complicated, as it is related to a host of more specific issues that include, but are not restricted to, the conceptualization and assessment of perfectionism and giftedness, the gifted sample's levels of giftedness and other demographic data such as age, and the choice of the appropriate comparison group to represent the nongifted population. Evidently, any choice would yield results representing a specific perspective, and could be different from results from other choices or perspectives.

With the evolving conceptions of perfectionism, there is now an accumulating body of evidence supporting the contention that perfectionism should be viewed as a multidimensional construct and a construct with positive and negative aspects (e.g., Bieling, Israeli, & Antony, 2004; Cox, Enns, & Clara, 2002; Fedewa, Burns, & Gomez, 2005; Haase & Prapavessis, 2004; Terry-Short et al., 1995). This positive-negative distinction is particularly relevant in gifted education where setting high standards and striving for excellence and perfection are often encouraged and considered desirable for gifted and highly able students, who could be considered adaptive or healthy perfectionists. This recognition entails that, instead of simply asking whether there are more perfectionists among the gifted, an additional question should be whether there are more healthy or adaptive perfectionists in the gifted population.

With this view, it is important that one should choose perfectionism measures that assess both positive and negative perfectionism, or constructs that could help differentiate healthy from unhealthy perfectionists. Although different perfectionism assessment instruments generally have different emphases, comparative studies have indicated that there are similarities among these scales (e.g., Frost, Heimberg,

Holt, Mattia, & Neubauer, 1993; Slaney et al., 2001; Suddarth & Slaney, 2001). Indeed, the construct that is commonly assessed in all measures seems to be the setting of very high standards. For example, one popular measure, the FMPS, suggests that having high standards for performance is not problematic, but having such standards accompanied by overly critical self-evaluations of behaviors or performance could be problematic (see Frost et al., 1990; Parker, 2002; Sondergeld, Schultz, & Glover, 2007; Speirs Neumeister, 2007). Another measure, the APS-R, suggests that, although the setting of high standards distinguishes perfectionists from nonperfectionists, it is the perception of discrepancy between high standards and best performance that distinguishes the adaptation or maladaptation of perfectionists. The present study used the APS-R, because of this clear reasoning on the distinction between adaptive and maladaptive perfectionists, and because it focuses on only a small number of constructs and excludes constructs that could be antecedents of perfectionism (e.g., parental criticism) or consequents of perfectionism (e.g., anxiety and procrastination), which are included in other measures (see Slaney, Rice, & Ashby, 2002).

Using the APS-R with gifted and nongifted students, this study extended past findings on perfectionism to the Chinese setting. Based on 18 items, the three-dimensional APS-R structure was found to apply to both gifted and nongifted students, laying the foundation for a meaningful comparison between gifted and nongifted students on the APS-R constructs. The findings that gifted students scored significantly higher on High Standards and Order and significantly lower on Discrepancy provided supporting evidence that perfectionism as defined by the APS-R was indeed more prevalent among the gifted, at least among Chinese students between the ages of 7 to 12 defined as gifted in the present study. The same conclusion was supported by the classification analyses that employed both a rational approach and an empirical clustering approach, consistent with past findings in non-Chinese settings (e.g., Parker, 1997). Not only were there more perfectionists among the gifted, there were more healthy perfectionists than unhealthy perfectionists among gifted students. In sum, the typical APS-R profile of a perfectionist was a high level of standards and organization, and a low level of perceived discrepancy between high standards and best performance characterized a healthy

perfectionist whereas a high level of perceived discrepancy marked an unhealthy perfectionist. The interpretation of types using the profiles of multiple intelligences was not particularly useful, as the elevation of levels of all eight intelligences seemed to indicate whether the student was a healthy perfectionist (highest levels), an unhealthy perfectionist (lower levels), or a nonperfectionist (lowest levels). In this regard, the unhealthy perfectionists identified in this study did not seem to perceive themselves having unrealistically high levels of intelligences in different domains.

The present findings also provided some insights as to how educators, teachers, and parents could work with perfectionist students. The appreciation of the distinction between positive and negative perfectionism and healthy versus unhealthy perfectionists would alert education practitioners to recognize that not all perfectionistic tendencies are dysfunctional or all perfectionists are unhealthy or maladaptive. Rather, students with a positive striving for excellence with mastery learning goals should be encouraged. In addition, students, while being helped to set high standards and meet challenging goals with good planning and organization, should also learn to recognize their own limitations and to derive satisfaction from having performed their best, although there could still be a discrepancy between their desired standards and their performance. Further, teachers and parents could also share with students their failure experiences and model adaptive coping strategies to tackle situations where a standard-performance discrepancy does occur (see Nugent, 2000). Nonetheless, it is not known whether such interventions by teachers and parents could help turn unhealthy perfectionists into healthy perfectionists, or prevent healthy perfectionists from becoming unhealthy perfectionists. These and other related issues certainly warrant further investigations in future longitudinal studies that could focus on the developmental trajectories of different perfectionist types, issues that could hardly be adequately addressed in the present cross-sectional study.

Apart from the above limitation of the cross-sectional nature of the study, this study certainly had other limitations. Thus, one could argue that the findings of this study might only be restricted to teacher-nominated gifted and nongifted students of the narrow age range of 7 to 12. In this regard, there is an urgent need for more cross-replication studies with gifted and nongifted samples not restricted

to teacher-nominated gifted and nongifted students as in the present study. Indeed, convergent results yielded by samples defined by different conceptions or measures of giftedness should be helpful in establishing the generalizability of the present findings. Another major limitation of the present study is the complete reliance on self-report data in the assessment of perfectionism. Thus, future studies need to address this issue and explore whether the use of observations, interviews, and anecdotal materials from teachers, parents, and peers in addition to student self-report data could provide additional information to address the question of prevalence of perfectionism among gifted students.

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