A psychometric analysis of the Frost Multidimensional Perfectionism Scale in a sample of New Zealand adolescents

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Increasingly, anecdote and research have suggested a high rate of perfectionism among adolescents. The authors of the most common measure used in perfectionism research, the Frost Multidimensional Perfectionism Scale, have proposed that perfectionism comprises six subcomponents, however this has been the subject of debate in regard to adolescent populations. Our study examined the psychometric properties of the Frost Multidimensional Perfectionism Scale in a sample of 930 New Zealand adolescents. Broadly consistent with our hypotheses, and previous research, the results showed that Frost and colleagues' original six-factor structure did not provide a good fit to the adolescent sample. Instead, exploratory factor analyses reveals a four-factor solution reflecting 'Concerns and Doubts', 'Parental Perceptions', 'Personal Standards' and 'Organisation'. Further analyses provides support for two second-order factors representing Positive and Negative perfectionism. Overall, despite differing from Frost and colleagues' original six-factor conceptualisation, the four first-order components conform to the two hypothesized second-order components.

Keywords: *Perfectionism, Adolescence, Mental Health, Factor Analysis*

INTRODUCTION

For at least two decades, there has been growing concern over the apparent increase in perfection amongst today's adolescents (e.g., Curran & Hill, 2019), with some researchers suggesting that we are amidst a perfectionism 'epidemic' (Flett & Hewitt, 2014, 2020; see also Hawkins et al., 2006; Mofield & Parker-Peters, 2015; Portesova & Urbanek, 2013; Rice et al., 2011). Previous research has highlighted the potentially detrimental effects of perfectionism, providing evidence of a number of negative mental health outcomes for highly perfectionistic adolescents (e.g., Affrunti & Woodruff-Borden, 2014; Boone et al., 2014; Claes et al., 2012; Hewitt et al., 1997). There is currently one self-report measure dominating perfectionism research; however its validity for use in adolescent samples has been questioned (e.g., Hawkins et al., 2006). The aim of this study was to evaluate the psychometric properties of this measure, the Frost Multidimensional Perfectionism Scale (FMPS: Frost et al., 1990), in order to support the validity of future research using this scale in adolescent samples.

Perfectionism

Perfectionism, typically defined as "the setting of excessively high personal standards of performance" (Frost et al., 1990, p. 450) has been considered a positive quality across a variety of situations, contributing to high levels of motivation and achievement (Hamachek, 1978; Stoeber & Rambow, 2007; Thorpe & Nettelbeck, 2014). More often, however, research has shown that perfectionism can manifest as an underlying cognitive vulnerability that can, when coupled with adverse environmental circumstances, result in psychological distress and associated sub-optimal coping strategies (e.g., Klibert et al., 2005; O'Connor et al., 2010)

Contemporary understanding of the multidimensional nature of perfectionism owes much to the influential contribution of Frost and colleagues (1990). In consolidating previously conflicting and unclear conceptualisations of what perfectionism might entail, these researchers identified key components of perfectionism within existing measures (e.g., The Burns Perfectionism Scale, Burns, 1980; subscales within the Eating Disorders Inventory, Garner et al., 1983; The Dysfunctional Attitudes Scale, Weissman & Beck, 1978; The Irrational Beliefs Test, Jones, 1969) and consolidated them to create the Frost Multidimensional Perfectionism Scale (Frost et al., 1990). The development of the FMPS moved perfectionism research from a state of conflicting definitions and findings to a position of widespread agreement on how research on the associated factors and outcomes of perfectionism can proceed. As such, the FMPS is now one of the most widely used scales to measure perfectionism (Flett & Hewitt, 2015).

The Frost Multidimensional Perfectionism Scale

Frost and colleagues' (1990) FMPS conceptualises perfectionism as having six factors; 'Concern over Mistakes' (CM; where even slight mistakes are perceived as failures), 'Doubts about Actions' (DA; feeling that a task is never successfully completed), 'Parental Criticism' (PC; anything less than perfection will result in

disapproval), 'Parental Expectations' (PE; feeling that parental expectations are increasingly high), 'Personal Standards' (PS; setting of challenging goals for oneself); and 'Organisation' (O; preoccupation with order and neatness). These six components are measured using a 35-item self-report measure, validated on several samples of female, American undergraduates (Frost et al., 1990). Initial analysis produced good internal reliabilities, exceeding that reported for other, previous, perfectionism scales (e.g., Burns, 1980) or subscales within other measures (e.g., the Eating Disorders Inventory, Garner et al., 1983; Irrational Beliefs Test, Jones, 1969), and displaying good convergent validity. Finally, consistent with early ideas that perfectionism may be related to negative outcomes, Frost and colleagues identified a positive relationship between the overall perfectionism scores (excluding O items due to low inter-correlations with the other subscales), and subscale scores for CM and DA, with a measure of depression.

Later research using this original six-factor structure has supported the relationship between specific components of perfectionism and negative outcomes. In particular, the components tapping into negative self-evaluation, namely CM and DA, have been associated with psychopathological symptoms and disorders such as depression, anxiety disorders, eating disorders, substance abuse, stress, and suicide ideation and attempts (Antony et al., 1998; Bieling et al., 2004; Dickie et al., 2012; Frost et al., 1990; Hamilton & Schweitzer, 2000; Handley et al., 2014). In addition, research has also highlighted a relationship between O and PS and positive outcomes. For example, O was shown to be related to positive achievement striving and good work habits (Frost et al., 1990). Overall, there is strong support for the division of the FMPS subscales into those typically related to negative outcomes (Concern over Mistakes, Doubts about Actions, Parental Criticism, and Parental Expectations) and those typically related to positive outcomes (Personal Standards and Organisation), sometimes referred to as positive and negative perfectionism (Frost et al., 1993).

The resulting two-factor model has since become the most well-supported conceptualisation of perfectionism (Bieling et al., 2004; Blankstein & Winkworth, 2004). However, there has been ongoing controversy regarding the scale's applicability for diverse populations. In particular, researchers have questioned whether the underlying six factors and overarching two second-order factors are equally as appropriate for diverse populations as they were for the undergraduates employed in both the original validation study (Frost et al., 1990), and Frost and colleagues' (1993) study identifying the overarching positive and negative components. Of particular interest is the scale's utility in an adolescent sample.

Using the FMPS psychometric with adolescents

With regard to the development of perfectionism and its associated outcomes, childhood and adolescence are particularly important life stages (Flett et al., 2002). With a view towards targeted prevention strategies, it follows that children and adolescents are logical targets for researching the onset of perfectionism, the factors associated with it, and related outcomes. Indeed, there is a growing body of research that supports the view that this population is particularly important, suggesting that perfectionism can adversely affect up to a third of children and adolescents in community settings, and likely more in clinical populations (Chan, 2009; Flett & Hewitt, 2014; Hawkins et al., 2006; Parker, 1997; Portesova & Urbanek, 2013). It is vital, therefore, that there is a reliable and valid measure of perfectionism with which research can be conducted and then utilised in reducing negative perfectionism and promoting positive perfectionism, thereby enhancing adolescent mental wellbeing.

Debating the conceptualisation of perfectionism

Although most researchers agree that perfectionism is multidimensional, there are conflicting perspectives on which particular conceptualisation of the FMPS should be used in order to generate the most empirically valid and theoretically useful information about its correlates and potential effects. At one extreme researchers have proposed using the original six factors (e.g., Parker & Adkins, 1995; Parker & Stumpf, 1995). At the other extreme this has been rendered down to only two factors representing positive and negative perfectionism (e.g., Chang et al., 2004; Coxet al., 2002; Khawaja & Armstrong, 2005). Given the importance of an appropriate measurement of perfectionism that can identify those at risk, this lack of consensus across a wide variety of samples, and specifically in adolescent samples, will be described and evaluated below.

Six-factor structure. Early psychometric analyses of the FMPS looked promising in regard to Frost and colleagues' (1990) proposed six-factor structure. For example, Parker and Stumpf (1995) broadly replicated the six factors in a sample of academically-talented children, except for two items which loaded on different factors. Internal reliabilities for the subscales and the overall perfectionism score ranged from .67 (DA) to .90 (O), slightly lower than those found in Frost's undergraduate sample. Parker and Stumpf also provided evidence for the existence of both a positive and a negative element of perfectionism through their relation to key personality traits. Specifically, PS and O were positively associated with conscientiousness while DA, CM and PC correlated positively with neuroticism.

Similarly, Parker and Adkins (1995) reported six factors in a sample of male and female undergraduates, and internal reliability scores similar to those identified by Frost and colleagues (except for the PE subscale: .57). However, Parker and Adkins decided to retain all items, concluding that the FMPS is psychometrically sound with an underlying six-factor structure.

Five-factor structure. Since Parker and colleagues' (1995, 1995) research, few other researchers have provided convincing support for the six-factor structure. For example, both Cox and colleagues (2002) and Stallman and Hurst (2011) have suggested that a lack of distinction between PE and PC calls for one combined subscale representing Parental Perceptions. Thus, an argument for a five-factor model arose. In a sample of clinical outpatients, Cox and colleagues also observed that many items load highly on more than one subscale. Consequently, after removal of the cross-loading items, they proposed a 22-item scale (Brief FMPS), that correlated highly with the original subscales and displayed adequate internal reliabilities (.63-.90) across

both clinical and non-clinical adults. Further analyses indicated a higher-order, positive and negative, factor structure (as proposed by Frost et al., 1993). The Brief FMPS and components of the Brief Multidimensional Perfectionism Scale (Brief-MPS-HF; Hewitt & Flett, 1991) demonstrated good fit on three of five fit indices, and better than the equivalent model using the full FMPS. Overall, Cox and colleagues supported a five-factor structure for the Brief FMPS, in which the five factors could be further grouped into secondary-order factors corresponding to positive and negative perfectionism.

In an Australian undergraduate sample, Stallman and Hurst (2011) also combined PE and PC into a single 'Parenting' factor, and a smaller item-set following exclusion of six items with low factor loadings (below 0.45). Confirmatory Factor Analysis (CFA) indicated a good fit, and internal reliabilities of the five subscales ranged from .76 (DA) to .90 (O & 'Parenting').

Finally, and directly pertinent to this investigation, Sotardi and Dubien (2019) report a five-factor structure after allowing two cross-loadings, but in a Uniervsity sample aged from 16 to 64.

Four-factor structure. Further, some researchers have taken the five-factor model and further reduced it to four (Hawkins et al., 2006; Stumpf & Parker, 2000), typically involving the amalgamation of CM and DA items. For example, Stumpf and Parker (2000) first identified four factors in a sample of academically talented children and then replicated the model with undergraduate students. They reported that Concerns and Doubts (CM and DA combined) was positively associated with neuroticism and negatively associated with self-esteem, whereas PS and O were positively associated with conscientiousness. These findings led them to explore second-order factors from which they found support for higher healthy (positive; O and PS) and unhealthy factors (negative; PE/PC and CM/DA) of perfectionism.

Hawkins, Watt and Sinclair (2006) conducted some of the first psychometric research on the FMPS using community adolescents. In their all-female sample, they also broadly replicated the above four factors with internal reliabilities ranging from .76 to .87 and only minor exclusions due to cross loadings (items originally from CM and PS respectively). In addition, Hawkins and colleagues explored the possibility of two higher-order factors. They reported that PS correlated with all three other factors and, importantly, correlated most strongly with CAD, rather than O as would be expected if they were to make up a healthy perfectionism factor. This finding, along with low internal reliability scores (.45 for 'healthy' perfectionism and .66 for 'unhealthy' perfectionism), led Hawkins and colleagues to conclude that higher-order factors were not valid in this sample.

Three-factor structure. Another less commonly proposed, although plausible, factor structure has been identified by Purdon, Antony and Swinson (1999) in a sample of clinically-anxious patients. Purdon and colleagues argue that, despite finding support for the original six-factor structure, low percentages of variance for the last three factors suggested it was over-extracted and, therefore, three factors were more statistically appropriate. They describe a further-reduced three-factor structure comprised of Fear of Mistakes (CM and DA), Goal Achievement Orientation (PS and O), and Perceived Parental Pressure (PC and PE). Internal reliabilities were .91, .85, and .91 respectively. However, it is important to note that, to our knowledge, this factor structure has not been replicated in any other sample (but see Kantack, 2014, for an example of research using these subscales). Moreover, Gelabert et al., (2011) tested Purdon and colleagues' three-factor structure along with the original six-factor structure (Frost et al., 1990) and a four-factor structure (Stoeber, 1998) in a Spanish sample. They found that the six-factor model showed the best fit, superior to a four-factor model and, finally, Purdon and colleague's three-factor model.

Two factor structure. Finally, and arguably most importantly given the current use, many researchers have supported Frost and colleagues (1993) and advocated an overarching two-factor structure representing positive and negative perfectionism. As evidenced above, this is often hierarchical, with two superordinate factors based on the six individual subscales at the first-order (e.g., Cox et al., 2002; Stumpf & Parker, 2000). Only Khawaja and Armstrong (2005) have conducted a first-order two-factor analysis of the individual scale items rather than subscale scores. In their sample of Australian undergraduates they found 17 items contributed to positive or negative perfectionism with internal consistency scores of .89 and .91 respectively (see also Burgess et al., 2016).

Overall, the existence of positive and negative facets of perfectionism have been broadly supported in adult clinical (e.g., Cox et al., 2002), undergraduate (e.g., Frost et al., 1993; Stallman & Hurst, 2011), adolescent non-clinical (e.g., Luyckx et al., 2008; Stumpf & Parker, 2000), and child (e.g., Parker & Stumpf, 1995) samples. Given that the focus of this paper is on adolescents, the following section will attend to evidence for, or against, the two-factor model of perfectionism specifically in adolescents.

In a sample of Belgian adolescents and undergraduates, Luyckx and colleagues (2008) investigated perfectionism and identity exploration in relation to well-being. They used the CM and DA subscales of the FMPS to represent negative perfectionism, and PS to represent positive perfectionism. CFA showed adequate fit to the data, and they reported good internal consistency for both positive perfectionism and negative perfectionism (α's > .75).

In another study with adolescents, Thorpe and Nettlebeck (2014) first identified a four-factor solution using exploratory factor analysis (EFA), and then conducted a second-order factor analysis resulting in two factors. Whilst Thorpe and Nettlebeck are confident with the reliability of positive perfectionism, they expressed concern around the clarity of negative perfectionism in their sample. However, overall the evidence supported a two-factor solution.

Current state of FMPS research

To summarise, it is not clear whether Frost's original six factors, or even which of the various proposed alternative factor structures, can be successfully applied to diverse populations. This uncertainty is compounded by inconsistent reporting of internal reliability. To illustrate, Ha and colleagues (2010) found only 40% of 145 studies identified as using the FMPS reported either full scale or

Table 1. *Goodness of fit statistics for Frost Multidimensional Perfectionism Scale factor structures*

	Proposed factors	Items retained	χ^2(d.f.)	χ^2/d.f.	CFI	RMSEA
Frost et al., 1990	6	35	2971.58 (545)	5.45	0.86	0.069
Cox et al., 2002	5	22	1206.84 (199)	6.07	0.90	0.074
Hawkins et al., 2006	4	33	3240.66 (489)	6.63	0.83	0.078
Purdon et al., 1999	3	35	5126.74 (557)	9.20	0.73	0.094
Khawaja & Armstrong, 2005	2	17	835.34 (118)	7.08	0.91	0.081
Frost et al., 1993	2	35	6029.19 (559)	10.79	0.68	0.103
One factor	1	35	9076.02 (560)	16.21	0.50	0.128

Note: All χ^2 significant at p<.001

subscale coefficient alphas. In a meta-analysis of those that have reported internal consistency, DA is reported as the least reliable subscale, while O is consistently the most reliable. Ha and colleagues also report that higher score reliabilities were associated with samples that are older, with higher proportions of 'White' and female participants, and greater variability on the FMPS. Unfortunately, routine underreporting of reliability adds a caveat to published research on perfectionism.

This study

Against this background, we aim to investigate the psychometric characteristics of the FMPS in a New Zealand community adolescent sample, and specifically its underlying factor structure. In light of the above debate, the support for a number of different factor structures makes it hard to predict which structure is likely to best fit New Zealand adolescents. However, there is a wider consensus for two overarching factors, therefore it is anticipated that a two-factor structure will be supported in this sample. To our knowledge this is the first study to examine the FMPS in a New Zealand sample. Clarifying the underlying nature of perfectionism will help enable researchers to conduct valid studies on the relationship between perfectionism and other positive and negative correlates, which in turn will help identify at risk individuals and prevent, associated negative mental health outcomes.

METHOD

Participants

Participants were 930 New Zealand adolescents (58% female, 42% male, <1% gender diverse), recruited to take part in a wider longitudinal Youth Wellbeing Study investigating a variety of factors associated with youth wellbeing. Secondary schools from the broad Wellington region were invited to participate, of which 15 ultimately participated.

Participants range in age from 13 years to 17 years (M = 14.50 years, SD = 1.29). The majority of the sample endorsed Pākehā (New Zealand/ European; 72.2%) and 7.3% indicated Māori as their primary ethnicity.

Materials

Within the wide array of measures used in the wider study, the focus of this study is Frost Multidimensional Perfectionism Scale (FMPS; Frost et al., 1990). It is comprised of 35 items measured on a 5-point Likert scale from 1 (*totally disagree*) to 5 (*totally agree*). For example, 'If I fail at school, I am a failure as a person', 'Other people seem to accept lower standards for myself than I do', 'My parents never try to understand my mistakes' and 'I try to be an organised person'.

Procedure

Ethical approval for this research was granted by the National Health and Disability Ethics Committee. Both school and parent/caregiver consent were sought prior to visiting the school to administer the survey. Students with parent/caregiver consent were then given the opportunity to participate in the survey during a period within their regular class hours. These students were briefed, by a member of the research team, on the purpose of the survey, with emphasis on the confidentiality and voluntary nature of the survey.

Students were typically allowed a full school period to complete the survey. Each classroom had a researcher available to answer any questions the students had, and at least one clinical psychologist from the research team was available in the event of participant distress. On completion, students were debriefed, provided with a sheet of paper detailing services that they could contact for support, and given a chocolate bar for participation.

Data was entered into and analysed using SPSS version 27 statistical software package (IBM, 2020) and AMOS (IBM, 2013).

RESULTS

Confirmatory Factor Analysis

First, Confirmatory Factor Analyses were conducted to ascertain which, of the various proposed factor structures for the FMPS, best fit this sample of New Zealand adolescents. CFA enables the researcher to test the goodness-of-fit for existing models and was therefore, given the plethora of proposed factor structures, considered a more appropriate first step than Exploratory Factor Analysis, which determines the factor structure that best represents the data without consideration of previous models (Hair et al., 2009).

14 different models were explored using AMOS 22 (IBM, 2013) including Frost's (1990) original factor structure, variations of the six-factor structure (Parker & Stumpf, 1995), five-factor (Cox et al., 2002; Stallman & Hurst, 2011), four-factor (Hawkins et al., 2006; Khawaja & Armstrong, 2005; Stumpf & Parker, 2000), a three-factor (Purdon et al., 1999), two-factor (Frost et al., 1993; Khawaja & Armstrong, 2005; Luyckx et al., 2008) and

hierarchical factor structures (Cox et al., 2002; Stumpf & Parker, 2000). For the sake of simplicity, the original model and only the variation with the best fit from each number of factors will be reported. As shown in Table 1, each model was assessed using multiple fit indices. These included the Chi-Square (χ^2), Comparative Fit Index (CFI), and the Root Mean Square Error of Approximation (RMSEA)[1].

As a guide, Tabachnik and Fidell (2013) suggest that a good fit is often represented by a non-significant χ^2, indicating that the model generated by the data is not significantly different to the model proposed. However, this statistic is particularly sensitive to large sample sizes, meaning our significant χ^2 statistics provide little guidance in regard to meaningful interpretation. Alternatively, it is suggested that χ^2 divided by the degrees of freedom is a more appropriate measure with an χ^2/d.f. between 2 (Tabachnick & Fidell, 2013) and 5 (Wheaton et al., 1977) indicating satisfactory fit. According to these guidelines, Frost and colleagues' (1990) original factor structure comes the closest to a good fit.

Other goodness-of-fit statistics broadly support the χ^2/d.f. statistic in highlighting large discrepancies between the proposed models and the model guided by this data. To illustrate, Tabachnick and Fidell (2013) state that for the data to be considered a good fit to the model the CFI should be greater than .95 (see also Hu & Bentler, 1999). As seen in Table 2, according to this fit index, the data does not show a good-fit with any of the previous models. However, Khawaja and Armstrong's (2005) two-factor model, and Cox and colleagues' (2002) five factor model appeared the closest to an acceptable fit with CFI statistics of 0.91 and 0.90 respectively.

The Root Mean Square Error of Approximation (RMSEA) was the final goodness-of-fit statistic considered. It too, raised questions about the validity of applying this data to previously proposed models. Hu and Bentler (1999) propose that RMSEA values less than 0.06 indicate a good-fit and values over 0.10 indicate a poor fit. According to this statistic, Frost and colleagues' (1990) original factor structure provides the best (although not good) fit, closely followed by Cox and colleagues (2002) five-factor structure. When combining all of the available fit indices, the statistics suggest that the data best fits Frost and colleague's original six factor structure ($\chi^2(545) = 2971.58$, $p < 0.001$; $\chi^2/d.f. = 5.45$; $CFI = .859$; $RMSEA = .069$) and Cox and colleague's five factor structure ($\chi^2(199) = 1206.84$, $p < 0.001$; $\chi^2/d.f. = 6.07$; $CFI = .90$; $RMSEA = .074$). However, none of the goodness-of-fit indices for either model exceed the criteria recommended to represent a good-fit.

Exploratory Factor Analysis

Given that the CFAs conducted showed that the data from this New Zealand adolescent sample does not show a good-fit with any of the previously proposed factor structures, exploratory Principle Components Analysis (PCA) with Varimax orthogonal rotation was employed to help determine the relationships between underlying variables and multiple items[2]. Traditional measures of suitability for factor analysis indicated that the data was suitable for PCA (Bartlett's Test of Sphericity $\chi^2(595) = 15771.70$, $p < .001$; Keyser-Meyer-Olkin: .94).

The PCA conducted on all 35 items from the FMPS produced some mixed results. Five components with eigenvalues greater than one accounted for 60.82% of the variance (Kaiser, 1974). However, Cattell's (1966) scree plot suggested either a two or four component solution. Given that Kaiser's criterion has often been critiqued for resulting in the retention of too many factors (e.g., Pallant, 2013) and the ambiguity of the current scree plot, Horn's (1965) parallel analysis was conducted to help determine the appropriate number of factors to retain.

Parallel analysis compares the eigenvalues produced with those from a randomly generated data set. This enables the researcher to retain only components that have larger eigenvalues than those generated randomly. Many argue that this method is more accurate than either Kaiser's criterion or the use of a Cattell's scree plot (e.g., Pallant, 2013). Parallel analysis resulted in the eigenvalues of four components exceeding those produced from a random data set. Specifically, the fifth PCA factor provided an eigenvalue of 1.05, below the 1.27 recommended by parallel analysis. As a result, another PCA was conducted, this time limiting the number of components to four.

In the resulting PCA, four components explained 57.83% of the variance. As can be seen in Table 2, the first component comprised of 13 items originally from CM and DA, plus two additional items (items 4 and 5) originally from the PS and PC factors respectively (Frost et al., 1990). The third and fourth components mirrored the original PS (6 items) and O (6 items) factors respectively. Finally, the fourth component comprised of seven items from PE and PC. Item 3 was excluded due to low loadings on two factors with neither loading significantly higher than the other (.42 on Factor 1; .40 on Factor 4). The four components explained 29.94%, 15.70%, 6.47% and 5.72% of the variance respectively. They will be referred to as Concerns and Doubts (CAD), Personal Standards (PS), Organisation (O) and Parental Pressure (PP) as in Stumpf and Parker (2000). All four components have high internal consistency. (CAD, $\alpha = .93$; PS, $\alpha = .84$; O, $\alpha = .91$; PP, $\alpha = .83$).

As previously outlined, higher-order factors are often created by combining correlated lower-level factors (e.g., Cox et al., 2002; Hawkins et al., 2006). As such, an exploratory PCA with Varimax orthogonal rotation was undertaken to test whether the factors combined to create two second-order factors representing positive and negative perfectionism. The PCA produced two components with eigenvalues greater than one and accounted for 78.66% of the variance (Kaiser, 1974).

[1] Multivariate outliers were computed with the 10 most extreme outliers removed. Further analysis showed that this had very little effect on the subsequent results, therefore all data was included in the final analyses.

[2] EFA was also conducted using an oblique rotation and results did not significantly differ, therefore, the results of the Varimax rotation are reported.

Table 2. *Result of FMPS PCA; factor structure and item loadings*

Item (original factor from Frost et al., 1990)	CAD (α=.93)	O (α=.91)	PS (α=.84)	PP (α=.91)
14. If I fail partly, it is as bad as being a complete failure (CM)	.79			
23. If I do not do as well as other people, it means I am an inferior human being. (CM)	.78			
9. If I fail at school, I am a failure as a person. (CM)	.76			
13. If someone does a task at work/school better than I, then I feel like I failed the whole task. (CM)	.74			
25. If I do not do well all the time, people will not respect me. (CM)	.74			
21. People will probably think less of me if I make a mistake. (CM)	.73			
28. I usually have doubts about the simple everyday things I do. (DA)	.72			
34. The fewer mistakes I make, the more people will like me. (CM)	.69			
10. I should be upset if I make a mistake. (CM)	.69			
17. Even when I do something very carefully, I often feel that it is not quite right. (DA)	.65			
33. It takes me a long time to do something "right." (DA)	.64			
18. I hate being less than the best at things. (CM)	.62			
32. I tend to get behind in my work because I repeat things over and over. (DA)	.59			
4. If I do not set the highest standards for myself, I am likely to end up a second-rate person. (PS)	.46			
5. My parents never tried to understand my mistakes. (PC)	.46			
31. I am an organized person. (O)		.84		
29. Neatness is very important to me. (O)		.84		
7. I am a neat person. (O)		.83		
8. I try to be an organized person. (O)		.80		
27. I try to be a neat person. (O)		.80		
2. Organization is very important to me. (O)		.77		
12. I set higher goals than most people. (PS)			.79	
19. I have extremely high goals. (PS)			.76	
6. It is important to me that I be thoroughly competent in everything I do. (PS)			.59	
24. Other people seem to accept lower standards from themselves than I do. (PS)			.57	
30. I expect higher performance in my daily tasks than most people. (PS)			.55	
16. I am very good at focusing my efforts on attaining a goal. (PS)			.54	
26. My parents have always had higher expectations for my future than I have. (PE)				.72
20. My parents have expected excellence from me. (PE)				.67
35. I never felt like I could meet my parents' standards. (PC)				.62
1. My parents set very high standards for me. (PE)				.61
11. My parents wanted me to be the best at everything. (PE)				.60
22. I never felt like I could meet my parents' expectations. (PC)				.58
15. Only outstanding performance is good enough in my family. (PE)				.51

Note: Loadings less than 0.30 not shown

Cattell's (1966) scree plot also supported a two component solution. As outlined in Table 3, CAD and PP combined to form a component representing negative perfectionism and O and PS combined to form a component representing positive perfectionism. Both negative and positive perfectionism had high internal consistency. In addition, an overall scale based on the individual 35 items was also found to have high internal consistency (α = .93).

DISCUSSION

This study investigated the psychometric properties of the FMPS in a New Zealand adolescent sample. Given

Table 3. *Result of FMPS second-order PCA; factor structure and item loadings*

Subscale identified in first order factor analysis	Negative Perfectionism (α = .93)	Positive Perfectionism (α = .89)
Concerns and Doubts	.86	
Parental Perceptions	.87	
Organisation		.93
Personal Standards		.75

that there is wide debate regarding the FMPS factors, there was no specific prediction about which conceptualisation of the underlying factor structure would best fit this sample. However, given the relatively consistent finding of two overarching factors, it was expected that positive and negative perfectionism would also be identified in this sample.

First level factor structure

Overall, CFA showed that none of the previously proposed models fit this sample as assessed using the range of conventional measures of fit. However, Frost and colleagues' (1990) original six factor structure indicated closer-to-satisfactory fit than the other 13 models tested. Therefore, EFA was used to form a data-driven model specific to this sample. A parallel analysis supported four factors, that subsequent EFA showed were mostly consistent with the factor structures previously reported by a number of previous researchers (e.g., Hawkins et al., 2006; Stumpf & Parker, 2000; Thorpe & Nettelbeck, 2014), whereby Concerns over Mistakes and Doubts about Actions are combined to form Concerns and Doubts and Parental Criticism and Parental Expectations were combined to form Parental Perceptions. Personal Standards and Organisation remained their own factors. Only one item was removed due to low and relatively equal loadings across two of the factors.

This initial analysis lends some support to the underlying factors proposed by Frost and colleagues (1990). However, in this younger sample it does raise questions about the validity of differentiating between CM and DA, and between PE and PC. It is possible that adolescents may have more difficulty in differentiating between these relatively similar constructs. This is similar to other studies using the FMPS in other child and adolescent samples who also struggled to differentiate between some of the original proposed factors (Hawkins et al., 2006; Kornblum & Ainley, 2005; Stumpf & Parker, 2000; Thorpe & Nettelbeck, 2014) and similar to other psychological constructs which show differing structures across ages (e.g., alexithymia; Parker et al., 2010). Indeed, Wadsworth and colleagues (2022) concluded that the FMPS (administered to both 8–12-year-olds and their parents) was valid for the parents, but not the pre-teens, potentially reflecting developmental factors.

Overarching positive and negative factors

A second-order factor analysis supported combining CAD and PP, and combining PS and O, to represent two overarching, positive and negative, factors. Therefore, this study more definitively lends support to the occurrence of positive and negative perfectionism in adolescents (Chang et al., 2004); Hawkins et al., 2006); Parker & Stumpf, 1995; Stumpf & Parker, 2000; Thorpe & Nettelbeck, 2014). Both the resulting fundamental four factors and the overarching two factors had satisfactory internal consistency alpha coefficients.

Theoretical and practical implications

This research supports the notion that perfectionism is comprised of components representing both positive and negative perfectionism. Relatedly, it further indicates that researchers should continue to use scales such as the FMPS that allow the distinction between positive and negative factors of perfectionism. Failure to do so poses the risk that significant relationships with important outcomes could potentially be masked through the cancelling out of each component's unique and typically opposite effects.

Clarifying the underlying nature of perfectionism in adolescents and providing a reliable measure of the components of perfectionism will allow researchers to begin developing a solid research base with a common language for the different facets of a perfectionistic presentation. This will then enable clinicians to have a better understanding of the correlates and risks of having perfectionism. For example, Thorpe and Nettlebeck (2014) reported that positive perfectionism was positively related to higher academic grades over and above intelligence and conscientiousness, and that negative perfectionism, specifically components representing parental criticism, were associated with lower academic achievement. Similarly, negative perfectionism has been associated with more depressive symptoms and positive perfectionism with greater academic adjustment (Luyckx et al., 2008). In addition, this greater understanding of perfectionism in adolescents, coupled with research that monitors perfectionism over time, will assist in identifying risk and protective factors for the development of perfectionism. For example, Flett and colleagues (2002) outline some family environmental factors, such as parental perfectionism, that could give rise to perfectionistic adolescents. Such understanding of the development of perfectionism will subsequently help identify interventions that can limit perfectionism and its associated maladaptive outcomes.

When the Youth Wellbeing Study Team present at local schools on the subject of adolescent wellbeing, parents report concern about perfectionism. This may reflect several things—an external pressure from the National Certificate of Education Achievement regime exacerbating levels of perfectionism, or that as young people move through secondary school the increase in important assessment is reflected in an apparently age-related increase in perfectionism. In either case, longitudinal research may help to establish whether there

is an increase in levels of perfectionism across all ages, or rather that it is particularly evident among older students.

Qualifications and limitations

There are two critical qualifying factors to consider in interpreting these results. First, there is research to suggest that perfectionism can present differently in males and females (Blankstein et al., 2008; Blankstein & Winkworth, 2004; Klibert et al., 2005). Given that this sample comprised of both males and females and analysis was not conducted individually with each gender, this study sheds little light on whether the underlying factor structure differs by gender. This factor structure has been supported in a female-only sample (Hawkins et al., 2006), but has not yet been tested in male or gender-diverse only samples.

A second limitation may be that the sample consisted of only students who were still attending school, present on the day of data collection, and whose parents had provided consent. Research suggests that adolescents that have already dropped out of school or engage in truancy have significantly higher levels of psychopathology than those who remain in education (Egger et al., 2003). Therefore, it could be possible that students who have higher levels of psychopathology, who based on previous research we would expect to have the highest level of negative perfectionism, may not be well represented in this sample. It is important to be aware of this potential limitation; however there is little to suggest that the underlying factor structure of perfectionism in the missing adolescents would be significantly different than those captured in the sample. Based on previous research (e.g., Gaudreau & Thompson, 2010) it would be expected that their perfectionism profile would be *more* extreme (higher on perfectionism and lower on positive perfectionism) rather than qualitatively different. It is unclear how parental consent might differentiate adolescents in terms of absolute levels of perfectionism of either kind, though it might be anticipated that parental expectations might be higher among parents of non-participants.

Strengths

This study has a number of key strengths. First, the aim was to comprehensively understand perfectionism in adolescents, therefore, analysis was conducted with previous models in mind, but also using a data-driven approach. Unlike studies that use only EFA, or construct scales based on the original factors, this multi-method approach limited the influence of bias regarding the best model for *this* adolescent sample.

Another key strength is that EFA was conducted using the full original 35 items rather than Frost and colleagues (1990) predetermined subscales. This allowed testing of Frost's original underlying six-factor structure through giving freedom for the items to load on any factor, whether it be the factor proposed by Frost or a factor more suited to this sample. This approach also allowed for individual item analysis and the removal of items that cross-loaded or only loaded weakly on the scales (only item 3 was removed).

Finally, the large sample used for this study broadly represents the heterogeneous nature of New Zealand adolescents. The sample included community adolescents from a variety of ethnicities and cultures, religious orientations, family structures, socio-economic status and from a wide range of schools (co-education/single sex, private/public, and religious/non-religious). This helps enable the generalisation of findings to New Zealand's wider adolescent population.

Future research

Future research could include a longitudinal investigation of perfectionism in adolescents to monitor how perfectionism develops and whether the underlying nature of the construct changes over time or remains relatively consistent. This could either provide support for one underlying model of perfectionism that is relevant throughout adolescence and young adult life or could shed some light on why there have been multiple conflicting models of perfectionism presented across different samples in past research. For example, it seems reasonable that parental expectations may contribute differently to perfectionism among young people living at home, compared to young adults living away from the sphere of close parental influence.

In addition, future research could investigate the underlying nature of perfectionism in males and females (and among gender-diverse youth). As mentioned above, most research has been conducted with males *and* females, or females *only*. Outcome research suggests perfectionism may have different effects for males and females (e.g., Blankstein et al., 2008; Blankstein & Winkworth, 2004; Klibert et al., 2005) therefore it makes logical sense to investigate whether the underlying nature of perfectionism is different. Indeed, 'perfectionism' may be a developmental construct, changing over time and developmental stage. For example, Branje and colleagues (2007) reported that conscientiousness increases among young women only. While they don't report sex differences in personality change, Heaven and Ciarrochi (2008) reported developmental declines in conscientiousness that appear to be ameliorated for youth with authoritaran parents.

Finally, the field of perfectionism could benefit from further psychometric analyses of the FMPS in different adolescent and adult samples, particularly non-western cultures, and male and female samples, to further increase confidence in the scale and perfectionism's underlying structure and to help extend and enable reliable and valid perfectionism research in wider populations.

Conclusions

In conclusion, this study has demonstrated that, in New Zealand adolescents, the FMPS is best conceptualised as having four underlying factors and two overarching positive and negative factors. Sub-scales based on first-, and second-order demonstrated more than adequate internal reliability alpha coefficients. Clarity regarding this widely used scale of perfectionism will enable further perfectionism research in adolescents which may then be used to develop prevention strategies, identify at risk populations, and reduce the negative outcomes associated with negative perfectionism.

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