



Citation for published version:

Loades, M, Rimes, K, Lievesley, K, Ali, S & Chalder, T 2019, 'Perfectionism and beliefs about emotions in adolescents with Chronic Fatigue Syndrome and their parents: A Preliminary Investigation in a Case Control Study nested within a cohort', *Psychology and Health*, vol. 34, no. 7, pp. 850-866.
<https://doi.org/10.1080/08870446.2019.1579331>

DOI:

[10.1080/08870446.2019.1579331](https://doi.org/10.1080/08870446.2019.1579331)

Publication date:

2019

Document Version

Peer reviewed version

[Link to publication](#)

This is an Accepted Manuscript of an article published by Taylor & Francis in *Psychology & Health* on 01 Mar 2019, available online: <http://www.tandfonline.com/10.1080/08870446.2019.1579331>

University of Bath

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

Take down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Supplementary information

Table S1. Reliability Analysis (Cronbach's alpha) for measures

ADOLESCENT MEASURES						
Measure/Subscale	CFS	Asthma			HC	
Fatigue (CFQ)	0.89	0.66			0.82	
Physical Functioning (SF36PFS)	0.91	0.72			0.90	
Beliefs about Emotions (BES)	0.92	0.85			0.90	
Perfectionism (CAPS)	0.92	0.92			0.88	
Perfectionism - Maladaptive perfectionism (FMPS)	>0.9	>0.9			>0.9	
Perfectionism - Personal standards (FMPS)	>0.7	>0.7			>0.7	
Perfectionism - Parental representations (FMPS)	>0.8	>0.8			>0.8	
Perfectionism - Organisation (FMPS)	>0.8	>0.8			>0.8	
PARENT MEASURES						
Measure/Subscale	Mother			Father		
	CFS	Asthma	Healthy controls	CFS	Asthma	Healthy controls
Perfectionism - Maladaptive Perfectionism (FMPS)	.91	.89	.91	.76	.85	.87
Perfectionism - Personal Standards (FMPS)	.83	.83	.81	.82	.90	.82
Perfectionism - Parental Representations (FMPS)	.85	.83	.89	.86	.91	.87
Perfectionism – Organisation (FMPS)	.83	.94	.89	.85	.87	.90
Beliefs about Emotions (BES)	.91	.68	.93	.91	.94	.87
Self-sacrificing (YSI)	.85	.89	.91	.85	.89	.84
Affect regulation - Concealing (ASQ)	.78	.74	.79	.79	.89	.84
Affect regulation – Adjusting (ASQ)	.80	.51	.77	.84	.91	.78
Affect regulation – Tolerating (ASQ)	.67	.20	.68	.75	.80	.70

ASQ - Affective Styles Questionnaire, BES - Beliefs about emotions scale, CAPS – Child and Adolescent Perfectionism Scale, CFQ – Chalder Fatigue Questionnaire, FMPS - Frost Multidimensional Perfectionism Scale, SF36 – Short for 36 physical functioning subscale, YSI - Young Schema Questionnaire Self-sacrificing subscale

Table S2. Comparison of means between CFS participants followed up and those not followed up

	CFS mean (S.D.) – followed-up	CFS mean (S.D.) – not followed up	Significance Tests – t (df)	Significance level (p)	Mean difference (95% CI)	S.E. of mean difference
Age	14.94 (1.77)	15.15 (1.57)	-0.65 (119)	.520	-0.22 (-0.44-0.87)	0.33
Fatigue (CFQ)	23.17 (5.89)	23.26 (5.60)	0.09 (118)	.932	0.10 (-2.16-2.35)	1.14
Physical Functioning (SF36PFS)	51.64 (24.69)	46.25 (25.94)	-1.06 (111)	.294	-5.38 (-15.50-4.73)	5.10
Perfectionism - Self-oriented perfectionism (CAPS)	35.07 (11.02)	34.34 (11.15)	-0.34 (119)	.735	-0.73 (-4.99-3.53)	2.15
Perfectionism - Other Oriented perfectionism (CAPS)	21.92 (8.19)	23.99 (9.92)	1.13 (63.30)	.263	2.07 (-1.59-5.72)	1.83
Perfectionism - Organisation subscale (FMPS)	18.36 (6.10)	19.00 (5.91)	0.54 (116)	.593	0.64 (-1.72-2.99)	1.19
Perfectionism - Maladaptive Perfectionism subscale (FMPS)	30.04 (12.39)	28.29 (11.50)	-0.73 (116)	.465	-1.75 (-6.48-2.98)	2.39
Perfectionism - Parental Representations subscale (FMPS)	16.14 (5.97)	15.92 (6.48)	-0.18 (116)	.857	-0.22 (-2.61-2.17)	1.21
Beliefs about emotions (BES)	34.29 (14.06)	34.68 (17.59)	0.13 (118)	.895	0.40 (-5.53-6.32)	2.99

2-tailed tests

BES – Beliefs about Emotions Scale, CAPS – Child and Adolescent Perfectionism Scale, CFQ – Chalder Fatigue Questionnaire, FMPS - Frost Multidimensional Perfectionism Scale, SF36PFS – Short Form 36 Physical Functioning Scale

Table S3. Summary of amount of missing data for each scale/subscale of interest (adolescent measures)

		Complete	≤ 25% missing (pro-rated using mean imputation)	>25% missing (no prorating applied)
Perfectionism – Self- oriented perfectionism (CAPS)	CFS	116 (95.9%)	5 (4.1%)	0
	Asthma	27 (100%)	0	0
	Healthy controls	77 (98.7%)	1 (1.3%)	0
Perfectionism- Other- oriented perfectionism (CAPS)	CFS	110 (90.9%)	10 (8.3%)	1 (0.8%)
	Asthma	27 (100%)	0	0
	Healthy controls	78 (100%)	0	0
Perfectionism- total (FMPS)	CFS	109 (90.1%)	9 (7.4%)	3 (2.5%)
	Asthma	26 (96.3%)	1 (3.7%)	0
	Healthy controls	77 (98.7%)	1 (1.3%)	0
Beliefs about Emotions (BES)	CFS	119 (98.4%)	1 (0.8%)	1 (0.8%)
	Asthma	27 (100%)	0	0
	Healthy controls	77 (98.7%)	1 (1.3%)	0

BES – Beliefs about Emotions Scale, CAPS – Child and Adolescent Perfectionism Scale, FMPS - Frost Multidimensional Perfectionism Scale

Table S4. Between group comparison on baseline variables – adolescent (using raw data for sensitivity analysis)

	Group			Group difference
	CFS	Asthma	Healthy controls	
	Mean (SD)	Mean (SD)	Mean (SD)	
Fatigue (CFQ)	23.14 (5.82)	11.89 (2.71)	10.46 (3.77)	$F(2,219)= 176.99, p<.0001^{**}$
Physical functioning (SF36PFS)	50.05 (25.33)	88.52 (12.70)	90.38 (16.99)	$F(2, 211)= 93.74, p<.0001^{**}$
Perfectionism – Self-oriented Perfectionism (CAPS)	34.74 (11.02)	34.07 (8.77)	35.74 (6.66)	$F(2, 217)= 0.41, p=.664$
Perfectionism – Other-oriented Perfectionism (CAPS)	22.28 (8.50)	24.15 (9.10)	25.97 (8.41)	$F(2, 212) =4.28, p=.015^*$
Perfectionism - Personal Standards (FMPS)	19.15 (7.24)	19.04 (4.26)	20.77 (5.13)	$F(2, 217)= 1.74, p=.177$
Perfectionism - Parental Representations (FMPS)	16.18 (6.17)	19.00 (6.79)	21.06 (7.13)	$F(2, 215)= 12.83, p<.0001^{**}$
Perfectionism - Maladaptive perfectionism (FMPS)	29.57 (11.96)	27.96 (9.01)	27.69 (9.28)	$F(2,215)=0.78, p=.462$
Perfectionism – Organisation (FMPS)	18.58 (6.07)	19.41 (5.42)	20.23 (5.90)	$F(2, 218)= 1.82, p=.164$
Beliefs about Emotions (BES)	34.54 (15.20)	29.74 (11.76)	31.55 (14.51)	$F(2, 220)= 1.71, p=.183$

*non-significant trend at $p<0.05$ level

**significant at $p<0.01$ level

BES – Beliefs about Emotions Scale, CAPS – Child and Adolescent Perfectionism Scale, CFQ – Chalder Fatigue Questionnaire, FMPS - Frost Multidimensional Perfectionism Scale, SF36PFS – Short Form 36 Physical Functioning Subscale

Table S5. Between group comparison on baseline variables – parents (using raw data for sensitivity analysis)

		Group			Group difference
		CFS	Asthma	Healthy controls	
		Mean (SD)	Mean (SD)	Mean (SD)	
Perfectionism - Personal Standards (FMPS)	Mother	19.55 (5.44)	20.84 (5.16)	21.01 (5.15)	$F(2, 202)= 1.85, p =.161$
	Father	20.54 (5.60)	21.71 (5.56)	22.94 (5.36)	$F(2, 105)= 2.08, p =.130$
Perfectionism - Parental Representations (FMPS)	Mother	18.71 (7.24)	17.24 (5.32)	20.50 (8.27)	$F(2, 197)= 2.20, p =.114$
	Father	18.24 (6.49)	22.29 (8.28)	22.44 (7.41)	$F(2, 106)= 4.60, p =.012^*$
Perfectionism - Maladaptive Perfectionism (FMPS)	Mother	27.53 (9.64)	25.80 (8.76)	27.38 (9.39)	$F(2, 197)= 0.35, p =.707$
	Father	28.75 (8.30)	32.43 (6.19)	30.22 (9.24)	$F(2, 104)= 0.79, p =.455$
Perfectionism – Organisation (FMPS)	Mother	21.19 (4.20)	21.04 (5.80)	22.79 (4.64)	$F(2, 199)= 2.95, p =.055$
	Father	20.63 (4.60)	20.57 (3.31)	20.22 (4.91)	$F(2, 106)= 0.09, p =.917$
Beliefs about Emotions (BES)	Mother	28.29 (13.26)	26.24 (7.35)	28.36 (14.52)	$F(2, 205)= 0.27, p =.762$
	Father	35.53 (14.41)	39.14 (12.39)	35.16 (11.25)	$F(2, 106)= 0.26, p =.771$
Self-sacrificing (YSI)	Mother	70.06 (11.65)	62.22 (11.31)	65.01 (14.35)	$F(2, 189)= 5.24, p =.006^{**}$
	Father	63.38 (11.39)	56.00 (11.09)	62.09 (10.95)	$F(2, 99)= 1.39, p =.255$
Affect regulation – Concealing (ASQ)	Mother	24.52 (5.01)	23.15 (5.10)	24.60 (5.27)	$F(2, 204)= 0.86, p =.427$
	Father	25.12 (5.84)	25.29 (6.50)	25.61 (5.74)	$F(2, 103)= 0.08, p =.929$
Affect regulation – Adjusting (ASQ)	Mother	23.33 (4.52)	23.35 (3.10)	24.27 (4.46)	$F(2, 205)= 1.11, p =.331$
	Father	22.75 (5.48)	21.43 (7.09)	22.87 (4.82)	$F(2, 103)= 0.21, p =.809$
Affect regulation – Tolerating (ASQ)	Father	15.99 (3.78)	17.43 (3.55)	17.32 (3.22)	$F(2, 103)= 1.72, p =.184$

*non-significant trend at $p<0.05$ level

**significant at $p<0.01$ level

ASQ - Affective Styles Questionnaire, FMPS - Frost Multidimensional Perfectionism Scale, YSI - Young Schema Inventory

Note: Group comparisons were not conducted on the ASQ Tolerating subscale (mother) due to the low reliability of this subscale in the group with asthma.

Table S6. Pearson's correlations between adolescent and parent perfectionism FMPS Subscales – CFS participants (using raw data for sensitivity analysis)

		Maladaptive Perfectionism	Personal Standards	Parental Representations	Organisation
Adolescent					
Maladaptive Perfectionism	Mother	0.34** (.003)			
	Father	0.21 (.107)			
Personal Standards	Mother		0.32* (.035)		
	Father		0.28** (.003)		
Parental Representations	Mother			0.13 (.234)	
	Father			<0.01 (.984)	
Organisation	Mother				0.05 (.648)
	Father				0.21 (.116)

Data shown as r (p)

Two tailed tests

*non-significant trend at $p < 0.05$ level

**significant at $p < 0.01$ level

Table S7. Pearson's correlations between adolescent beliefs about emotions and adolescent perfectionism and parent affective styles questionnaire (using raw data for sensitivity analysis) – CFS participants

		Beliefs about Emotions (BES)	Maladaptive Perfectionism (FMPS)	Personal Standards (FMPS)	Parental Representations (FMPS)	Organization (FMPS)	Self-oriented perfectionism (CAPS)	Other-oriented perfectionism (CAPS)
		Adolescent						
Affect regulation - Concealing (ASQ)	Mother	-0.11 (.301)	-0.12 (.305)	-0.08 (.459)	-0.04 (.726)	0.04 (.724)	0.02 (.853)	-0.14 (.240)
	Father	0.07 (.596)	0.01 (.919)	0.04 (.760)	-0.02 (.902)	-0.01 (.938)	0.09 (.508)	0.01 (.948)
Affect regulation - Adjusting (ASQ)	Mother	-0.02 (.831)	-0.18 (.106)	-0.16 (.136)	-0.08 (.475)	0.01 (.924)	-0.07 (.516)	-0.06 (.638)
	Father	-0.11 (.418)	-0.41** (.001)	-0.13 (.320)	-0.48** ($<.001$)	-0.06 (.649)	-0.18 (.186)	-0.39** (.003)
Affect regulation - Tolerating (ASQ)	Father	0.15 (.256)	-0.28* (.031)	-0.17 (.192)	-0.30* (.021)	-0.12 (.386)	-0.14 (.289)	-0.43** (.001)
Self-sacrificing (YSI)	Mother	0.33** (.004)	0.18 (.144)	0.22 (.065)	0.03 (.789)	0.13 (.275)	0.27* (.022)	0.26* (.042)
	Father	-0.124 (.072)	-0.10 (.470)	0.17 (.216)	-0.24 (.080)	0.03 (.853)	0.02 (.894)	<0.00 (.986)

ASQ - Affective Styles Questionnaire, BES – Beliefs about Emotions Scale, CAPS – Child and Adolescent Perfectionism Scale, FMPS - Frost Multidimensional Perfectionism Scale, YSI - Young Schema Inventory

Data shown as r (p)

Two tailed tests

*non-significant trend at $p < 0.05$ level

**significant at $p < 0.01$ level