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RUNNING HEAD: Perfectionism and CFS

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A person-centred test of multidimensional perfectionism and health in people with chronic fatigue syndrome versus healthy controls

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Abstract

Theory and evidence suggests that person-centred models may be especially relevant for elucidating the role of perfectionism in health and well-being in those with chronic health conditions. This may be particularly true for conditions, such as chronic fatigue syndrome (CFS), in which perfectionism is known to play a prominent role in health outcomes. Yet to date no research has taken a person-centered approach to examine how within-person combinations of perfectionistic strivings and perfectionistic concerns are linked to vulnerability for poor health in CFS. The current study compared matched samples of people with CFS and healthy controls (*N* = 163 each) on measures of stress, depression, and health problems. Consistent with the Stress and Coping Cyclical Amplification Model of Perfectionism in Illness and the tripartite model of perfectionism, within-person combinations of high perfectionistic concerns and strivings had the poorest health profile compared to other within-person combinations, but only among those with CFS. In addition, the perfectionism was indirectly associated with health through stress in those with CFS only. Findings add to a growing evidence base on the utility of person-centred models for understanding the health risks of perfectionism in the context of chronic illness.

KEYWORDS: perfectionism; chronic fatigue syndrome; stress; physical health; chronic illness; tripartite model; person-centred approach

As the evidence base linking perfectionism to health outcomes increases, so does the need to understand the factors and mechanisms that are involved. This is particularly important for individuals living with chronic health conditions that creates a backdrop of stress that can amplify the negative impact of perfectionism on both mental and physical health (Molnar & Sirois, 2016). Yet there remains some debate as to whether perfectionism as a multidimensional construct is uniformly or differentially linked to poor health (Sirois & Molnar, 2017).

Perfectionism is often viewed as consisting of two higher order factors *Perfectionistic Concerns* (PC) and *Perfectionistic Strivings* (PS) (Stoeber & Otto, 2006). PC is commonly viewed as the more maladaptive dimension, especially regarding health, as it is characterised by harsh self-criticism, excessive concerns and reactions over mistakes, and not meeting others' perceived demands for perfection. These qualities create risk for higher stress, poor coping, and in turn poor mental and physical health (Sirois & Molnar, 2016). PS, in contrast, is characterised by setting and compulsively striving to meet often unrealistically high personal standards, qualities which can promote goal attainment and therefore well-being (Stoeber & Corr, 2016), or stress and poor mental health (Flett et al., 2018). PS remains controversial as to its protective or detrimental effects on health (Sirois & Molnar, 2016).

Increasingly theory and research has examined person-centred models of perfectionism, such as the 2 X 2 model (Gaudreau & Thompson, 2010) and the tripartite model (Rice & Ashby, 2007). These models examine how within-person combinations of PC and PS are linked to health and well-being. The 2 X 2 model posits that the combinations of high or low PC and PS result in four distinct perfectionism profiles. In contrast, the tripartite model proposes that among the possible combinations of PC and PS only three profiles are meaningful: healthy perfectionism (high PS/low PC), unhealthy perfectionism (high PS/high PC), and non-perfectionism (low PS).

Research to date has provided more support for the tri-partite model than the 2 X 2 model with respect to health. For example, Smith and colleagues (2015) found evidence in favour of the tripartite model over the 2 X 2 model across two large samples. They found that the combination of high PC/PS was linked to higher scores on negative emotionality compared to the combination of high PC/low PS. Although differences in physical health were not tested in this study, recent theory and research provides further support for the application of the tripartite model for understanding how perfectionism is implicated in physical and mental health.

According to the Stress and Coping Cyclical Amplification Model of Perfectionism in Illness (SCCAMPI; Molnar & Sirois, 2016), both PC and PS are vulnerability factors for poor coping, higher stress, and in turn poor health in the context of living with a chronic health condition. The daily challenges, limitations, pain and stress that are often involved in managing a chronic health condition can be particularly difficult for perfectionists (Sirois & Molnar, 2014). Struggling with such challenges provides them with a daily reminder that they are falling short of meeting their often unreasonably high standards, a revelation that can reinforce punitive self-evaluations, self-criticism, and feelings of helplessness to be able to function as well as they once did. Although this would appear to apply more to PC, the inherent unpredictability of living with a chronic illness can be challenging for those high in PS who have a greater need for control (Flett et al., 1995). Accordingly, the SCCAMPI posits that both PC and PS can complicate adjustment and result in poor health in the context of a chronic health condition, whereas PS may not be as harmful for individuals without chronic illness (Molnar & Sirois, 2016).

A recent test of the SCCAMPI comparing people with fibromyalgia to healthy controls provides evidence for these propositions. Consistent with the tri-partite view of perfectionism (Rice & Ashby, 2007), within-person combinations of high PC/PS had the highest stress and

poorest mental and physical health in comparison to other combinations of PC and PS, but only in the fibromyalgia group, not in the healthy control group (Sirois et al., 2019). Consistent with the SCCAMPI (Molnar & Sirois, 2016), high PC/PS was indirectly associated with health through stress in both samples, with the indirect effects being larger in the fibromyalgia group. The findings from this initial test of the SCCAMPI suggests that high PC/PS may be particularly detrimental for health among individuals living with a chronic health condition.

Despite the promise of these initial findings, it remains to be empirically corroborated whether the SCCAMPI can be applied to other chronic conditions where perfectionism appears to play a prominent role in health outcomes. Chronic fatigue syndrome (CFS) is one such chronic condition. Characterised by persistent fatigue that is medically unexplained and accompanied by post-exertional malaise, CFS appears to be linked to a loss of resilience to the stress response due to chronic stress and over-exertion in trying to reach one's goals (Kempke et al., 2016). Not surprisingly, a growing body of research has implicated perfectionism, and especially PC, as a predisposing and perpetuating factor for CFS that can complicate adjustment and aggravate health (Luyten et al., 2011).

Other research has found suggestive evidence that a combination of high PC and PS may be particularly problematic in the context of CFS. In one study, those with CFS scored higher on measures of PC and depression than controls (Deary & Chalder, 2008). However, PC and PS were significantly associated in the CFS group but not in the control group, suggesting that PS may be "unhealthy" in the context of CFS. However, the small group sizes (27 and 30) call into question the robustness of the findings. In addition, links to physical health were not assessed.

Aims and hypotheses

The current study aimed to extend previous research on the utility of the SCCAMPI

(Molnar & Sirois, 2016) for understanding the implications of perfectionism for health in the context of chronic illness by testing how within-person combinations of PC and PS were associated with physical and mental health in people with CFS compared to matched healthy controls. Similar to the test of the SCCAMPI in people with fibromyalgia (Sirois et al., 2019), we expected that the within-person combination of high PC/PS would be linked to higher stress, and poorer physical and mental health compared to high PS/low PC and low PS combinations. We also expected that these linkages would be stronger for those with CFS compared to healthy controls.

In the SCCAMPI, stress has a central role in explaining how high PC/PS confer vulnerability for poor health (Molnar & Sirois, 2016). Given this and previous research demonstrating that stress explains the link between PC and depression in CFS (Luyten et al., 2011), we therefore also tested the potential mediating role of stress in the proposed link between high PC/PS and health. We expected to replicate the findings from the test of the SCCAMPI in fibromyalgia with indirect effects of stress being significant for those with CFS but not for healthy controls.

Method

Participants and procedure

Participants in this study were 195 individuals with CFS and 564 healthy controls drawn from a larger sample of 980 community-dwelling adults who completed an anonymous online survey on personality and health after providing informed consent. Participants were recruited via online ads. Full recruitment, ethical clearance, and data screening details have been published previously (*authors names hidden for blind review*). Individuals were selected for the CFS group if they indicated that they had received a valid diagnosis of CFS from a medical professional.

Individuals who indicated that they had not been diagnosed with any chronic health conditions were selected for the healthy control group.

Because healthy controls outnumbered individuals with CFS by almost three to one, it was possible to use propensity score matching to match samples on age, sex, education, and employment status, four key demographic variables. CFS and healthy control sample characteristics for the full and matched samples are provided in Table 1.

Measures

Perfectionism. PS and PC were measured using the Standards and Discrepancy subscales, respectively, of the 23 item Almost Perfect Scale (APS-R; Slaney et al., 2001). Items are scored on a 7-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). The 7-item Standards and 12-item Discrepancy subscales have demonstrated good internal consistency previously (αs = .85 and .91, respectively) (Slaney et al., 2001). The Standards subscale demonstrated good reliability in the CFS (α = .90) and healthy controls (α = .88). The Discrepancy subscale had good reliability in the CFS (α = .94) and healthy controls (α = .95). High and low PS and PC were determined by the commonly-used median-split procedure (Stoeber & Otto, 2006).

Stress. Perceived stress was measured with the 10-item Perceived Stress Scale (PSS) (Cohen & Williamson, 1988), a widely used and well-validated measure of the perceived stressfulness of events. Items are rated using a 5-point Likert-type scale ranging from 0 (never)

Table 1

Socio-Demographic Characteristics for Full and Matched Samples

	Full Sample			Matched Sample		
	HC (N = 564)	CFS (N = 195)	F/χ^2	HC (N = 163)	CFS (N = 163)	F/χ^2
Age in years[1]	30 (8)	33 (13)	14.94***	31 (10)	31 (11)	.19
Education[2]			11.64**			5.53
High School	57	33		20	27	
Some College	171	65		57	58	
College Graduate	188	44		50	33	
Graduate School	147	52		36	45	
Employment[2]			22.05***			.36
Employed Full Time	294	67		69	65	
Employed Part Time	113	42		31	35	
Not Employed	156	86		63	63	
Sex[2]			24.55***			.05
Male	224	117		93	91	
Female	339	77		70	72	

[1]Mean (standard deviation) and *F*-test; [2]*N* and Chi-square test. ** $p < .01$, *** $p < .001$

to 4 (*very likely*). The PSS has demonstrated good internal consistency previously (α = .78) (Cohen & Williamson, 1988). In the current study the PSS was reliable in those with CFS (α = .86) and in healthy controls (α = .90).

Depressive symptoms. A 10-item version of the Center for Epidemiological Studies Depression (CES–D) scale (Radloff, 1977) assessed the frequency of depressive symptoms over the past two weeks. Items are rated on a 4-point scale ranging from "rarely or none of the time" (0) to "most or all of the time" (3). The 10-item version has demonstrated very good reliability (α = .92) in a previous study of people with chronic tinnitus (Sirois et al., 2006). In the current study the CES-D was reliable in the CFS (α = .81) and healthy controls (α = .70).

Health problems. The Brief Health History questionnaire (Sirois & Gick, 2002) assessed the number of physical health problems experienced within the last six months. It includes 14 acute physical health problems (e.g., colds, headaches, digestive problems). The number of problems endorsed is summed to give a total score with higher values reflecting more health problems.

Analyses

Sample matching was conducted using propensity score matching. The propensity score matching routine in SPSS 22 was used to match the data. This SPSS routine uses standard logistic regression to arrive at propensity scores and then uses FUZZY matching to match individuals with CFS to the most comparable healthy controls per the matching criteria. Match tolerance for FUZZY matching was set at .01 which requires that individuals with CFS and healthy controls have propensity scores within .01 to be matched. Matching was done without replacement.

Analyses included descriptive statistics, *t*-tests with Cohen's *d* effect size, bivariate

correlations, and moderated mediation models using the PROCESS macro for SPSS. *t*-tests examined levels of stress and health outcomes across CFS and controls. Bivariate correlations examined the associations of perfectionism, stress, and health outcomes in CFS and controls. PROCESS was used to test indirect associations of perfectionism variables with health outcomes through the mechanism of stress. PROCESS allows for the examination of moderated indirect effects (i.e., moderated mediation) to determine if the indirect associations of perfectionism with health outcomes through the mechanism of stress is stronger for CFS or controls. PROCESS uses bias-corrected bootstrapped estimates of moderated and indirect associations and moderated indirect associations. Because perfectionism, as the primary independent variable, contained three groups, dummy coding was used where indicator variables were created to represent the high PS/PC and high PS/low PC groups and the low PS group was omitted as the reference category. Reported coefficients are standardized estimates of differences between the low PS reference group and the high PS/PC and high PS/low PC group.

Two separate models were estimated to examine mental and physical health outcomes. The mediator in both models was stress. The moderator in both models was CFS or control group. The moderating effect of CFS versus control group was examined for the association of perfectionism dummy variables with stress and each health outcome, the association of stress with each health outcome, and the indirect association of perfectionism dispositions with health outcomes through stress. All PROCESS models controlled for age, sex, and education. Variables were linearly related, normally distributed, and assumptions of statistical tests were met. Ten percent of the stress and depression data were missing at random. Hence, we used hot-deck imputation to impute missing values for these cases. Statistical significance was set at $p < .05$.

Results

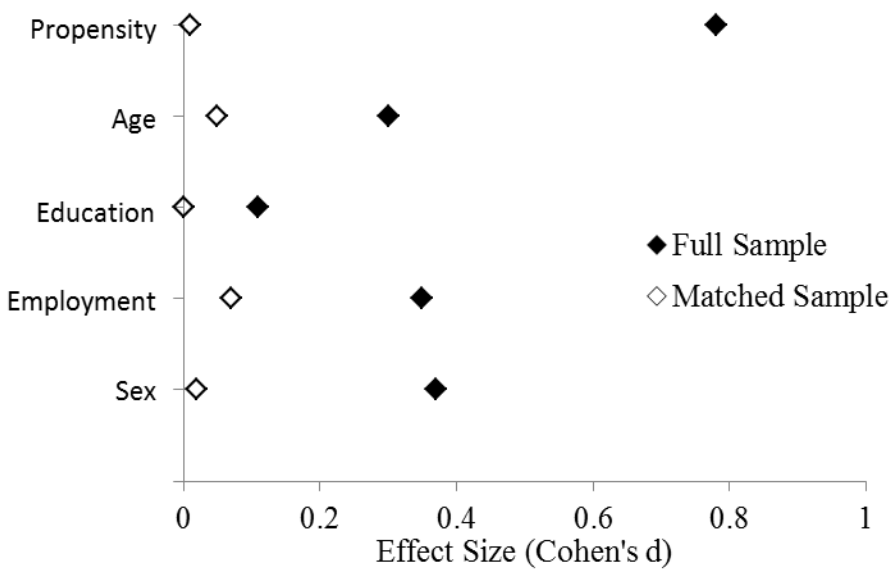

Figure 1. Effect size for difference between chronic fatigue syndrome patients and controls on socio-demographic variables and propensity score in full and propensity score matched samples.

Propensity score matching was evaluated by examining significance and effect size of differences between individuals with CFS and healthy controls on all variables used for the matching process (i.e., age, education, employment, and sex). As shown in Table 1 and Figure 1, in the full sample, individuals with CFS differed from healthy controls (*p*s < .01) on propensity scores, age, education, employment, and sex and effect sizes ranged from .11 to .78. After propensity score matching, individuals with CFS did not differ from healthy controls (*p*s > .05) on propensity scores, age, education, employment, and sex and effect sizes ranged from .00 to .07.

Descriptive Statistics

A greater proportion of CFS (*n* = 52; 36%) than controls (*n* = 33; 20%) were classified as

Table 2

Differences Between Chronic Fatigue Patients and Controls

	CFS Patients		Controls			
	M	*SD*	*M*	*SD*	*t*	*d*
Stress	3.30	.68	2.84	.72	6.06***	.67
Depressive Symptoms	1.75	.71	1.10	.47	9.80***	1.10
Physical Health Problems	4.50	2.30	2.83	1.77	7.37***	.82

*** $p < .001$

Table 3

Bivariate Correlations for the Study Variables for Chronic Fatigue Patients (above diagonal) and Healthy Controls (below diagonal)

	1	2	3	4	5
1. High strivings/High Concerns	--	-.24**	.33***	.33***	.21**
2. High strivings/Low Concerns	-.30***	--	-.18**	-.12	-.03
3. Stress	.09	-.35***	--	.43***	.22***
4. Depressive Symptoms	.09	-.32***	.53***	--	.25***
5. Physical Health Problems	.02	.05	.24**	.13	--

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

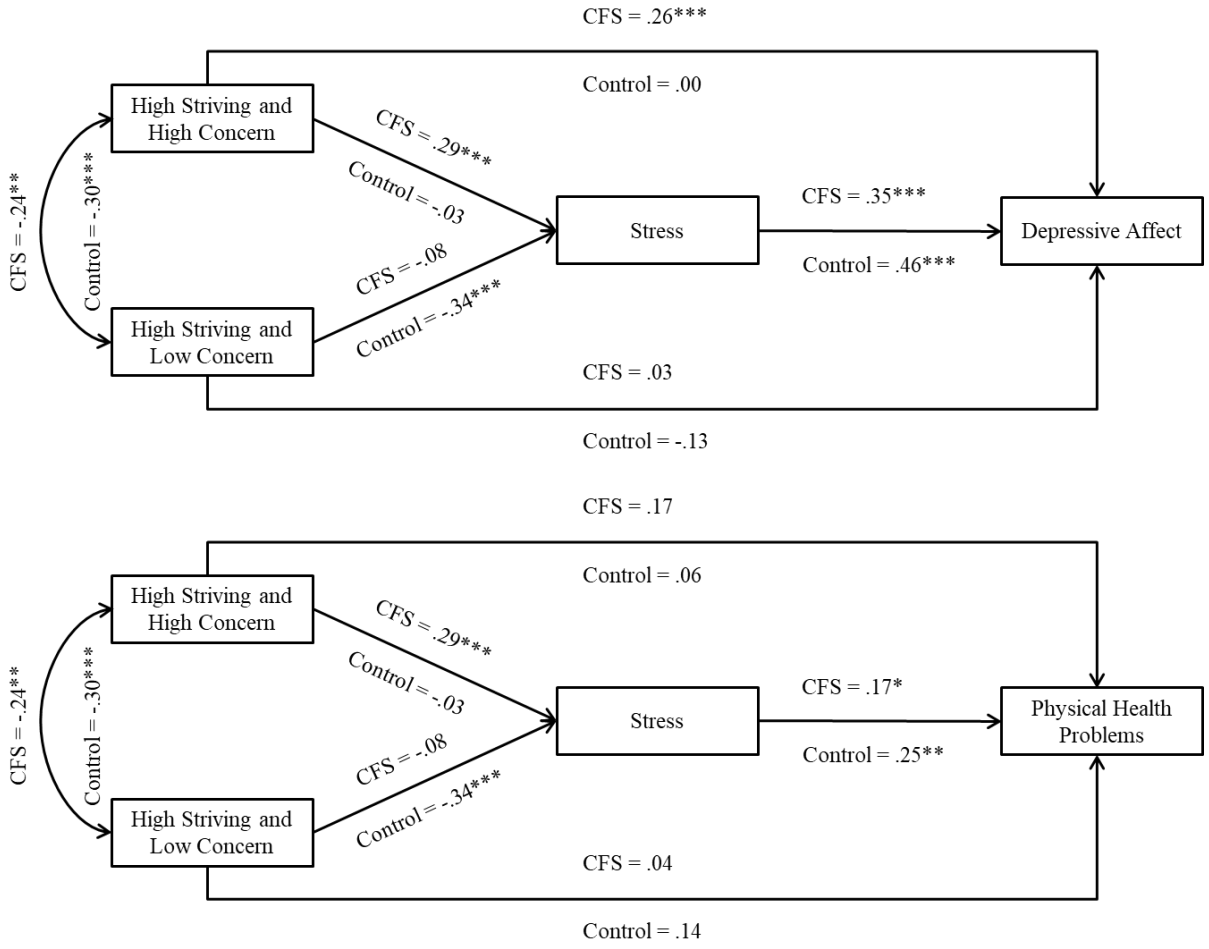

Figure 2. Top path diagram shows direct and indirect associations, through stress, of perfectionism with depressive symptoms for both chronic fatigue syndrome (CFS) patients and controls. Bottom path diagram shows direct and indirect associations, through stress, of perfectionism with physical health problems for both chronic fatigue syndrome (CFS) patients and controls. All coefficients are standardized and adjusted for age, sex, and education. * $p < .05$, ** $p < .01$, *** $p < .001$.

high PS/PC. A lesser proportion of CFS (n = 18; 11%) than controls (n = 43; 26%) were classified as high PS/low PC, and the same was true for low PS where CFS (n = 93; 57%) showed a higher proportion than controls (n = 87; 53%). These differences between CFS and controls were statistically significant (χ^2 = 14.69, p = .001, Cramer's V=.21). Compared to controls, CFS showed higher stress, depressive symptoms, and physical health problems (see Table 2). For the associations between perfectionism, stress, and health outcomes, high PS/PC was related to more stress, depressive symptoms, and physical health problems for CFS patients but not controls (see Table 3). Stress was related to more depressive symptoms and physical health problems for both CFS patients and controls. Depressive symptoms were positively correlated with physical health problems for CFS patients but not controls (see Table 3).

Direct Associations of Perfectionism with Health Outcomes

All moderated mediation model results are provided in Figure 2. A direct association was observed for CFS patients in the high PS/PC group who showed greater depressive symptoms, compared to the low PS group. Although this association was not even significant in controls, the strength of the association did not differ significantly for CFS patients versus controls (β=.14, p =.104).

Direct Associations of Perfectionism with Stress

A direct association was observed for CFS patients in the high PS/PC group who showed a significantly higher level of stress, as compared to the low PS group. This association was quite small and non-significant for controls, and the strength of the association did differ significantly for CFS patients versus controls (β=.22, p=.026). A direct association was observed for controls in the high PS/low PC group who showed a significantly lower level of stress, compared to the low PS group. Although this association was not even significant in CFS patients, the strength of

the association did not differ significantly for CFS patients versus controls (β =.10, *p* =.331).

Direct Associations of Stress with Health Outcomes

The association of stress with depressive affect and physical health problems was significant for CFS patients. The association of stress with depressive affect and physical health problems was also significant for controls. The association of stress with depressive affect (β=.04, *p*=.708) and physical health problems (β=.01, *p*=.903) was not significantly different in size when comparing CFS patients with controls.

Indirect and Moderated Indirect Effects

In CFS patients, being in the high PS/PC group was significantly indirectly associated with greater depressive affect (β=.09, 95% C.I.=.04 - .16) and physical health problems (β=.06, 95% C.I.=.01 - .12) through the mechanism of stress. For controls, this same indirect association of high PS/PC through stress with depressive affect and physical health problems was not significant. The tests of moderated mediation showed that in for depressive affect the indirect associations were significantly larger in CFS versus controls (β=.09, 95% C.I.=.01 - .18). For physical health problems, the indirect associations just approached being significantly larger in CFS versus controls (β=.05, 95% C.I.=-.01 - .13).

In CFS patients, being in the high PS/low PC group was not indirectly associated with greater depressive affect (β=-.06, 95% C.I.=-.14 - .01) and physical health problems (β=-.04, 95% C.I.=-.10 - .01) through the mechanism of stress. For controls, this same indirect association of high PS/low PC through stress with depressive affect (β=-.09, 95% C.I.=-.15 - -.03) and physical health problems was significant (β=-.06, 95% C.I.=-.11 - -.02). The tests of moderated mediation showed that for both depressive affect (β=.03, 95% C.I.=-.07 - .12) and physical health problems (β=.02, 95% C.I.=-.04 - .09) the indirect associations were not significantly

larger in either CFS patients or controls.

Discussion

Using the SCCAMPI (Molnar & Sirois, 2016) and the tripartite model of perfectionism (Rice & Ashby, 2007) as guides, the current study found that within-person combinations of high PC/PS had the unhealthiest profile when assessed across the entire sample, with higher levels of stress, and depression and poorer physical health compared to other perfectionism profiles. When the combination of high PC/PS was considered for those in the CFS group and the healthy controls separately, a different pattern of results emerged. Only those with high PC/PS in the CFS group had a significantly poorer health profile compared to other PC/PS combinations; this was not found among the healthy controls. Consistent with our hypotheses and the tenets of the SCCAMPI (Molnar & Sirois, 2016), the links between high PC/PS and poor physical and mental health were indirect through stress, but only for the CFS group. This finding provides further support for the idea that high levels of PC and PS together heighten vulnerability for stress in the context of a chronic health condition, and this stress contributes to poor physical and mental health.

The current findings provide several novel and important contributions to our understanding of when and how perfectionism dimensions create vulnerability for poor health and well-being. Using larger samples that were matched on key demographic variables, our study replicates and extends the findings from the previous test of the SCCAMPI in people with fibromyalgia (Sirois et al., 2019), and demonstrates that the results for high PC/PS can also be found in people with CFS. This may not seem that surprising, given that fatigue and chronic pain are prominent symptoms in both fibromyalgia syndrome and chronic fatigue syndrome (Abbi & Natelson, 2013). However, the two conditions are also distinct in several ways. Mood disorders,

including depression, are significantly more prevalent in CFS compared to fibromyalgia (Janssens et al., 2015). Previous research has also found that compared to those with fibromyalgia, people with CFS score higher on PC, and are more likely to use maladaptive coping strategies that can exacerbate and maintain stress (Sirois & Molnar, 2014).

Despite the growing evidence base highlighting perfectionism as a vulnerability factor for poor health and adjustment in CFS (Kempke et al., 2016), no research to date has taken a person-centered view when assessing the risks posed by perfectionism for those with CFS. Previous research has mainly focused on the effects of PC on health outcomes in CFS, noting this dimension as a predisposing and perpetuating factor for fatigue, pain, and depression (Kempke et al., 2016). Kempke and colleagues (2011) found that PC, but not PS, was linked to greater severity of fatigue and depression in people with CFS. However, they also noted that PC and PS were strongly correlated leading them to speculate, as others have (Deary & Chalder, 2008), that PS might also be unhealthy in the context of CFS. By taking a person-centered approach, the current study provides more direct evidence to support this proposition and clarify that it is the combination of high PC/PS that creates the most vulnerability for poor health. In addition, our finding that a larger proportion of those with CFS compared to controls were classified as high PC/PS, is consistent with previous research and theory suggesting that perfectionism may be a predisposing factor for the development of CFS (Kempke et al., 2016).

There are several reasons why the combination of high PC/PS may be particularly detrimental for health in people with CFS. The relentless drive towards self-improvement that characterizes PS may contribute to the "boom and bust" activity pattern that typifies CFS, with bursts of overexertion and overactivity aimed at pursuing goals followed by periods of extreme fatigue after going beyond physical and mental limits (Kempke et al., 2016). In the context of

CFS, the strong drive to reach goals associated with PS can be challenged when there is a lack of physical resources due to fatigue. This pattern coupled with the self-critical nature of PC and difficulty in tolerating being inactive can be particularly detrimental to the stress system, and in turn physical and mental health. Alternatively, the achievement-oriented nature of PS combined with the relentless need of PC to prove oneself could drive individuals to work well beyond their physical and mental limits (Kempke et al., 2011). Indeed, in the current study PS was only linked to higher stress in the CFS group when in combination with PC, whereas PS on its own was linked to lower stress in the healthy controls.

Strengths and limitations

There are several limitations and strengths to consider. The cross-sectional design precludes drawing firm conclusions about the directionality of the relationships among perfectionism, stress, and health. However, the assumed directions are consistent with theory (Molnar & Sirois, 2016), and longitudinal evidence demonstrating that perfectionism is linked to depression via stress in people with CFS (Luyten et al., 2011). Nevertheless, the results of causal modeling with cross-sectional data should always be interpreted with caution as direct and indirect effects in these models have potential to be biased. Longitudinal or momentary ecological assessment research would be well-placed to provide further insights into this issue. Using propensity score matching is a clear strength that permitted equitable comparisons between the CFS and control groups, reducing the possibility that observed distinctions between the groups were not due to demographic differences. Nevertheless, confounding variables may still exist. Much research on the tripartite model relies on dichotomizing variables to create high/low categories of PS and PC. A useful approach for future work might be to examine latent profiles of PS and PC to explore the number and nature of subgroups.

Conclusion

The current findings support the utility of taking a person-centered view of the role of perfectionism in the physical and mental health of people with a chronic health condition, and CFS in particular. Consistent with the SCCAMPI (Molnar & Sirois, 2016), within-person combinations of high PC/PS presented with the poorest health profiles in those with CFS, with higher stress and depression, and more self-reported health problems compared to the high PS/low PC and low PS combinations. Further research is needed to track the potential dynamic and deleterious interplay of PC and PS with stress and health over time.

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