



Perfectionistic Cognitions Pre-Pandemic Predict Greater Anxiety Symptoms During the Pandemic Among Emerging Adults: A Two-Wave Cross-Lagged Study

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Abstract

This study employed a two-wave cross-lagged panel analysis to examine associations between perfectionistic cognitions, anxiety, and depression pre-pandemic to during the pandemic in a sample of 171 (57% female, $n=98$) emerging adults. Results demonstrated that perfectionistic cognitions decreased, anxiety increased, and depressive symptoms did not change pre-pandemic to during the pandemic. Cross-lagged results indicated that pre-pandemic perfectionistic cognitions predicted higher levels of anxiety symptoms (but not depressive symptoms) during the pandemic after accounting for pre-pandemic levels of anxiety and depressive symptoms. These results held with the inclusion of covariates (i.e., sex, age, education, exposure to COVID-19, whether or not participants knew someone diagnosed with COVID-19, had lost income due to the pandemic, and how often they thought about COVID-19). Psychological distress (i.e., anxiety and depressive symptoms) pre-pandemic did not predict perfectionistic cognitions during the pandemic after accounting for pre-pandemic levels of perfectionistic cognitions. Results support assertions that individuals with heightened levels of perfectionism are at an increased risk for poorer mental health during the pandemic. Findings underscore the importance of assessing perfectionistic cognitions for the prevention and treatment of anxiety symptoms among emerging adults during and post-pandemic.

Keywords Anxiety · COVID-19 · Depression · Emerging adults · Pandemic · Perfectionism · Perfectionistic cognitions

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Introduction

The novel coronavirus infectious disease (COVID-19) pandemic and its related government lockdowns continue to pose significant challenges for billions of people. At the time of this writing, 178 million individuals have tested positive for COVID-19 with 3.87 million deaths reported worldwide (World Health Organization, 2021). Even if individuals have not been directly impacted by the physical effects of COVID-19, they have arguably experienced substantial life disruptions and stressors associated with the pandemic due to government-imposed restrictions designed to reduce the transmission of the virus, such as closing schools or transitioning to remote learning, closing of businesses and public spaces, and limiting social gatherings. Not surprisingly, preliminary research indicates overall declines in mental health during the pandemic amongst youth and adults (Cost et al., 2021; O'Connor et al., 2020), which many believe reflects a parallel “mental health crisis” (Horesh & Brown, 2020). However, although the extent of the effects has been vast and not all individuals have developed poorer mental health since the inception of the COVID-19 pandemic (Stallard et al., 2021). This suggests that individual differences may play an important role with respect to the development of psychological distress during the pandemic. Thus, it is imperative to examine pre-pandemic individual differences that may be contributing to psychological distress during the pandemic to inform prevention and intervention efforts aimed at improving mental health both during and after the pandemic. Yet, due to the precipitous arrival and the rapid progression of the pandemic, empirical evidence remains limited in addressing changes in psychological distress pre-pandemic to during the pandemic or potential psychological factors that may predict these changes in psychological distress.

Although the roots of psychological distress are multifarious, one factor that is gaining increased attention is perfectionism (i.e., the tendency to set and strive for unrealistically high standards accompanied by harsh self-criticism (Frost et al., 1990)); which has been increasing in Canada, the United States, and Britain in the last three decades (Curran & Hill, 2019). Indeed, perfectionism is a well-established vulnerability factor for a host of mental health problems (Flett et al., 2007; Limburg et al., 2016). Further, perfectionism has been directly implicated as a crucial individual difference that may affect adjustment and psychological distress during the pandemic (Flett & Hewitt, 2020). In their illuminating commentary and analysis, Flett and Hewitt (2020) posited that individuals higher in perfectionism would experience poorer mental health and greater adjustment issues during the pandemic due to their heightened demands, poorer self-regulation, failure to take into account conditions that would limit their abilities to meet their goals, and higher levels of stress. Emerging evidence supports Flett and Hewitt’s (2020) assertions such that perfectionism has been found to be one of the leading mental health issues affecting youth during the pandemic (The Breakdown, n.d.). However, to our knowledge no research to date has examined prospective associations between perfectionism and psychological distress pre-pandemic to during the pandemic. Thus, to address this gap in the literature the goal of this two-wave cross-lagged panel analysis was to

examine prospective associations between perfectionism and psychological distress (i.e., anxiety and depressive symptoms) pre-pandemic to during the pandemic.

Cognitive theories of perfectionism (Flett et al., 2016, 2018) state that individual differences in the experience of perfectionistic cognitions (PCs) (i.e., automatic and recurring thoughts signifying the need for perfection) are pertinent for psychological distress. This notion is consonant with the perseverative cognition hypothesis (i.e., the idea that rumination prolongs the stress response, thus conferring additional risk for psychological distress; Verkuil et al., 2011). Compared to trait measures of perfectionism, there are fewer research studies examining individual differences in PCs with respect to psychological distress. Yet, extant research supports the proposition that PCs are associated with psychological distress among young adults both within (Flett et al., 2002) and across time (Besser et al., 2020) and among clinical samples (Flett et al., 2007; Tyler et al., 2021). Further, research has demonstrated that PCs uniquely contribute to distress over and above trait measures of perfectionism (Casale et al., 2020; Flett et al., 1998; Tyler et al., 2021). Consequently, to expand our understanding of how perfectionism contributes to psychological distress during the global pandemic, this study focused on cognitive aspects of perfectionism by concentrating on the frequency with which individuals experience PCs.

Mounting evidence indicates that mental health problems are widespread during the COVID-19 pandemic (Horigian et al., 2021; Hyland et al., 2020; Rajkumar, 2020). Evidence from studies that were able to assess changes in psychological distress pre-pandemic to during the pandemic indicates that psychological distress has increased since the onset of the pandemic (Elmer et al., 2020; Rajkumar et al., 2020). For example, a government report showed that 84% of Canadians reported that their mental health had deteriorated since the beginning of the pandemic and that individuals' concerns over their mental health increased by 14% since the onset of the pandemic (Howatt et al., 2020). Additionally, a large international collaborative study that included 12 samples found evidence to support that depressive symptoms increased pre-pandemic to during the pandemic among adolescents aged 9 to 18 years (Barense et al., 2021). However, it is important to note that there was heterogeneity in the findings such that anxiety symptoms did not significantly change pre-pandemic to during the pandemic (Barense et al., 2021). Further, some studies that were carried out early in the pandemic have indicated that psychological distress has worsened among emerging adults (EAs; ages 18–25 years; Arnett, 2000) since the pandemic unfolded (Kujawa et al., 2020), whereas others have found that early deteriorations in mental health plateaued or rebounded to some extent as the pandemic progressed (Fancourt et al., 2020).

Psychological distress during the pandemic has been particularly salient amongst EAs (Huang & Zhao, 2020; Wang et al., 2020). This is likely due to the fact that emerging adulthood is already a particularly challenging developmental period fraught with stress and instability brought about by identity exploration, recurrent job loss or change due to greater engagement in precarious work, and greater financial dependency on others as the result of having accumulated fewer savings (Arnett, 2005, 2014). Importantly, key life transitions that often occur during this period (e.g., moving away from home, establishing a career) have been greatly disrupted by the pandemic causing significant upheaval during an already tumultuous

time. Kujawa et al., (2020), for example, reported that approximately 91% of EAs indicated that they had experienced significant life disruptions across multiple life domains. Further, evidence indicates that the pandemic has had a larger effect on EAs' mental health relative to other age cohorts (Kwong et al. 2020; Pierce et al., 2020); including higher levels of anxiety and depressive symptoms, stress, and anger (Cao et al., 2020; Huang & Zhao, 2020; Ozamiz-Etxebarria et al., 2020; Shanahan et al., 2020). These findings are concerning given that emerging adulthood is already considered to be a developmental period of increased vulnerability for the onset of psychopathology (Cía et al., 2018; Kessler et al., 2005).

The Current Study

The goal of this study was to address urgent calls for empirical work aimed at understanding the adverse mental health impacts of this global health crisis and potential sensitizing effects such as pre-existing vulnerabilities for poorer mental health during the pandemic (Golberstein et al., 2020; Holmes et al., 2020; Wade et al., 2020). Given that perfectionism is a vulnerability factor for a myriad of mental health problems (Flett et al., 2007; Limburg et al., 2016), we tested whether PCs conferred risk for subsequent depressive and anxiety symptoms (or vice versa) with two timepoints (pre-pandemic to during the global pandemic) among a community sample of EAs. According to Flett and Hewitt, (2020), perfectionism represents a vulnerability factor for experiencing greater psychological distress during the pandemic given that individuals with elevated levels of perfectionism are more reactive to stress, are less resilient, and tend to report higher levels of depression and anxiety pre-pandemic than individuals lower in perfectionism. Consequently, and similar to propositions put forth by Flett and Hewitt, (2020), we expected that pre-pandemic levels of PCs would predict greater psychological distress (i.e., higher levels of depressive and anxiety symptoms) both within and across time. Consistent with Flett and Hewitt, (2020) we further hypothesized that PCs would change pre-pandemic to during the pandemic. However, the direction of this change was not hypothesized a priori given that individuals with pre-existing perfectionistic tendencies could increase their perfectionistic ways as a coping mechanism to regain a sense of control due to the uncertainty of the pandemic or alternatively, decrease their perfectionism because they learned to embrace positive changes during the pandemic (Flett & Hewitt, 2020).

Analyses were conducted both with and without the inclusion of potential covariates which included respondent sex, age, education, whether the participants had been exposed to COVID-19 or not, whether they knew someone diagnosed with COVID-19 or not, had lost income due to the pandemic, and how often they thought about COVID-19. These potential covariates were included given evidence indicating inequities in psychological distress during the pandemic with respect to key demographics such as sex, age, and income, such that female sex, being younger, and experiencing lower income have been associated with greater distress (Fancourt et al., 2020). Further, we expected poorer mental health among those more directly affected by COVID-19. Finally, we accounted for the effects of frequency with

which respondents thought about COVID-19 in an effort to assess the unique predictive utility of PCs versus general rumination about the pandemic as research has established robust links between rumination and psychological distress (Harrington & Blankenship, 2002).

Method

Participants

The data for this study is part of an on-going longitudinal study, the Niagara Longitudinal Heart Study (NLHS; Wade et al., 2019), described in detail below, to examine cardiovascular development in emerging adults. This sample included 171 EAs who completed measures pre-pandemic and during the pandemic ($n=98$ women, $n=73$ men) between the ages of 19 and 25 years (pre-pandemic $M=22.61$; $SD=1.48$). Most participants were Canadian (96%). Pre-pandemic, and in terms of work, most participants reported working full-time (42.7%), part-time (29.2%), or were not working because they were attending school (20.5%) or for other reasons (e.g., unemployed, too ill to work, staying home by choice; 7.6%). With respect to education, 8.8% had achieved grade 12 or less, 19.9% completed high school, 21.1% had some college training, 43.8 completed college or university, and 6.4% completed a professional or graduate degree. Finally, with respect to living situation 53.2% of the participants reported living with their parents, 17.5% reported living with a romantic partner, and 29.3% reported either living by themselves or with roommate(s).

Measures

Perfectionistic Cognitions

The Perfectionism Cognitions Inventory (PCI; Flett et al., 1998) was used to measure PCs both pre-pandemic and during the pandemic. The PCI is a 25-item measure of the frequency, over the past week, of automatic thoughts indicating the need to achieve perfection such as “Why can’t I be perfect?” and “I should be perfect”. A total score was computed by summing items. Higher scores indicate experiencing more PCs. Scores on the PCI can theoretically range from 0 to 100, with scores for the present sample ranging from 6 to 95 pre-pandemic and between 2 and 100 during the pandemic. The PCI has demonstrated high internal consistency and validity in both student and clinical samples (Flett et al., 1998, 2007). Internal consistencies for all study measures are in Table 1.

Table 1 Descriptive statistics and bivariate correlations of all study variables

	1	2	3	4	5	6	7	8	9	10	11	12
1. PCT1	—											
2. PCT2	.608*	—										
3. ANXT1	.302*	.201*	—									
4. ANXT2	.359*	.426*	.613*	—								
5. DEPT1	.382*	.331*	.637*	.607*	—							
6. DEPT2	.289*	.487*	.439*	.688*	.633*	—						
7. Sex	-.006	-.017	-.177*	-.164*	-.144 ^a	-.162*	—					
8. Age	.070	-.015	-.126	-.135	.029	-.021	.081	—				
9. Education	-.101	-.078	-.078	-.152*	-.126	-.005	-.098	.383*	—			
10. Exposed to COVID	.086	.093	-.090	-.103	-.010	-.002	-.130	.156*	.127	—		
11. Lost income COVID	-.152	.028	-.002	.026	-.008	.169*	.009	-.132	.052	$\chi^2_{(1)}=2.25$	—	
12. Think of COVID	-.107	.044	.040	.011	.051	.034	-.167*	.041	.176*	.165	.142	—
Mean	45.24	41.07	16.73	17.81	16.14	17.17	42.7% male	22.61	6.19	6.4%	39.5%	5.81
SD	18.57	22.37	5.34	6.01	11.01	12.23	n/a	1.48	1.10	n/a	n/a	2.66
α							n/a	n/a	n/a	n/a	n/a	n/a

Note. * $p < .05$. ^a $p < .06$. PCT1 = perfectionistic cognitions pre-pandemic; PCT2 = perfectionistic cognitions during the pandemic; ANXT1 = anxiety pre-pandemic; ANXT2 = anxiety during the pandemic; DEPT1 = depressive symptoms pre-pandemic; DEPT2 = depressive symptoms during the pandemic; Sex = respondent sex (0 = female, 1 = male); EXPOSED TO COVID = whether exposed to COVID-19 or not (0 = no, 1 = yes); LOST INCOME COVID = whether lost income or job due to COVID-19 or not (0 = no, 1 = yes); THINK OF COVID = how often participants thought about COVID (0 = not at all to 10 = all the time). Chi-square tests of independence were conducted to test for associations between two dichotomous variables

Anxiety

Anxiety was measured using the 10-item Symptom Checklist (SCL-90-R) subscale (Derogatis, & Unger, 2010) both pre-pandemic and during the pandemic. Participants responded to how often they experienced each item on a scale ranging from 1 (*Never*) to 4 (*Most of the Time*). The SCL-90-R has been demonstrated to be a reliable and valid measure of anxiety (Derogatis et al., 1976; Koeter, 1992). Items were summed to create a total score for anxiety and higher scores indicate higher levels of anxiety.

Depressive Symptoms

The Centre for Epidemiological Studies-Depression (CESD) scale (Radloff, 1977) was used to assess depression symptoms both pre-COVID and during COVID. The CESD includes 20-items and has shown adequate validity and reliability (Cosco et al., 2017; Radloff, 1977). At both timepoints, participants were asked to report how often they felt a certain way within the past 7 days on a scale of 0 (*Rarely, none of the time*) to 3 (*Most or all of the time*). A total score was computed by summing all of the responses. Higher scores indicate experiencing greater depression symptoms.

Covariates

Age

Participants indicated their age in years.

Sex

Information on sex of participants was collected by the cardiovascular technician during the in-person testing visit for the NLHS (Wade et al., 2019).

Education

Participants indicated the highest grade in school that they have completed to date ranging from (1) grade 9 to (8) graduate or professional training.

COVID-Related Questions

Participants were asked whether they had been (1) exposed to COVID or (0) not.¹ Participants also reported on whether they knew anyone who had (1) been diagnosed

¹ Participants were asked whether they had been diagnosed with COVID or not. None of the participants in this sample indicated that they had been diagnosed. Given the lack of variability this variable could not be used as a potential covariate in the analyses.

with COVID-19 or (0) not. Participants were also asked how often they thought about COVID on a slider scale from (0) not at all to (10) all of the time. Finally, participants were asked whether (1) they had lost their job or had to close their business due to COVID or (0) not.

Procedure

The pre-pandemic data came from the NLHS (Wade et al., 2019), which assessed 248 emerging adults before the pandemic from March, 2017 to March, 2020. We had to stop in-person human research due to the government lockdown in March, 2020. Discussed elsewhere (Wade et al., 2019), the NLHS collected detailed data on a variety of domains including mental health and perfectionism, which are the constructs of interest in this study. An online COVID-19 supplemental survey, which included the NLHS (Wade et al., 2019) mental health measures, PCs, and questions related to COVID-19 was distributed to participants using Qualtrics XM online survey software (Qualtrics, Provo, UT, USA) to all 248 participants of which 171 responded for a response rate of 69%. Participants completed the COVID-19 supplemental survey over a two-month period, between July 27, 2020 and Oct 5, 2020 when Ontario, and Canada more generally, had the pandemic under relative control and were loosening social restrictions. Both the NLHS and the COVID-19 supplemental survey received ethics clearance from the University Research Ethics Board.

Data Analysis

Attrition analyses were first conducted to assess sample bias. Next, structural equation modeling (SEM) was performed using Mplus version 7.2 (Muthen & Muthen, 1998–2017) with Maximum Likelihood estimation (ML). We tested each model using a half-longitudinal design, as our model included two timepoints (Cole & Maxwell, 2003). Confirmatory factor analysis (CFA) of the latent variables was conducted along with measurement invariance of our constructs across time to confirm that equivalent constructs were assessed at both timepoints (Little, 2013). The following fit indices were used to assess model fit: a comparative fit index (CFI) greater than or equal to 0.95 (Hu & Bentler, 1998), a standardized root mean square residual (SRMR) less than 0.08 (Hu & Bentler, 1999), and a root mean square error of approximation (RMSEA) less than 0.06 (Hu & Bentler, 1999). The fixed-factor method (e.g., pre-setting each latent construct's variance to 1.0) was used to create a metric (i.e., standardized) scale for all latent variables.

A parceling technique (i.e., calculating the mean of two or more items) was used to create indicators for PCs, depressive symptoms, and anxiety. Parceling was enacted, given that it improves reliability by increasing true variance and decreasing error (Little et al., 2013). Specifically, the item-to-construct balancing technique was employed to create parcels for PCs, depressive symptoms, and anxiety, such that the items with highest loadings were combined with those with the lowest loadings for each construct (Little et al., 2013).

Results

First, attrition analyses were conducted to assess potential differences between those who completed (69%) and did not complete (31%) the second timepoint. Overall, results indicated that there were no statistically significant differences in PCs ($t(192)=-1.19$, $p=0.236$, Cohen's $d=0.19$), depressive symptoms ($t(245)=-1.00$, $p=0.318$, Cohen's $d=0.14$), or anxiety ($t(242)=-1.47$, $p=0.143$, Cohen's $d=0.21$). Further, there were no statistically significant differences with respect to our pre-pandemic covariates including age ($t(132.59)=0.22$, $p=0.823$, Cohen's $d=0.03$) or sex ($\chi^2(1)=3.67$, $p=0.056$, Cramer's $V=0.122$). However, results revealed that there were significant differences with respect to education such that those who did not complete the second timepoint had a significantly lower average level of education compared to those who did complete the second timepoint ($t(124.08)=-2.54$, $p=0.012$, Cohen's $d=0.36$).

Paired-sample t tests indicated that PCs decreased from pre-pandemic to during the pandemic ($t(136)=2.89$, $p=0.004$, Cohen's $d=0.25$) whereas anxiety increased pre-pandemic to during the pandemic ($t(169)=-2.85$, $p=0.005$, Cohen's $d=0.22$). Finally, depressive symptoms did not significantly change pre-pandemic to during the pandemic ($t(170)=-1.34$, $p=0.182$, Cohen's $d=0.10$). Descriptive statistics and bivariate correlations for study variables are presented in Table 1. PCs were positively associated with anxiety and depressive symptoms at both timepoints. Anxiety was positively related to depressive symptoms at both timepoints. Men reported lower levels of depressive symptoms than women and those who reported losing income during the pandemic reported greater depressive symptoms during the pandemic than those who did not lose income.

Longitudinal Invariance

CFAs for each of our measurement models were conducted (see Table 2). Next, we assessed configural invariance in which all latent variables (i.e., PCs, depressive and anxiety symptoms) at both times 1 and 2 were tested together. This freely estimated configural invariance model demonstrated acceptable model fit ($\chi^2(111)=161.56$, $p=0.001$; CFI=0.98; RMSEA=0.05; 95% CI [0.03, 0.07]; SRMR=0.04). All indicators were significant and positive. Consistent with procedures to evaluate measurement invariance (Little et al., 2013), weak invariance (equated loadings) and strong invariance (equated intercepts) models passed, providing evidence of consistency of our measurement model (see Table 3).

Hypothesized Model Testing

We tested two cross-lagged structural models to investigate the relationships among PCs, anxiety, and depressive symptoms pre-pandemic to during the pandemic (see Table 4). First, we tested a two-wave cross-lagged model in which PCs, anxiety, and depressive symptoms pre-pandemic predicted PCs, anxiety, and depressive symptoms during the pandemic. This model had acceptable fit ($\chi^2(113)=189.55$,

Table 2 Factor loadings from confirmatory factor analyses

	B	SE(B)	β	95% CI (B)
<i>PC T1</i>				
PC P1T1	.738*	.041	.799	.658, .819
PC P2T1	.779*	.036	.868	.710, .849
PC P3T1	.767*	.037	.861	.696, .839
<i>DEPRESSION T1</i>				
DEP P1T1	.669*	.041	.738	.589, .748
DEP P2T1	.804*	.036	.870	.733, .874
DEP P3T1	.687*	.039	.783	.611, .762
<i>ANXIETY T1</i>				
ANX P1T1	1.042*	.087	.762	.871, 1.123
ANX P2T1	1.531*	.079	.876	1.376, 1.685
ANX P3T1	1.564*	.078	.905	1.412, 1.717
<i>PC T2</i>				
PC P1T2	1.396*	.072	.796	1.256, 1.537
PC P2T2	1.297*	.077	.768	1.146, 1.448
PC P3T2	.980*	.087	.623	.809, 1.151
<i>DEPRESSION T2</i>				
DEP P1T2	.436*	.051	.459	.336, .536
DEP P2T2	.446*	.040	.795	.367, .524
DEP P1T2	.534*	.087	.641	.362, .705
<i>ANXIETY T2</i>				
ANX P1T2	.838*	.069	.609	.703, .974
ANX P2T2	.870*	.054	.798	.764, .976
ANX P3T2	1.117*	.055	.862	1.009, 1.226

Note. * $p < .05$, PC=perfectionistic cognitions; ANX=Anxiety; DEP=Depressive symptoms; P1=parcel 1; P2=parcel 2; P3=parcel 3; T1=pre-pandemic; T2 during the pandemic

Table 3 Results of tests of measurement invariance

Model	χ^2			RMSEA		TLI	CFI	Model Evaluation
	Value	df	p	Value	95% CI			
Null				–	–	–	–	N/A
Configural Invariance	161.560	111	.001	.052	[.033, .068]	.979	.972	Pass
Loading Invariance	171.817	117	.001	.052	[.034, .069]	.978	.971	Pass
Intercept Invariance	176.275	123	.001	.050	[.032, .066]	.978	.973	Pass

$p < 0.001$; CFI=0.969; RMSEA=0.063; 95% CI [0.047, 0.078]; SRMR=0.053). Results demonstrated that PCs pre-pandemic predicted higher levels of anxiety during the pandemic after accounting for pre-pandemic levels of anxiety. PCs pre-pandemic did not predict depressive symptoms during the pandemic after accounting

Table 4 Results from cross-lagged structural equation models for perfectionism, depression, and anxiety

Model	Variable	PC T2					Depression T2					Anxiety T2					
		B	SE	β	95% CI(B)	B	SE	β	95% CI(B)	B	SE	β	95% CI(B)	B	SE	β	95% CI(B)
<i>Model without Covariates</i>																	
	PC T1	.785*	.118	.609*	.555,1.016	.078	.106	.064	-.129,.285	.270*	.104	.190*	-.129,.285	.270*	.104	.190*	.067,.474
	Depression T1	.083	.152	.064	-.215,.381	.649*	.129	.535*	.396,.902	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Anxiety T1	-.027	.140	-.021	-.300,.247	n/a	n/a	n/a	n/a	.899*	.132	.630*	n/a	.899*	.132	.630*	.641,1.156
<i>Model with Covariates</i>																	
	PC T1	.844*	.128	.634*	.593,1.10	.191	.112	.153	-.030,.411	.272*	.110	.197*	-.030,.411	.272*	.110	.197*	.057,.486
	Depression T1	.054	.152	.040	-.244,.351	.527*	.128	.422*	.277,.778	n/a	n/a	n/a	.277,.778	n/a	n/a	n/a	n/a
	Anxiety T1	-.067	.144	-.050	-.350,.216	n/a	n/a	n/a	n/a	.806*	.131	.585*	n/a	.806*	.131	.585*	.549,1.06
	Sex	-.056	.183	-.021	-.415,.304	-.337	.199	-.133	-.727,.053	-.197	.193	-.070	-.727,.053	-.197	.193	-.070	-.575,.181
	Age	.023	.067	.026	-.108,.155	-.028	.072	-.033	-.169,.113	-.006	.071	-.006	-.169,.113	-.006	.071	-.006	-.145,.133
	Education	-.137	.089	-.113	-.310,.037	.060	.095	.053	-.126,.247	-.136	.094	-.109	-.126,.247	-.136	.094	-.109	-.320,.048
	COVID-Exp	.261	.351	.050	-.427,.949	.283	.380	.058	-.462,1.03	-.381	.379	-.071	-.462,1.03	-.381	.379	-.071	-.1.124,.362
	COVID-think	.051	.034	.102	-.016,.177	-.013	.036	-.029	-.085,.058	.012	.036	.024	-.085,.058	.012	.036	.024	-.058,.082
	COVID-job	.283	.187	.104	-.084,.650	.744*	.206	.292*	.341,1.15	.101	.195	.036	.341,1.15	.101	.195	.036	-.282,.484

Note. PC=Perfectionistic cognitions; Sex=respondent sex (0=female, 1= male); COVID-Exp= whether exposed to COVID-19 or not (0=no, 1= yes); COVID-think =how frequently think about COVID-19; COVID-job= whether lost income or job due to COVID-19 or not (0=no, 1= yes); n/a =Not applicable; T1 = pre-pandemic; T2 = during the pandemic

for pre-pandemic levels of depressive symptoms. Further, depressive symptoms and anxiety pre-pandemic did not predict PCs during the pandemic after accounting for pre-pandemic levels of PCs. Next, the model with the inclusion of covariates was tested. This model was also an adequate fit to the data ($\chi^2(203) = 299.87, p < 0.001$; CFI = 0.957; RMSEA = 0.055; 95% CI [0.041, 0.068]; SRMR = 0.062). There were no meaningful differences in results with the inclusion of covariates.

Discussion

To our knowledge this is the first study that examined whether PCs conferred risk for subsequent psychological distress pre-pandemic to during the pandemic among a community sample of EAs. Overall, anxiety increased pre-pandemic to during the pandemic among EAs, whereas no changes in depressive symptoms were detected. These results are generally consistent with a growing body of work demonstrating deteriorating mental health among EAs during the pandemic (Cao et al., 2020; Huang & Zhao, 2020; Kujawa et al., 2020; Kwong et al., 2020; Ozamiz-Etxebarria et al., 2020) and extend these findings to a Canadian sample. For example, our findings are harmonious with Kwong et al. (2020) who showed that anxiety, but not depression, increased pre-pandemic to during the pandemic in adults in the United Kingdom. However, our findings are inconsistent with other studies either showing that both anxiety and depression have increased since the onset of the pandemic (Kujawa et al., 2020) or that neither depression nor anxiety have changed since the pandemic began (Shanahan et al., 2020). It is logical that anxiety was heightened among participants in this study given that data collection for the second timepoint of this study transpired during the relatively early stages of the pandemic in Canada when uncertainty was particularly high surrounding continual and rapidly changing government policies and general lack of understanding about the virus. However, future research is needed to understand the longer-term psychological impacts of the pandemic as it progresses and afterwards.

Cross-lagged results demonstrated that over and above within-time associations and across-time stability effects, pre-pandemic PCs did not predict later depressive symptoms (or vice versa). Although contrary to our initial hypotheses, these results became expected once no changes in depressive symptoms pre-pandemic to during the pandemic were detected. However, it is too premature to conclude that PCs are unrelated to later depressive symptoms. Indeed, it is important to note that PCs were positively associated with depressive symptoms within time at both timepoints. Consequently, it is important for researchers to continue to explore prospective links between perfectionism and depressive symptoms as the pandemic progresses given that our within time associations suggest possible links and that both theory (Flett & Hewitt, 2002; Hewitt et al., 2017) and extant research (Smith et al., 2016, 2017) would predict such findings.

Results demonstrated that pre-pandemic PCs contributed to subsequent anxiety experienced during the pandemic. However, pre-pandemic anxiety did not contribute to PCs during the pandemic. These results lend credence to vulnerability models (Hewitt et al., 2017; Smith et al., 2016) and cognitive theories of perfectionism (Flett

et al., 2016, 2018) and further suggest that PCs may function as a sensitizing factor (Wade et al., 2020) within the context of the global pandemic. The current findings are also consistent with diathesis-models of perfectionism and distress (Hewitt & Flett, 1991; 1993) and Flett and Hewitt's (2020) contention that the stress of the pandemic would be particularly difficult for individuals elevated in perfectionism and would result in higher levels of psychological distress. Results are also consistent with a study on Italian adults, which found that trait perfectionism in the early stages of the pandemic predicted higher levels of psychological distress and burnout 2 months later (Spagnoli et al., 2021). These findings also dovetail with previous work showing robust links between perfectionism and anxiety pre-pandemic (Burgess & DiBartolo, 2016; Hewitt et al., 2017). These results also held after accounting for the effects of pre-pandemic levels of anxiety, respondent sex, age, and education, along with whether individuals were exposed to COVID or not, whether they knew someone who was diagnosed with COVID or not, and how frequently they thought about COVID. Thus, this study speaks to the incremental predictive utility of individual differences in PCs in the prediction of anxiety among EAs during the pandemic.

Finally, this study demonstrated that PCs decreased pre-pandemic to during the pandemic among EAs. These results provide preliminary support for Flett and Hewitt's (2020) notion that the pandemic may stimulate perfectionists to disengage from their extreme perfectionistic tendencies in favour of more positive tendencies, such as striving for excellence and better self-care. Nevertheless, it is too early to gain firm conclusions about how the pandemic is affecting changes in perfectionism. Indeed, Flett and Hewitt (2020) also put forth the possibility that perfectionism could increase during the pandemic, given that perfectionists could adopt greater perfectionistic tendencies as a means of gaining a sense of greater control and security to deal with heightened fear and uncertainty engendered by the pandemic. Moreover, the current work was relegated to the early stages of the pandemic, thus precluding an investigation of longer-lasting changes. Interestingly, a study on adults found that trait perfectionism (i.e., perfectionistic concerns and strivings) did not change across a two-month interval early on in the pandemic (Spagnoli et al., 2021). However, given differences in samples (i.e., Canadian EAs versus Italian adults), measures of perfectionism (perfectionistic cognitions versus trait perfectionism), and time intervals (assessing pre-pandemic to during pandemic changes versus changes during the early stages of the pandemic) it is difficult to compare findings.

Limitations and Strengths

Current findings should be understood within the context of its limitations and strengths. First, whereas our study was able to establish temporal precedence using a half-longitudinal model with two timepoints and was in a unique position to assess change from pre-pandemic conditions to during pandemic conditions, this strategy may only catch a restricted and possibly non-repetitive depiction of change (McGrath et al., 2012). This is especially likely given the fast-changing landscape of the global pandemic. Thus, studies including three or more timepoints merit

consideration because this would allow for more stringent tests of temporal precedence, including a more comprehensive investigation of the potentially reciprocal nature of the a between PCs and psychological distress. Further, assessing three or more timepoints would permit tests of growth in PCs and psychological distress to better assess within and between person changes. This is important in light of studies indicating that psychological distress has demonstrated nonlinear changes since the onset of the pandemic (e.g., Fancourt et al., 2020).

Second, our study focused on a sample of EAs. Whereas this provides important insight into the relationship between PCs and psychological distress pre-pandemic to during the pandemic in a sample that has shown increased vulnerability to the stresses, financial implications, and mental health problems during the pandemic (Kwong et al. 2020; Pierce et al., 2020; Wang et al., 2020), our results may lack generalizability to other age groups. Future research should continue to examine these relationships in other samples, particularly in samples of children and youth who are also experiencing higher levels of psychological distress during the pandemic (Barense et al., 2021).

Finally, our study relied on self-report variables. Though we used well-validated measures of PCs and psychological distress, common method variance from reliance on single-source self-reported measures may artificially inflate associations among constructs. Researchers are thus encouraged to consider answering calls for a broader array of research designs including the use of informant reports (Flett et al., 2005; Smith et al., 2021) to mitigate biases such as social desirability or deprecation distress and to potentially increase the accuracy of the findings.

Conclusion

Present findings underscore Flett and Hewitt's (2020) cogent insights about the importance of assessing individual differences in perfectionism when investigating the mental health impacts of the global pandemic. PCs decreased across the early stages of the pandemic, providing preliminary support for Flett and Hewitt's (2020) notion that the pandemic may "serve as a catalyst for positive change" encouraging individuals elevated in perfectionism "to realize the folly of striving for absolute perfection rather than excellence (p.96)." Our results also support vulnerability models and cognitive theories of perfectionism (Flett et al., 2016, 2018), such that higher levels of pre-pandemic PCs contributed to later anxiety among EAs during the pandemic and not vice versa. Consequently, clinicians are encouraged to recognize that EAs struggling with perfectionistic tendencies are at heightened risk for psychological distress to prevent long-lasting effects. However, additional research is needed to understand the potential dynamic and detrimental interplay of PCs and psychological distress over time as the pandemic progresses and beyond the pandemic itself.

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Availability of data material Materials and analysis code for this study are available by emailing the corresponding author.

Declarations

Conflict of interest Danielle S. Molnar, Tabitha Methot-Jones, Jessy Moore, Deborah D. O’Leary, & Terrence J. Wade declare that they have no other conflict of interests aside from the funding listed above.

Ethical Approval Ethics approval was obtained from the Brock University Research Ethics Board.

Human and Animal Rights No animal studies were carried out for the purposes of this article.

Informed Consent Informed consent was obtained from every participant who took part in this study.

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