


EMPIRICAL ARTICLE

Dynamic changes in perfectionism dimensions and psychological distress among adolescents assessed before and during the COVID-19 pandemic

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Abstract

This prospective longitudinal study evaluated changes in psychological distress among adolescents, pre-pandemic to intra-pandemic, the extent to which within-person and between-person differences in trait multidimensional perfectionism were associated with such changes, and the role of stress in explaining associations between perfectionism and psychological distress. Adolescents ($N = 187$; 80% female; 78% White, 7% Asian Canadian, 2% Indigenous Peoples in Canada, 2% Black or African Canadian, 2% Latin Canadian, or 9% Other; $M_{\text{age}} = 17.96$ years) completed online surveys assessing perfectionism (i.e., self-oriented perfectionism and socially prescribed perfectionism), depression, anxiety, and stress pre-pandemic (i.e., March 12, 2020 or earlier) and during Ontario, Canada's first (i.e., March 13, 2020 to July 24, 2020) and second (December 26, 2020 to February 7, 2021) government-mandated lockdowns. Between-person differences and within-person changes in multidimensional trait perfectionism were associated with increases in psychological distress and perceived stress. Perceived stress served as an intermediary pathway linking multidimensional trait perfectionism to psychological distress during the pandemic.

Many young people perceive their mental health to be poorer since the pandemic began (Hawke et al., 2020). Parents are reporting higher levels of behavioral problems in their children, and visits to emergency departments for mental health problems have increased since 2019 in children aged 5–11 years (24%) and in adolescents aged 12–17 years (31%; Leeb et al., 2020). The COVID-related upsurge in mental health difficulties among youth compounds previous increases in mental health problems among this age group. In the United States, Canada, and the UK, young people have been experiencing higher levels of depression and anxiety compared

to 10 years ago, even before the pandemic began (e.g., Bor et al., 2014) and more recently the U.S. Surgeon General (2021) issued a mental health advisory for youth. Thus, there is an urgent need to identify the key etiological factors prompting the mental health crisis faced by today's youth.

Perfectionism (i.e., the requirement of perfection of the self or others; Hewitt & Flett, 1991) is an established risk factor for psychological distress in adults and youth (e.g., Limburg et al., 2017). Perfectionism is relevant given evidence of its widespread prevalence, with higher levels of perfectionism presenting in about one in four children

Abbreviations: CAPS, Child–Adolescent Perfectionism Scale; CES-D-R, Center for Epidemiological Studies—Depression Scale Revised; ICC, intraclass correlations; PSS, Perceived Stress Scale; RCMAS, Revised Manifest Anxiety Scale; SES, socioeconomic status; SOP, self-oriented perfectionism; SPP, socially prescribed perfectionism.



or adolescents (Flett & Hewitt, 2022). Furthermore, the harmful effects of perfectionism may be exacerbated during the pandemic for myriad reasons (Flett & Hewitt, 2020). Specifically, individuals higher in perfectionism do not respond well to uncontrollable stress and prolonged uncertainty, and the pandemic represents an unprecedented and evolving stress sequence that can activate vulnerabilities and exacerbate distress present prior to the pandemic. Indeed, stress may play a key role in helping to explain the link between perfectionism and psychological distress, as there is theory to support its role as both a mediator (e.g., Hewitt & Flett, 2002) and a moderator (e.g., The Perfectionism Diathesis-Stress Model; Flett et al., 1995; Hewitt & Flett, 1991). Thus, in light of these considerations, using three waves of data collected before and during the pandemic (pre-pandemic [Time 1], first government-mandated lockdown [Time 2], second government-mandated lockdown [Time 3] in Ontario, Canada), we examined whether within-person changes and between-person differences in perfectionism among a community sample of adolescents were associated with psychological distress and whether these associations were mediated by general levels of perceived stress and/or moderated by pandemic-related worries.

Changes in adolescents' mental health during COVID-19 pandemic

Compelling evidence has confirmed the deleterious mental health impacts of the COVID-19 pandemic for many young people (e.g., Barendse et al., 2021; Flett, 2021; Racine et al., 2021). For example, one large study found that Canadian adolescents perceived declines in their psychological health from pre-pandemic to intra-pandemic due to increases in anxious and depressive symptoms (Hawke et al., 2020). In another study surveying over 30,000 caregivers of children and youth in pre-kindergarten to Grade 12, caregivers reported that their children's anxiety had increased from 12.6% pre-pandemic to 23.3% intra-pandemic (Raviv et al., 2021). Furthermore, between 21.1% and 44.3% of caregivers indicated that positive markers of well-being among their children had decreased. These findings are consistent with a meta-analysis of 29 studies that included 80,879 children and adolescents which found that approximately 1 in 4 (25.2%) young people exhibited signs of diagnosable depression and 1 in 5 (20.5%) had diagnosable anxiety during the pandemic (Racine et al., 2021). These estimated rates are double pre-pandemic rates. Prospective longitudinal studies also paint a cogent picture of deteriorating psychological health among young people during the pandemic. For instance, one study found that adolescents between the ages of 13 and 16 years reported significantly higher levels of anxious and depressive symptoms, and lower levels of life satisfaction during the early stages of the pandemic (Magson

et al., 2021). These results are consistent with another study that followed a large international sample of adolescents between the ages of 9 and 18 years during the first 6 months of the pandemic (Barendse et al., 2021): Adolescents, especially those with multiracial identities and those living in regions under government-mandated lockdown, reported significant increases in depressive symptoms pre-pandemic to intra-pandemic. In sum, there is a general trend toward deteriorating mental health among adolescents during the pandemic.

However, there is evidence to suggest that mental health is not necessarily declining at an elevated rate in all respects or for all youth. For instance, Belanger et al. (2021) found that psychological distress was increasing among youth over the first 2 to 3 months of the pandemic, but not more so than increases seen pre-pandemic. It is worth noting, however, that this study took place early in the pandemic and, as such, may not have captured the accumulated effects of the prolonged state of the pandemic (Belanger et al., 2021). Furthermore, although Barendse et al. (2021) found increases in depressive symptoms among youth across the beginning of the pandemic, they did not find any pandemic-related changes in anxiety. Moderation analyses revealed that some subgroups of youth were experiencing a decrease in anxious symptoms (e.g., younger adolescents, Latino or Hispanic adolescents), whereas others were experiencing an increase (e.g., biracial or multiracial adolescents). Similarly, Cost et al. (2022) found that although most youth reported declining mental health (70%), 19.5% of young people aged 6–18 years old were experiencing improvements in at least one domain of mental health during the pandemic.

Although these studies provide compelling evidence that many adolescents have experienced various changes to their mental health since the onset of the pandemic, they are limited in various ways. Some studies (e.g., Hawke et al., 2020; Raviv et al., 2021) relied on retrospective reports of psychological well-being prior to the pandemic, making them vulnerable to recall bias (e.g., misremembered pre-pandemic life to be more positive). The meta-analysis by Racine et al. (2021) relied on cross-sectional comparisons of studies conducted before and after the pandemic. Therefore, alternative explanations cannot be ruled out. Moreover, these studies have been limited to studying the early stages of the pandemic. Recent research with adult samples indicates that psychological distress returned to pre-pandemic levels by June 2020 (e.g., Aknin et al., 2022). It is unclear, however, whether this decline in distress was also observed in adolescents or whether this decline plateaued as the pandemic progressed. Furthermore, despite a net downward trend in mental health among youth as the pandemic progresses, evidence suggests that the impact of the pandemic is not uniform among adolescents, pointing to a need to explore individual differences among youth that may serve as additional risk factors during this

unprecedented global event to build our understanding of which youth are most at risk for poorer pandemic-related mental health outcomes and why.

Perfectionism and mental health

One individual difference factor that may contribute to this heterogeneity is multidimensional trait perfectionism, as individuals higher in perfectionism may be at greater risk for pandemic-related declines in mental health (Flett, 2021; Flett & Hewitt, 2020). There are currently a wide variety of conceptualizations and measures of perfectionism, which have saturated both the adult and youth literature (Flett & Hewitt, 2022, for review). With respect to multidimensional trait perfectionism, it is sometimes conceptualized and assessed in children and adolescents with adult measures such as the Multidimensional Perfectionism Scale (Frost et al., 1990; Hewitt & Flett, 1991) or the Almost Perfect Scale—Revised (Slaney et al., 2001). In other cases, it is assessed with measures specifically designed for youth such as the Child–Adolescent Perfectionism Scale (CAPS; Flett et al., 2016). Given that our focus was on trait perfectionism in adolescents, we conceptualized and assessed perfectionism according to the multidimensional model of trait perfectionism that underlies the CAPS (Flett et al., 2016), which is theoretically based, developmentally appropriate, and the most widely used and well-validated measure of trait perfectionism among children and adolescents (Flett & Hewitt, 2022).

The CAPS assesses two trait dimensions: socially prescribed perfectionism (SPP) and self-oriented perfectionism (SOP; Flett et al., 2016). SPP is an *interpersonal* dimension of trait perfectionism that includes the belief that others require perfection from the self and that others are highly critical of the self (Flett et al., 2016). High levels of SPP can reflect feelings of helplessness and hopelessness, and the notion that success will result in even higher standards and expectations being imposed on the self (Hewitt & Flett, 1991). In contrast, SOP is an *intrapersonal* dimension of trait perfectionism that entails a self-driven requirement to be perfect and to achieve exorbitantly high standards, as well as punitive self-criticism (Hewitt & Flett, 1991).

The current study is in keeping with recent longitudinal analyses of trait perfectionism in adolescents with a focus on SOP and SPP and their role in maladjustment (e.g., Asseraf & Vaillancourt, 2015; Damian et al., 2017). Studies conducted prior to the pandemic established multidimensional trait perfectionism as a vulnerability factor for a multitude of psychological disorders including depression and anxiety. For example, extensive research has found that SPP is related to higher levels of depressive and anxious symptoms among adolescents (e.g., Flett et al., 2016; Sironic & Reeve, 2015; Stornaes et al., 2019). Moreover, longitudinal studies have found

that SPP predicts increases in anxiety over a 12- to 15-month period in adolescents aged 12–19 years (Damian et al., 2017), and increases in depressive symptoms 6 months later, after accounting for baseline depression, among mid to late adolescents (O'Connor et al., 2010).

In contrast, findings concerning SOP and psychological distress tend to be mixed, mirroring theoretical tensions concerning the relative healthiness of this dimension of perfectionism. Some studies suggest a positive link between SOP and psychological distress among adolescent samples (e.g., Sironic & Reeve, 2015; Stornaes et al., 2019). However, longitudinal studies examining youth samples (e.g., Asseraf & Vaillancourt, 2015; Smith et al., 2018) have failed to detect an association between SOP and psychological distress. In sum, research has established that trait perfectionism is a vulnerability factor for psychological distress among young people pre-pandemic. However, links between SPP and psychological distress tend to be more robust than associations between SOP and psychological distress.

Perfectionism and psychological distress within the context of the COVID-19 pandemic

Flett and Hewitt (2020) reasoned that psychological distress experienced by individuals with elevated perfectionism would be exacerbated by the pandemic. These assertions have received some initial support in adult samples. For instance, cross-sectional data collected early in the pandemic in Italy and Spain demonstrate that SPP was associated with greater psychological distress (i.e., depressive symptoms, anxiety, and stress). However, SOP was unrelated to psychological distress (Vacca et al., 2021). Another study found that self-critical perfectionism (closely aligned with SPP) was positively associated with psychological distress, both directly and indirectly via repetitive negative thinking and fear of COVID-19 (Pereira et al., 2022). This study also found indirect links between rigid perfectionism (i.e., demanding perfection from the self; akin to SOP) and psychological distress via repetitive negative thinking and fear of COVID-19. Finally, among a community sample of Canadian emerging adults (18–25 years), a prospective two-wave cross-lagged study indicated that experiencing more frequent perfectionistic cognitions pre-pandemic predicted higher levels of anxiety during the pandemic (Molnar et al., 2021). To our knowledge, only one study thus far has examined relations between perfectionism and psychological distress among adolescents within the context of the COVID-19 pandemic. This study compared a sample of early adolescents (grades 7 and 8) collected pre-pandemic to a different sample of early adolescents collected intra-pandemic with respect to SOP and markers of psychological distress (Lane et al., 2022). Results indicated that SOP was higher in the intra-pandemic sample compared to the pre-pandemic sample and that



SOP was related to higher levels of psychological distress in both samples. Unfortunately, this study was methodologically limited; SPP was not assessed in either sample, and within-person changes could not be assessed due to its cross-sectional design. Collectively, cross-sectional and prospective half-longitudinal data provide initial support for Flett and Hewitt's (2020) notion that individuals higher in perfectionism may be especially vulnerable to greater psychological distress during the pandemic. It is unclear, however, whether these trends will hold as the pandemic unfolds and whether adolescents will have a similar trajectory given the unique challenges they face during the pandemic (e.g., remote schooling, missing major milestones such as graduation, prom).

Furthermore, to our knowledge, all studies examining the role of perfectionism in predicting intra-pandemic changes in psychological distress have been limited in solely examining the predictive role of between-person differences in perfectionism, without capturing the role of within-person changes. It is critical to examine both between-person differences and within-person changes in perfectionism across the pandemic given that the pandemic has been posited as a stressor that may prompt changes in perfectionistic tendencies (Flett & Hewitt, 2020). For example, the pandemic may provide people with a time for self-reflection and the adoption of healthy changes, resulting in decreases in perfectionism. Alternatively, the pandemic may intensify their perfectionistic tendencies to salvage a feeling of control due to the uncertainty accompanying the pandemic (Flett & Hewitt, 2020). Furthermore, adolescence is a developmental period during which personality traits tend to undergo the greatest changes relative to other stages of the lifespan, highlighting the importance of assessing changes in perfectionism throughout this period, irrespective of the pandemic (Ashton, 2013). Thus, in the current work, there were theoretical and empirical justifications for expecting changes in trait perfectionism, given the unique and ever-changing context of the COVID-19 pandemic and developmental differences in the stability of personality during adolescence. Finally, key explanatory pathways that could potentially explain why perfectionism confers risk for psychological distress among adolescents during the pandemic have yet to be explored.

The role of stress

A key mechanism linking perfectionism with psychological distress, particularly during the pandemic, may be stress. Indeed, stress is hypothesized to act as both a mediator and a moderator in the relation between perfectionism and poorer mental health outcomes (Dunkley et al., 2016). With respect to mediation and as theorized by Hewitt and Flett (2002), perfectionism is linked to psychological distress through increased levels of stress

due to the pursuit of unrealistic goals and setting of unreasonable expectations for the self (i.e., stress generation), a preoccupation with potential stressors (i.e., stress anticipation), a tendency to respond to stressors in a way that prolongs feelings of elevated stress (i.e., stress perpetuation), and the magnification of stressful events via maladaptive coping mechanisms (i.e., stress enhancement). In turn, these elevated levels of stress confer risk for poorer outcomes.

Individuals elevated in perfectionism are expected to be especially prone to experiencing stress during the pandemic given that they would perceive heightened demands because their boundaries between work or school and home life have become increasingly distorted due to pandemic-related work-at-home measures. For example, individuals higher in perfectionism may not be able to disengage from work/school because they no longer have clear indicators of when work or school starts and when it should end for the day. Second, many perfectionistic individuals define themselves by their achievements. Consequently, once individuals elevated in perfectionism are no longer able to achieve, they may feel higher levels of stress, especially because they will believe that they "should" have been able to achieve under all circumstances, even a global pandemic (Flett & Hewitt, 2020). Pre-pandemic research has demonstrated that multidimensional trait perfectionism is associated with higher levels of stress among adolescents (e.g., Flett et al., 2016; Richardson & Gradisar, 2020; Sironic & Reeve, 2015) and support for this mediational hypothesis has been garnered in adult samples (e.g., Smith et al., 2020). However, to our knowledge, research has yet to test this hypothesis among adolescents, either pre-pandemic or intra-pandemic. As such, the current work aimed to contribute to our understanding of how perfectionism confers risk for psychopathology by testing the potential mediating role of perceived stress in the relation between trait perfectionism and psychological distress among adolescents throughout the COVID-19 pandemic.

Alternatively, the Perfectionism Diathesis-Stress Model (Flett et al., 1995; Hewitt & Flett, 1991) posits that perfectionism is especially likely to function as a vulnerability factor during times of adversity. In other words, people with elevated levels of perfectionism may seem to be faring well when under low levels of stress. However, when faced with adversity, they will be more likely to experience distress compared to people lower in perfectionism because their perfectionism heightens the averseness of the stress that they are experiencing. Specifically, it is thought that extreme life stress tends to disrupt perfectionistic individuals' need for control and attempts to achieve their exorbitantly high standards (Flett et al., 1995; Hewitt & Flett, 1991, 1993). There is some initial support for the viability of this model in pre-pandemic work with adolescents (e.g., Hewitt et al., 2014; O'Connor et al., 2010). Moreover, this model may be particularly relevant during the COVID-19 pandemic, which

is characterized by uncertainty, perceived uncontrollability, and ever-changing restrictions and life conditions (Flett & Hewitt, 2020; Flett & Zangeneh, 2020). Thus, the current work sought to extend the growing body of literature linking perfectionism to poorer pandemic-related outcomes by examining the potential moderating role of COVID worries (i.e., related to health, finances), with respect to the relation between trait perfectionism and adolescent psychological distress.

The current work

To address the critical gaps outlined above, the current work examined between-person differences and within-person changes in perfectionism among adolescents in Ontario during the pandemic and their associations with changes in psychological distress (i.e., anxiety, depression). Multilevel modeling was used at three time points (i.e., pre-pandemic, first government-mandated lockdown, second government-mandated lockdown). This work also sought to provide a comprehensive test of the role of stress within these associations, by testing the mediating role of perceived stress and the moderating role of COVID worries. Specifically, trajectories of depression, anxiety, and perceived stress across the pandemic (i.e., pre-pandemic, first and second government-mandated lockdowns) were assessed. We expected that each of these outcomes would increase over the course of the study. Consonant with Flett and Hewitt (2020), we expected multidimensional perfectionism to change over the course of the pandemic. However, we did not hypothesize the direction of the change a priori because there is limited evidence to support a specific directional hypothesis. Furthermore, we hypothesized that adolescents higher in SPP, relative to those lower in SPP, would experience greater psychological distress and perceived stress (between-person effects). We also predicted that when adolescents experienced increased SPP, relative to their average SPP, they would also experience relative increases in psychological distress and perceived stress (within-person effects). We did not have any directional hypotheses a priori regarding SOP and psychological distress or perceived stress, given the mixed findings discussed. We sought to test perceived stress as a mediating pathway and COVID worries as a moderating factor in the relations between trait perfectionism and psychological health during the pandemic. Specifically, we expected that adolescents higher in SPP, relative to those lower in SPP, would experience greater perceived stress, and, in turn, would experience higher levels of psychological distress (between-person effects). Given the limited research examining within-person changes in perfectionism, we explored whether this mediational model would also be observed at the within-person level. Regarding moderation, we hypothesized that associations among multidimensional perfectionism, perceived stress, and

psychological distress would be strengthened under conditions of heightened COVID worries. Whereas our hypotheses were based on prior theory, we consider this work to be relatively exploratory given the novelty of the pandemic context.

Finally, to determine the unique role of perfectionism during the pandemic, we also considered theoretically and empirically relevant covariates. In light of evidence indicating that older adolescents (e.g., Duan et al., 2020), female adolescents (e.g., Magson et al., 2021), racial minorities (e.g., Barendse et al., 2021; Miconi et al., 2021), and individuals with lower socioeconomic status (SES; e.g., Miconi et al., 2021) are at increased risk of psychological distress during the pandemic, we included demographic variables such as respondent age, race, biological sex, maternal and paternal education, and SES.

METHOD

Participants

Participants were invited to participate in a larger longitudinal study that started before the COVID-19 pandemic began and included up to five time points examining the contribution of personality and interpersonal factors to well-being over time among adolescents between the ages of 13 and 19 years. Participants were eligible for inclusion in the present analyses if they completed at least one survey prior to the COVID-19 pandemic (i.e., March 12th, 2020 or earlier) and at least one survey during either the first or second COVID-19 lockdown in Ontario (i.e., March 13, 2020 to July 24, 2020, or December 26, 2020 to February 7, 2021). If participants had completed a survey during both lockdowns, both surveys were included. If participants had completed more than one pre-pandemic survey, the closest time point to the cutoff date of March 12, 2020 was selected.

In our final analyses, we included 187 participants from Ontario, Canada (35 boys, 150 girls, 1 other, 1 prefer not to say; $M_{\text{age}} = 17.96$ years, $SD_{\text{age}} = 1.23$; age range = 13–19 years). Most participants identified as White (78.07%). The remainder of the sample identified as Asian Canadian (7.49%), Indigenous Peoples in Canada (2.14%), Black or African Canadian (1.6%), Latin Canadian (1.6%), or Other (8.56%). One participant preferred not to identify their race. To gauge participants' SES, we asked participants how rich they perceived their family to be compared to the average Canadian. Most participants perceived their family to be about the same as the average Canadian (39%), 18.7% responded that their family was more rich than the average Canadian, and 22.5% indicated that their family was less rich or a lot less rich than the average Canadian. About one-fifth of the sample (19.8%) did not provide a response to this question. Participants reported their parents' highest level of education. More than half of the parents had



completed a postsecondary education (51.6%), 22.7% had completed their high school education, and 5.9% had not completed high school. About one-fifth of the sample (19.8%) did not provide a response to this question.

There was little missing data, beyond participants lost to attrition (i.e., <3% missing data on any given item). Participants completed an average of 2.78 surveys ($SD = 0.41$; 41 participants had two time points and 146 had three time points) for a total of 520 surveys. Across the three time points, 41 surveys were missing (7.31%). Of these surveys, 33 were missing from the second time point (i.e., the first lockdown in Ontario). However, these participants did complete surveys for the third time point (i.e., second lockdown). The remaining missing surveys were mostly due to attrition ($n = 7$). One participant completed the study before the arrival of the second lockdown. We conducted a sensitivity analysis using Monte Carlo simulations with 5000 samples. To generate the simulated samples, we used the estimates we obtained in our analyses as population values (Bolger & Laurenceau, 2013) and then varied the slope size until we found the slope for which we had at least 80% power. This analysis revealed that our sample was sufficiently powered to detect a small-to-medium effect size of $r = .21$.

Measures

Cronbach's alphas for all measures are reported in Table 1.

Demographics

Participants reported their age, sex, race, SES, mother's highest level of education, and father's highest level of education. Our self-reported SES item was negatively correlated with COVID worries regarding family finance, $r = -.27$, $CI_{95\%} = [-0.433, -0.094]$, $p = .001$, indicating that this adolescent self-reported item did capture household income.

Trait perfectionism

The CAPS (Flett et al., 2016) has 22 items that make up two subscales measuring distinct trait dimensions: SOP (12 items; e.g., "It really bothers me if I don't do my best all the time") and SPP (10 items; e.g., "I am always expected to do better than others"). Participants indicated how true each item was of them on a 5-point scale (1 = *false-not at all true of me* and 5 = *very true of me*). The CAPS has been established as a reliable and well-validated measure of perfectionism among adolescents (see Flett & Hewitt, 2022; Flett et al., 2016). Summed scores for each of the subscales were created. As such, SOP scores potentially ranged from 12 to 60 and SPP

scores could range from 10 to 50. Normative data from adolescent community samples (<https://hewittlab.sites.olt.ubc.ca/files/2016/03/Child-Adolescent-Perf-Scale.pdf>) indicate the following mean levels for SOP and SPP: $M_{SOP} = 29.38$, $SD = 8.34$, $M_{SPP} = 25.80$, $SD = 8.57$. The test-retest reliabilities in this study suggested substantial temporal stability with $r_s > .60$.

Anxiety symptoms

Participants completed the Revised Manifest Anxiety Scale Short Form (RCMAS-2 Short Form; Reynolds & Richmond, 2008). Participants answered 10 items (e.g., "I often worry about something bad happening to me") in a yes (1)/no (0) format whereby each item represented a symptom of anxiety. Total scores for this scale were created by calculating the sum of these items. Total scores could range from 0 to 10. Guidelines indicate that, among adolescents, a score of 9 or higher indicates extremely problematic levels of anxiety, scores ranging from 6 to 8 indicates moderately problematic anxiety, scores ranging from 1 to 5 indicate an average level of anxiety, and a score of 0 indicates lower than average levels of anxiety. The RCMAS-2 Short Form has demonstrated good reliability and validity among youth samples (Reynolds & Richmond, 2008).

Depressive symptoms

The 10-item version of the Center for Epidemiological Studies—Depression Scale Revised (CES-D-R; Radloff, 1977) assessed depressive symptoms. Participants rated how often they experienced a range of symptoms (e.g., "I had trouble keeping my mind on what I was doing") over the past week on a scale ranging from 0 (*rarely or none of the time—less than 1 day*) to 3 (*all of the time to—5–7 days*). Total scores were created by calculating the sum of the items and ranged from 0 to 30. Scores greater than or equal to 10 indicated significant depressive symptoms (Andresen et al., 1994; Zhang et al., 2012). The CESD-R has been established as a valid and reliable measure of depression among adolescent samples (e.g., Thanh et al., 2016).

Perceived stress

The 10-item Perceived Stress Scale (PSS; Cohen & Williamson, 1988) assessed levels of stress. Scale items assessed the degree to which participants perceived their lives to be uncontrollable and overloaded (e.g., "How often have you felt that you were on top of things?") as well as their current levels of stress (e.g., "How often have you felt nervous and 'stressed'?"). Participants were prompted to think about how they have felt in the past

TABLE 1 Descriptive statistics, Cronbach alphas, and bivariate associations between all model variables

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	
1. Cov Wor	—																						
2. Age	.157*	—																					
3. Sex	-.039	-.138	—																				
4. Race	.190*	-.011	$\chi^2(1) = .549, ns$	—																			
5. SES	-.089	-.228*	.104	-.031	—																		
6. MEdu	-.109	-.205*	-.096	-.082	.368*	—																	
7. DEdu	-.065	-.100	.066	.022	.230*	.453*	—																
8. SOP T1	.175*	-.005	-.065	.007	.031	.168*	.172*	—															
9. SOP T2	.178*	-.043	-.057	-.017	.230*	.113	.089	.703*	—														
10. SOP T3	.123	-.082	-.146	-.072	.030	-.024	-.042	.668*	.753*	—													
11. SPP T1	.172*	.009	.079	.064	.015	-.186*	.041	.356*	.374*	.355*	—												
12. SPP T2	.291*	.093	.128	.125	.074	-.135	.061	.337*	.505*	.412*	.675*	—											
13. SPP T3	.190*	.134	.007	.100	.030	-.097	-.083	.459*	.491*	.650*	.618*	.590*	—										
14. DEP T1	.151*	-.011	-.160*	.105	-.181*	-.040	.031	.301*	.302*	.245*	.332*	.292*	.344*	—									
15. DEP T2	.202*	.039	-.204*	.138	.074	.021	.001	.203*	.339*	.299*	.228*	.341*	.380*	.664*	—								
16. DEP T3	.308*	-.003	-.325*	.005	-.162*	-.041	-.097	.220*	.284*	.247*	.225*	.175*	.339*	.573*	.591*	—							
17. ANX T1	.149*	-.084	-.334*	-.003	-.152	-.001	.049	.284*	.264*	.190*	.216*	.130	.265*	.609*	.484*	.574*	—						
18. ANX T2	.227*	.145	-.500*	.016	-.069	.081	.004	.259*	.335*	.342*	.122	.115	.238*	.495*	.561*	.626*	.730*	—					
19. ANX T3	.253*	.128	-.377*	-.008	-.242*	-.094	-.071	.300*	.341*	.349*	.154	.187*	.341*	.521*	.475*	.624*	.642*	.768*	—				
20. Stress T1	.109	-.014	-.304*	.023	-.102	.022	.021	.276*	.284*	.309*	.297*	.313*	.354*	.758*	.596*	.537*	.614*	.534*	.546*	—			
21. Stress T2	.326*	.088	-.312*	.064	.015	-.043	.001	.196*	.289*	.322*	.270*	.357*	.324*	.554*	.745*	.615*	.509*	.619*	.521*	.611*	—		
22. Stress T3	.110	-.118	-.246*	-.063	-.082	.077	-.024	.301*	.380*	.371*	.097	.190	.276*	.552*	.515*	.557*	.515*	.562*	.530*	.643*	.587*	—	
M	3.35	17.96	80.2% female	78.5% female	2.88	2.57	2.57	41.40	41.37	41.03	28.47	29.00	29.80	11.27	10.61	14.30	4.93	4.69	4.85	20.87	19.81	22.85	
SD	0.88	1.23	n/a	n/a	0.85	0.63	0.63	8.12	8.02	9.14	8.33	8.42	7.83	6.08	6.40	6.49	3.11	3.13	3.23	6.26	6.57	6.48	
α	.57	n/a	n/a	n/a	n/a	n/a	n/a	.88	.86	.91	.91	.90	.89	.87	.88	.88	.84	.85	.86	.98	.99	.99	

Note: T1 = pre-pandemic; T2 = first government-mandated lockdown; T3 = second government-mandated lockdown; Sex: -1 = female, 1 = male; RACE: -1 = white, 1 = non-white. Chi-square tests of independence were conducted to test for associations between two dichotomous variables. Abbreviations: ANX, anxiety; Cov Wor, COVID worries; DEP, depressive symptoms; F EDU, father's education; M EDU, mother's education; n/a, not applicable; SES, socioeconomic status; SOP, self-oriented perfectionism; SPP, socially prescribed perfectionism.

* $p < .05$.
[†] $p < .06$.



month. Item responses were provided on a 5-point Likert scale ranging from 0 (*never*) to 4 (*very often*). Total scores were computed by calculating the sum and potential scores ranged from 0 to 40. The 10-item PSS has demonstrated adequate validity and reliability across a range of populations (see Lee, 2012), including in adolescent samples (e.g., Liu et al., 2020).

COVID worries

Participants reported their level of worry about catching COVID-19, their family's finances during the pandemic, and their family's health during the pandemic on a scale ranging from 1 (*not at all worried*) to 5 (*extremely worried*). The mean score of these items reflected participants' average levels of COVID worries. This assessment was at the third time point.

Procedure

Community adolescents between the ages of 13 and 19 years were recruited through a variety of methods, including live presentations, social media advertisements, and posts on online classified advertising websites (e.g., Kijiji). Participants were invited by email to complete online surveys spaced approximately 4 months apart. We sent participants anonymous links to the surveys using Qualtrics XM online survey software (Qualtrics). Ethical clearance from the university ethics board was granted and, consistent with that clearance, consent was given by participants 18 years and older, whereas parental consent and child assent were obtained for younger participants. Participants received a gift card and were entered into a draw for an iPad for each completed survey. Participants received a \$15 gift card for their Time 1 survey, a \$15 gift card for their Time 2 survey, and a \$20 gift card for any subsequent surveys completed.

RESULTS

Analytic strategy

We analyzed our data with multilevel models using the lme4 package (Bates et al., 2015) in R v. 4.0.1 (R Core Team, 2020) with an unstructured covariance matrix and Satterthwaite degrees of freedom. Our intraclass correlations for depression ($ICC = .54$), anxiety ($ICC = .72$), and stress ($ICC = .60$) indicated that outcome variables from the same individual were clustered together, and thus should be accounted for in our analyses. We conducted two-level models with a random intercept for each participant, allowing the average amounts of each outcome to vary between

individuals. We included time and time-squared (when relevant) to account for any third variables that may covary with time as a fixed effect. We also entered time as a random slope to allow for different trajectories over time when possible (Bolger & Laurenceau, 2013). In all models, 0 represented our pre-pandemic time point. For all models, we modeled a random intercept for each adolescent.

To facilitate the interpretation of intercepts in our analyses, we subtracted the grand mean of our predictor variables across participants and time points from each score (grand-mean centering). Because our predictors (SOP and SPP) varied both between- and within-participants, we created a between-person version of the predictor variable by centering each individual's responses on the grand mean and then calculating each individual's mean across their responses, and a within-person version of the predictor variables by centering each individual's responses on their own mean (i.e., person-mean centering). We entered both versions of our two predictors into our models to examine the between- and within-person effects simultaneously. Categorical covariates such as race and sex were entered as effects-coded variables. All other variables were grand-mean centered.

For each outcome, we first reported results from base growth curve models (i.e., only time in the model). Second, we described results from models testing whether SOP and SPP predicted psychological distress (i.e., depressive and anxiety symptoms) and perceived stress. Third, we tested whether perceived stress mediated associations between multidimensional trait perfectionism and psychological distress. These analyses were conducted using 1-1-1 unconfined multilevel mediation models in MPlus (Preacher et al., 2010) while controlling for the other dimension of perfectionism and time. No other covariates were included.

We found that the mean for COVID worries was above the scale midpoint, and there was limited variability in this measure ($M = 3.35$, $SD = 0.88$), suggesting that most participants perceived the pandemic to be stressful. Consequently, it was not possible to test whether COVID worries moderated the degree to which perfectionism was associated with psychological distress because we could not examine conditions under which stress was very low or absent. Thus, we treated COVID worries as a potential covariate. Specifically, we assessed potential covariates and those that were not statistically significant were trimmed from the model to improve model parsimony and stability (Raudenbush & Bryk, 2002). In these models, sex and COVID worries were the only significant covariates, $ts > 2.27$, $ps < .025$. Finally, we presented results without covariates and noted differences when relevant covariates such as sex and COVID worries were included.

For all results, we reported effect sizes as r s. Using the conventions outlined by Cohen (1992), we

considered $r_s \leq .10$ to be small, $r_s \leq .30$ to be medium, and $r_s \leq .50$ to be large. We also reported bootstrapped confidence intervals with 5000 resamples for coefficient estimates.

Descriptive statistics and bivariate associations

Descriptive statistics, reliabilities for each measure, and bivariate correlations are presented in [Table 1](#). Notably, before the onset of the pandemic, 54% of our sample met or surpassed the cutoff for significant depression (i.e., a total score of 10 on the CES-D). This dropped slightly during the first lockdown (49%). However, depression symptoms appeared to worsen by the second lockdown, with 77% of the sample meeting or surpassing the cutoff for significant depression at the third time point. In contrast, there appeared to be a relatively equal number of adolescents indicating severe anxiety problems (T1: 14.5%; T2: 13.8%; T3: 16%), moderate anxiety problems (T1: 29.4%; T2: 30.9%; T3: 30.7%), average levels of anxiety (T1: 48.1%; T2: 42.1%; T3: 40.7%), and below average levels of anxiety (T1: 8.0%; T2: 13.2%; T3: 12.6%), at each time point.

Concerning trait perfectionism, the majority of adolescents in our sample scored above established normative levels for SOP at each time point. The proportion of adolescents surpassing these norms decreased slightly across time points, although remained quite high (T1: 93.7%; T2: 92.2%; T3: 89.7%). Furthermore, more than half of our sample had scores above normative levels of SPP before the onset of the pandemic (63.44%). This proportion increased steadily across time points, with 65.6% and 71.1% of the sample surpassing normative levels of SPP at the first and second lockdowns, respectively. Note that these are not clinical cutoffs; comparisons to normative levels of perfectionism are presented here to offer the present findings more context, rather than to indicate clinical levels of perfectionism.

With respect to the key model variables, results indicated that individuals with more COVID worries reported higher levels of SOP, SPP, depressive symptoms, anxiety, and levels of perceived stress. Girls reported comparatively higher levels of depressive and anxiety symptoms as well as levels of perceived stress at all study time points than did boys. Race was not related to any model variables. SES was positively associated with SOP at Time 2. SES was negatively associated with depressive symptoms at Times 1 and 3, and with anxiety at Time 3. Maternal education was positively associated with SOP at Time 1 and negatively associated with SPP at Time 1. Paternal education was positively associated with SOP at Time 1. SOP at Time 1 was positively associated with SOP, SPP, depressive and anxious symptoms at all time points. SPP at Time 1 was positively related to depressive and anxiety symptoms at all time points. In sum, both SOP and SPP were associated with higher levels

of depressive and anxiety symptoms at each time point and over time. Depressive and anxious symptoms were positively associated with one another at all time points. Finally, perceived stress at Times 1 and 2 were positively related to SOP, SPP, depression, and anxiety at each time point. Perceived stress at Time 3 was linked to SOP, depression, and anxiety at each time point and to SPP at the third time point only.

Perfectionism over time

We examined whether SOP and SPP changed over the course of the study by fitting the data to a growth curve model (see [Figure 1](#)). Time was included as a fixed predictor. These models did *not* include a random slope of time because models with a random slope of time did not fit the data better than a random-intercept only model, $\chi^2_s < 4.77$, $ps > .189$. For SPP, there was a significant linear upward trend, $b = 0.71$, $CI_{95\%} [0.154, 1.290]$, $SE = 0.29$, $t(285.11) = 2.45$, $p = .015$, $r = .14$, indicating that SPP increased over the course of the study. In contrast, there was no significant effect of time for SOP, $b = -0.11$, $CI_{95\%} [-0.690, 0.469]$, $SE = 0.29$, $t(156.90) = -0.38$, $p = .705$, $r = .03$. In sum, these findings suggest that adolescents reported greater levels of SPP over the course of the pandemic, but no changes in SOP.

Depressive symptoms

To test whether depressive symptoms changed over the course of the study, we fitted the data to a growth curve model. Time was included as a fixed predictor and a random slope. We also included time-squared as a fixed predictor only to test a quadratic growth model. There was a significant linear downward trend for depression, $b = -2.36$, $CI_{95\%} [-3.897, -0.832]$, $SE = 0.78$, $t(176.89) = -3.03$, $p = .003$, $r = .22$, indicating that depression decreased over time. The random intercepts and random slopes were also correlated, $r = -.14$ such that individuals who reported higher levels of depression pre-pandemic also tended to experience slower declines in depression over time. However, there was also a significant acceleration rate (i.e., effect of time-squared), $b = 1.96$, $CI_{95\%} [1.209, 2.704]$, $SE = 0.38$, $t(156.83) = 5.15$, $p < .001$, $r = .38$, indicating that at each subsequent time point, the slope of time increased by 1.96. As shown in [Figure 1](#), there was an initial decline in depression from before the pandemic to the first lockdown followed by an increase in depression from the first to the second lockdown.

There were significant between and within-person effects of SPP (see [Table 2](#) for full results). Adolescents who had higher average levels of SPP were more depressed compared to those with lower average SPP (between-person effect). Similarly, when adolescents experienced

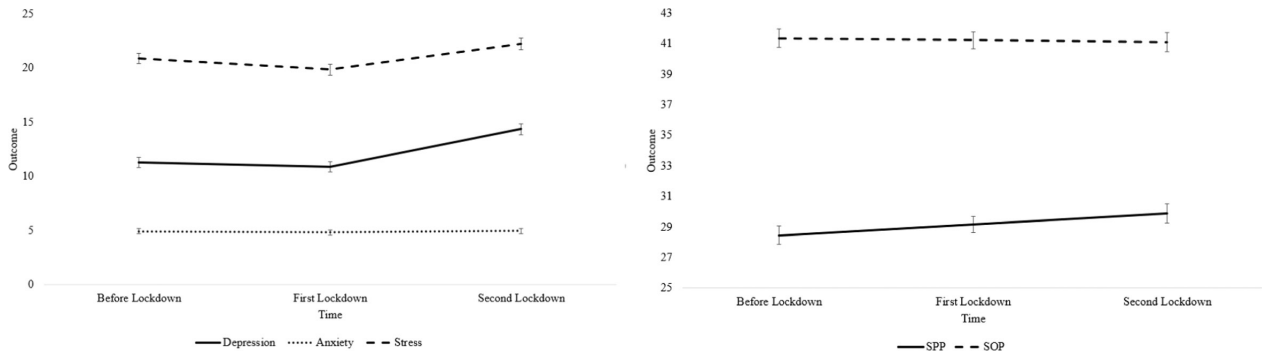


FIGURE 1 Anxiety, depression, and trait perfectionism means over time. *Note:* Error bars represent standard errors. Before Lockdown measurements were collected prior to March 12, 2020. First Lockdown measurements were collected between March 13 and July 24, 2020. Second Lockdown measurements were collected between December 26, 2020 and February 7, 2021; SOP, self-oriented perfectionism; SPP, socially prescribed perfectionism

an increase in SPP relative to their own mean at any given time point, they reported an increase in depressive symptoms as well (within-person effect). The between-person, $b = 0.24$, $CI_{95\%} [0.122, 0.360]$, $SE = 0.06$, $t(159.52) = 3.95$, $p < .001$, $r = .30$, and within-person, $b = 0.11$, $CI_{95\%} [0.000, 0.214]$, $SE = 0.05$, $t(232.27) = 1.97$, $p = .050$, $r = .13$, associations between SPP and depressive symptoms held even after controlling for sex and COVID worries. There was also a significant between-person effect of SOP such that adolescents who had higher average levels of SOP were more depressed than those with lower average levels of SOP. However, this effect was no longer statistically significant when we accounted for the effects of sex and COVID worries, $b = 0.11$, $CI_{95\%} [-0.001, 0.229]$, $SE = 0.06$, $t(157.08) = 1.94$, $p = .054$, $r = .15$. There were no significant within-person effects of SOP with respect to depression.

Anxiety symptoms

To test whether anxious symptoms changed over the course of the study, we fitted the data to a growth curve model. Time was included as a fixed predictor and a random slope. There was no significant linear trend for anxiety, $b = 0.00$, $CI_{95\%} [-0.203, 0.212]$, $SE = 0.11$, $t(167.32) = 0.04$, $p = .966$, $r = .00$ (see Figure 1). However, the random-intercepts and random slope of time were correlated, $r = -.21$, such that individuals who reported higher anxiety before the pandemic experienced slower declines in anxiety over time. Although there was no significant fixed effect of time, this linear growth curve model fit the data better than a no growth (i.e., random intercepts only) model, $\chi^2(3) = 10.84$, $p = .013$. Thus, we included time as a fixed predictor and a random slope in subsequent models. We also tested whether a quadratic growth model would fit the data better by including time-squared as a fixed-effect predictor only. It did not fit the data better and was thus not included in subsequent models, $\chi^2(1) = 0.64$, $p = .425$.

There were significant between-person and within-person effects of SOP (Table 2 for full results). Adolescents

who were on average higher on SOP than adolescents who were on average lower on SOP were more anxious (between-person effect). Similarly, when adolescents experienced an increase in their SOP relative to their own mean at any given time point, they reported increases in anxiety as well (within-person effect). The between-person, $b = 0.10$, $CI_{95\%} [0.044, 0.161]$, $SE = 0.03$, $t(155.87) = 3.43$, $p = .001$, $r = .26$, and within-person, $b = 0.06$, $CI_{95\%} [0.013, 0.109]$, $SE = 0.02$, $t(230.89) = 2.49$, $p = .013$, $r = .16$, associations between SOP and anxiety held even after controlling for sex and COVID worries. There were no significant between-person or within-person effects of SPP with respect to anxiety. However, the between-person effect of SPP became statistically significant after accounting for the effects of sex and COVID worries, $b = 0.06$, $CI_{95\%} [0.005, 0.125]$, $SE = 0.03$, $t(157.83) = 2.11$, $p = .037$, $r = .17$. Specifically, relative to those lower in SPP, adolescents higher in SPP were more anxious.

Stress

To test whether perceived stress changed over the course of the study, we fitted the data to a growth curve. Time was included as a fixed predictor but did *not* include a random slope of time because the model with a random slope of time did not fit the data better than a random-intercept only model, $\chi^2(3) = 4.54$, $p = .209$. There was a significant upward linear trend for stress in this model, $b = 0.50$, $CI_{95\%} [0.019, 0.990]$, $SE = 0.25$, $t(284.28) = 2.04$, $p = .042$, $r = .12$, such that stress increased over time. Finally, we tested a quadratic growth model. There was also a significant acceleration rate (i.e., effect of time-squared), $b = 1.69$, $CI_{95\%} [0.867, 2.515]$, $SE = 0.42$, $t(288.95) = 4.02$, $p < .001$, $r = .23$, indicating that at each subsequent time point, the slope of time increased by 1.69. As shown in Figure 1, there was an initial decline in stress from before the pandemic to the first lockdown followed by an increase in stress from the first to the second lockdown.

There were significant between-person effects of SOP and SPP (see Table 2 for full results). Adolescents who

TABLE 2 Multilevel model analyses testing the between-person and within-person association between self-oriented and socially prescribed perfectionism and psychological distress (i.e., depression and anxiety)

Predictors	Depression	Anxiety	Stress
Between-person associations			
Self-oriented perfectionism	$b = 0.12$ (0.06) $CI_{95\%}$ [0.003, 0.228] $p = .046$, $r = .15$	$b = 0.10$ (0.03) $CI_{95\%}$ [0.041, 0.165] $p = .001$, $r = .24$	$b = 0.16$ (0.06) $CI_{95\%}$ [0.042, 0.273] $p = .008$, $r = .19$
Socially prescribed perfectionism	$b = 0.23$ (0.06) $CI_{95\%}$ [0.116, 0.344] $p < .001$, $r = .28$	$b = 0.04$ (0.03) $CI_{95\%}$ [-0.018, 0.107] $p = .163$, $r = .10$	$b = 0.21$ (0.06) $CI_{95\%}$ [0.093, 0.327] $p = -.001$, $r = .25$
Within-person associations			
Self-oriented perfectionism	$b = 0.09$ (0.06) $CI_{95\%}$ [-0.019, 0.200] $p = .102$, $r = .10$	$b = 0.07$ (0.02) $CI_{95\%}$ [0.023, 0.113] $p = .003$, $r = .18$	$b = 0.06$ (0.06) $CI_{95\%}$ [-0.051, 0.167] $p = .300$, $r = .06$
Socially prescribed perfectionism	$b = 0.11$ (0.05) $CI_{95\%}$ [0.005, 0.208] $p = .041$, $r = .13$	$b = -0.01$ (0.02) $CI_{95\%}$ [-0.052, 0.032] $p = .620$, $r = .03$	$b = 0.06$ (0.05) $CI_{95\%}$ [-0.042, 0.167] $p = .245$, $r = .07$
Time effects			
Time	$b = -2.84$ (0.78) $CI_{95\%}$ [-4.361, -1.324] $p < .001$, $r = .28$	$b = -0.05$ (0.11) $CI_{95\%}$ [-0.269, 0.174] $p = .677$, $r = .04$	$b = -2.73$ (0.83) $CI_{95\%}$ [-4.351, -1.109] $p = .001$, $r = .19$
Time-squared	$b = 2.31$ (0.40) $CI_{95\%}$ [1.524, 3.086] $p < .001$, $r = .41$		$b = 1.68$ (0.42) $CI_{95\%}$ [0.862, 2.495] $p < .001$, $r = .23$

Note: The between- and within-person effect for a given predictor was always included in the same model, and the predictors were entered simultaneously. All analyses were run in R. *bs* are unstandardized multilevel modeling coefficients with standard errors appearing in parentheses. These models do not include covariates.

were on average higher on SOP than adolescents who were on average lower on SOP were more stressed (between-person effect). Adolescents who were on average higher on SPP than adolescents who were on average lower on SPP were more stressed (between-person effect). There was no significant within-person effect of SOP or SPP on stress. The between-person effect of SOP, $b = 0.14$, $CI_{95\%}$ [0.018, 0.256], $SE = 0.06$, $t(156.53) = 2.24$, $p = .026$, $r = .18$, and between-person effect of SPP, $b = 0.24$, $CI_{95\%}$ [0.114, 0.359], $SE = 0.06$, $t(159.06) = 3.74$, $p < .001$, $r = .28$, held even after controlling for sex and COVID worries.

Stress as a mediator

SPP

The between-person indirect effects for SPP were significant for both depression and anxiety: Individuals higher in SPP perceived greater stress than those lower in SPP, which, in turn, predicted greater depression and anxiety (see Table 3; Figure 2). Furthermore, although the total effect of SPP on depression was significant (see Table 2), the direct effect of SPP on depression was no longer significant when the indirect path through perceived stress was included. These results suggest that individuals higher in SPP perceived the pandemic to be more stressful than individuals lower in SPP, which, in turn, was associated with greater psychological distress.

Furthermore, these indirect effects held even after controlling for sex and COVID worries.

The within-person mediation effects were not significant for any of the models.

SOP

The between-person indirect effects for SOP were significant for both depression and anxiety: Individuals higher in SOP perceived greater stress than those lower in SOP, which in turn, predicted greater depression and anxiety (see Table 3; Figure 2). Although the total effects of SOP on depression and anxiety were significant (see Table 2), the direct effects for SOP on depression was no longer significant and the direct effect for SOP on anxiety was reduced when the indirect path through perceived stress was included. These results suggest that individuals higher in SOP perceived the pandemic to be more stressful than individuals lower in SOP, which, in turn, was associated with greater psychological distress. Furthermore, these indirect effects held even after controlling for sex and COVID worries.

The within-person mediation effects were not significant for any of the models.

DISCUSSION

To our knowledge, this empirical study is the first to investigate how within-person changes and between-person

TABLE 3 Summary of multilevel mediation analyses testing the between-person mediations whereby the socially prescribed perfectionism (SPP) and self-oriented perfectionism (SOP) predicts the degree to which individuals feel stressed, which, in turn, statistically accounts for psychological distress

Outcome	Mediation statistics			
	Perfectionism → perceived stress (<i>a</i> path)	Perceived stress → outcome (<i>b</i> path)	Perfectionism → outcome (<i>c'</i> path)	Indirect effect (<i>ab</i>)
SPP				
Depression	$b = 0.214$ (0.066) CI _{95%} [0.084, 0.343] $p = .001^{**}$	$b = 0.753$ (0.041) CI _{95%} [0.672, 0.834] $p < .001^{***}$	$b = 0.072$ (0.038) CI _{95%} [-0.003, 0.147] $p = .061$	$b = 0.161$ (0.051) CI _{95%} [0.062, 0.260] $p = .001^{**}$
Anxiety	$b = 0.214$ (0.066) CI _{95%} [0.084, 0.343] $p = .001^{**}$	$b = 0.334$ (0.030) CI _{95%} [0.276, 0.392] $p < .001^{***}$	$b = -0.028$ (0.026) CI _{95%} [-0.079, 0.023] $p = .283$	$b = 0.071$ (0.022) CI _{95%} [0.028, 0.115] $p = .001^{**}$
SOP				
Depression	$b = 0.148$ (0.064) CI _{95%} [0.022, 0.273] $p = .021^*$	$b = 0.753$ (0.041) CI _{95%} [0.672, 0.834] $p < .001^{***}$	$b = -0.003$ (0.040) CI _{95%} [-0.082, 0.076] $p = .944$	$b = 0.111$ (0.047) CI _{95%} [0.019, 0.204] $p = .018^*$
Anxiety	$b = 0.148$ (0.064) CI _{95%} [0.022, 0.273] $p = .021^*$	$b = 0.334$ (0.030) CI _{95%} [0.276, 0.392] $p < .001^{***}$	$b = 0.055$ (0.024) CI _{95%} [0.008, 0.102] $p = .023^*$	$b = 0.049$ (0.021) CI _{95%} [0.008, 0.090] $p = .018^*$

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

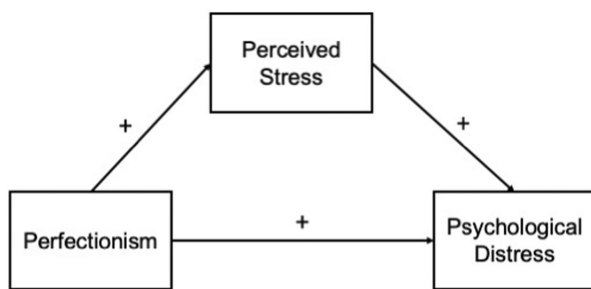


FIGURE 2 The between-person mediation model tested. The association between perfectionism and psychological distress is mediated by greater perceived stress.

differences in perfectionism were related to trajectories of psychological distress and examine the role that stress plays within these relations among a community sample of adolescents pre- to intra-pandemic. The present results mirror several other studies showing increases in psychological distress following the onset of the pandemic among young people (e.g., Barendse et al., 2021; Racine et al., 2021), but allow for a more nuanced assessment of change by examining trajectories of change among adolescents over a longer period of time during the pandemic. Indeed, an intriguing pattern emerged with respect to changes in depressive symptoms and stress from pre-pandemic to intra-pandemic. Specifically, depressive symptoms and levels of perceived stress decreased slightly from pre-pandemic to the first lockdown and then increased dramatically from the first to second lockdown. The increase in mean depressive symptoms between the first and second lockdowns is especially notable, given that it was larger than half a standard deviation and, as a result of this increase,

77% of our sample met or surpassed the cutoff for significant depressive symptoms by the second lockdown, compared to 49% at the first lockdown and 54% pre-pandemic. Overall, it is possible that the first lockdown offered adolescents a break from their usual schedules, temporarily alleviating depressive symptoms and stress. However, a growing sense of hopelessness and demoralization as the pandemic continued to unfold coupled with prolonged social isolation and feelings of uncertainty, uncontrollability, and helplessness during the second lockdown likely exacerbated depressive symptoms and levels of perceived stress among adolescents. This pattern of change in depressive symptoms underscores the importance of collecting multiple datapoints during the pandemic (Wade et al., 2020). Specifically, it highlights the importance of research examining the impact of and potential compounding effects of multiple lockdowns on the psychological well-being of adolescents, in line with findings suggesting that lockdowns may be particularly detrimental for young people (Barendse et al., 2021; Magson et al., 2021).

Contrary to our predictions, other results showed that anxious symptoms remained relatively stable across the study. These findings are consistent with some studies that failed to detect changes in anxiety pre-pandemic to intra-pandemic (e.g., Barendse et al., 2021), but are inconsistent with other studies that have documented pandemic-related increases in anxiety (e.g., Magson et al., 2021; Molnar et al., 2021; Racine et al., 2021). Perhaps changes in anxiety across the pandemic may be difficult to detect due to the multidimensional nature of anxiety. That is, some forms of anxiety (e.g., social anxiety) may have briefly decreased due to reduced social interaction, whereas other forms of anxiety (e.g., general

anxiety) may have increased due to high levels of uncertainty during the pandemic, resulting in zero net change (Barendse et al., 2021). Finally, anxiety was assessed with the RCMAS-Short Form (Reynolds & Richmond, 2008) which measures overall trait levels of anxiety. Whereas trait measures of anxiety are commonly used to assess anxiety among adolescents in longitudinal studies (e.g., Drazdowski et al., 2021) and are sensitive to change, it may have nonetheless hampered our ability to capture change in anxiety across the pandemic.

The present study also examined trajectories of trait perfectionism from pre-pandemic levels across the first two lockdowns. With respect to SPP, our findings demonstrated a slight increase as the pandemic progressed. These results provide preliminary support for Flett and Hewitt's (2020) notion that perfectionistic tendencies may be exacerbated by the pandemic. Specifically, Flett and Hewitt (2020) reasoned that individuals may intensify their perfectionistic ways as a coping mechanism to try and recapture a sense of control that individuals high in perfectionism need, especially during times of uncertainty, such as a pandemic. Notably, the increase in SPP across the study was quite small (i.e., 0.16 of a standard deviation). However, given the relative stability of this trait (i.e., test-retest correlation for T1 to T3 = .618) and the limited amount of time between the first and last time points included in the current study (i.e., approximately 8 months), this increase is quite striking. Indeed, a meta-analysis by Curran and Hill (2019) indicated that SPP among college students had increased by 0.90 of a standard deviation over 28 years and demonstrated the practical significance of this shift by highlighting that this represented an increase of 32% from the average level of SPP among college students in 1989. Furthermore, this meta-analysis indicated a significant shift in SOP over this period, evidenced by an increase of 0.12 standard deviations and a practical mean increase of 10%. Considering these findings, the fact that our results indicated an increase of 0.16 of a standard deviation in SPP over an 8-month period and that an additional 7.66% of our sample scored higher than established community norms for SPP at the third time point compared to the beginning of the study is quite concerning. Future work should continue to examine changes in trait perfectionism throughout the pandemic among adolescents with more time points to provide a more comprehensive assessment of the extent to which trait perfectionism may be shifting among youth and how these changes impact the health and well-being of young people.

Interestingly, changes in perfectionism across the pandemic were limited to SPP; no changes in SOP were detected. One trend that may help to explain these results is that young people are perceiving their parents to be more critical of them and to have higher expectations of them, compared to previous age cohorts, according to findings from a recent meta-analysis (Curran & Hill, 2022). This trend of higher perceived parental pressure to be perfect

combined with the fact that the current study focused on periods of government-mandated lockdowns, when adolescents were spending more time in close contact with their immediate family, could help to explain the rise in SPP, but not SOP.

Furthermore, the current work provides evidence to suggest that both between-person differences and within-person changes in trait perfectionism predict consequential outcomes among adolescents. More specifically, as expected, we found that adolescents who were higher, relative to those who were lower, in SPP across the pandemic felt more depressed and stressed (between-person effects). Furthermore, when adolescents experienced higher levels of SPP compared to their average levels of SPP, they also experienced relative increases in depressive symptoms (within-person effects). These findings corroborate vulnerability models of perfectionism (Hewitt et al., 2017), and offer preliminary support for the notion that multidimensional trait perfectionism may operate as a sensitizing factor (e.g., Wade et al., 2020) for psychological distress within the context of the COVID-19 pandemic. Flett and Hewitt (2020) highlight the potential reasons for increased depression among individuals higher in SPP during the pandemic including a sense of entrapment and lack of control, increased emotional and physical burnout, and increased social disconnection during social isolation measures, especially for those individuals higher in SPP who are prone to feeling disconnected from others.

Regarding SOP, adolescents higher in SOP reported higher levels of depression, anxiety, and stress than those lower in SOP and when adolescents experienced higher levels of SOP relative to their average SOP, they experienced relative increases in depressive and anxiety symptoms. Whereas some pre-pandemic studies have not detected links between SOP and psychological distress among youth (e.g., Asseraf & Vaillancourt, 2015) and others have found associations with better outcomes in this age group across time (e.g., Smith et al., 2018), our findings call into question interpretations that SOP may be healthy or adaptive, and instead support theoretical models that consider SOP to be a vulnerability factor for psychological distress (Hewitt & Flett, 1991; Hewitt et al., 2017), especially during times of stress (Hewitt & Flett, 2002), such as a global pandemic. Flett and Hewitt (2020) offer several explanations as to why the pandemic would be profoundly challenging for perfectionistic individuals and result in increased levels of psychological distress. For example, they postulated that individuals higher in SOP center their identities on their ability to achieve success and would therefore be experiencing additional barriers to their typical goal-directed behaviors during the pandemic, which would result in a sense of loss and identity crisis (e.g., "Who am I if I cannot achieve?").

Finally, this study examined the role of stress in links between trait perfectionism and psychological distress

across the pandemic among adolescents. Specifically, the goal was to test the role of pandemic-related stress (i.e., COVID worries) as a moderating factor and the role of perceived stress as a mediator; however, we were unable to test for moderation given the lack of variability in COVID worries. Indeed, the present results suggest that adolescents perceived the pandemic to be stressful and were concerned about their own health, their family members' health, and their family's finances during this time. Although this prevented us from testing the moderating role of pandemic-related stress, it is worth noting that the pandemic seemed to represent a significant stressor and had a relatively uniform effect on the adolescents included in our sample, at least during the second government-mandated lockdown in Ontario. This is disconcerting given the significant positive bivariate associations of COVID worries with depression and anxiety during the first and second lockdowns. Future work should continue to assess COVID worries as the pandemic and related restrictions continue to evolve. As restrictions continue to be lifted, some adolescents may become less stressed about the health-related and financial impacts of the pandemic, whereas others may become increasingly worried about these aspects (e.g., those who are chronically ill or have chronically ill family members). Researchers are also encouraged to use a more reliable measure of COVID worries such as the COVID-19 Anxiety Scale (Silva et al., 2020) given that the questions that we used were created for the purpose of this study and had a relatively low reliability (i.e., $\alpha = .57$).

Other analyses with a meditational focus showed that perceived stress emerged as an explanatory pathway linking SPP and SOP to both depression and anxiety at the between-person level. Specifically, adolescents higher in SPP and SOP perceived greater stress as the pandemic progressed, which helped to explain why these individuals were experiencing increased levels of depression and anxiety. This aligns with and extends pre-pandemic research with adult samples supporting the role of stress as an explanatory mechanism in the relation between trait perfectionism and psychological distress (e.g., Smith et al., 2020). Notably, to our knowledge, this is the first study to test this theoretical model among adolescents. Future work should continue to test this meditational hypothesis among teenagers using both pre-pandemic and intra-pandemic samples to help elucidate our understanding of how stress functions as an intermediary pathway between perfectionism and psychological distress.

Overall, the current work has several theoretical implications. First, although longitudinal designs are gaining more traction (e.g., Asseraf & Vaillancourt, 2015; Damian et al., 2017), most of our understanding of how perfectionism among adolescents is linked to psychological distress comes from cross-sectional research. Importantly,

the present work replicates previous work demonstrating longitudinal links between SPP and depression among adolescents (e.g., Asseraf & Vaillancourt, 2015; O'Connor et al., 2010). However, the present findings diverge from previous work that has failed to capture a longitudinal relation between SOP and psychological distress (e.g., Asseraf & Vaillancourt, 2015; Smith et al., 2018). Furthermore, although there are some studies with adult samples assessing within-person changes in perfectionism (e.g., Dunkley et al., 2014; Franche & Gaudreau, 2016), there is little work to date that has examined how within-person changes predict psychological distress among adolescents (see Boone et al., 2012, for exception). To our knowledge, this is the first study documenting how within-person fluctuations in perfectionism are linked to depression and anxiety among adolescents. The present work supports the utility of such methods and highlight a need for more complex and dynamic models of perfectionism when conducting research with adolescents. Finally, few longitudinal studies have examined explanatory mechanisms in the relation between perfectionism and psychological distress in teenagers. This study begins to address this gap. We found that adolescents higher in trait perfectionism were experiencing greater changes in depression and anxiety across the pandemic due to increased levels of perceived stress, which can inform prevention and intervention efforts.

At the practical level, it is evident that perfectionistic adolescents stand to benefit from treatment and counseling. Ideally, these interventions will involve preventive and proactive outreach efforts to perfectionistic adolescents who are likely quite distressed, both during the pandemic and post-pandemic, but who tend to be hesitant to seek support when they are struggling due to a proclivity to viewing their struggles as imperfections (Flett & Hewitt, 2014). Some practical recommendations for helping to reduce perfectionism among youth via targeted interventions include reframing failure and mistake experiences as learning opportunities and highlighting the difference between striving for excellence and pursuing perfection (Flett & Hewitt, 2014; Gaudreau et al., 2022). Furthermore, our results indicate that such interventions should focus on strategies to help manage and reduce stress among adolescents with perfectionistic tendencies. The promotion of a self-compassionate frame of mind is one way in which this may be achieved. Indeed, self-compassion is linked with lower levels of both perceived stress and physiological measures of stress (e.g., Arch et al., 2014; Finlay-Jones et al., 2015), suggesting that self-compassion may aid in disrupting the link between perfectionism and psychological distress by attenuating levels of stress. Furthermore, self-compassion represents a tenable target for intervention, given evidence supporting its malleable nature and lasting gains following intervention

in adolescents (e.g., Bluth & Eisenlohr-Moul, 2017). Finally, given the increase in SPP across the course of the present study, we echo the importance of taking a family-based approach to addressing perfectionism, and its associated costs and consequences (Flett & Hewitt, 2014). Such an approach is critical in aiding parents and caregivers in modeling positive coping strategies and reactions to setbacks, as well as in tempering their expectations for their children. This is important during the pandemic, in which public health recommendations may be leading adolescents to spend increased time with their parents, compared to pre-pandemic age cohorts.

Limitations and strengths

Limitations to the current work must be acknowledged. First, our study relied solely upon self-report measures. Although well-validated scales were employed to assess multidimensional trait perfectionism and psychological distress, associations among constructs may have been overestimated due to common method variance from reliance on single-source data. Thus, to assuage biases and to potentially strengthen the accuracy of the results, future research would benefit from the inclusion of a more extensive range of research designs, including the use of informant reports (e.g., Smith et al., 2021).

Second, a strength of our study was our focus on adolescents, a group with relatively high rates of perfectionism (e.g., Flett & Hewitt, 2022) and increased vulnerability to psychological distress both before (e.g., Copeland et al., 2011) and during the pandemic (e.g., Hyland et al., 2020; Lane et al., 2022). However, the current sample of adolescents was primarily white, female, and upper-middle class. Given findings showing disparities in the psychological impact of the pandemic with respect to race, sex, and social class (Barendse et al., 2021; Magson et al., 2021; Miconi et al., 2021), future research should continue to examine links between perfectionism and psychological distress in more diverse samples.

Finally, a strength of this study was that we were able to determine whether within-person and between-person differences in multidimensional trait perfectionism impact psychological distress across three meaningful time points (i.e., pre-pandemic and the first and second lockdowns). Examining adolescents' psychological responses during periods of strict government restrictions was especially important given that adolescents appear to be especially affected by the restrictions put in place to reduce the spread of the virus (Barendse et al., 2021; Magson et al., 2021). Nonetheless, reassessing links between trait perfectionism and psychological distress with additional time points later into the pandemic would be advantageous and provide a more rigorous investigation of how trait perfectionism impacts psychological distress

within the context of the pandemic, especially given the presence of nonlinear changes in psychological distress and the quick, and often unpredictable, changes of the pandemic itself.

CONCLUSION

This study both clarified and highlighted the impact of multidimensional trait perfectionism on adolescents' psychological responses to the pandemic and its related stressors. Specifically, adolescents higher in trait perfectionism have not been faring as well as those who are lower in trait perfectionism during the pandemic with respect to their mental health and levels of perceived stress. Our results support vulnerability models of perfectionism (Hewitt et al., 2017) such that adolescents who were elevated in SPP experienced greater depressive symptoms and levels of stress, whereas adolescents higher in SOP experienced greater depression, anxiety, and stress. Furthermore, we found that perceived stress mediated relations between trait perfectionism and psychological distress. Thus, we recommend that parents, educators, and mental health providers recognize that perfectionistic adolescents are particularly vulnerable to experiencing psychological distress during the pandemic and that this vulnerability may be due to heightened levels of stress during this unprecedented time.

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The data necessary to reproduce the analyses presented here are not publicly accessible. The analytic code necessary to reproduce the analyses presented in this paper is publicly accessible. Code is available at the following URL: <https://osf.io/j254p/>. The materials necessary to attempt to replicate the findings presented here are publicly accessible (with the exception of the Revised Manifest Anxiety Scale Short Form, which is copyrighted). Materials are available at the following URL: <https://osf.io/j254p/>. The analyses presented here were not preregistered.

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