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Major Article

Perfectionism, Anxiety, and Depressive Distress: Evidence for the Mediating Role of Negative Automatic Thoughts and Anxiety Sensitivity

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Abstract. Objective: This study assessed a mediational model in which negative automatic thoughts and anxiety sensitivity were hypothesized to mediate the relationship between perfectionism cognitions and depressive and anxiety symptoms. **Participants:** Participants were undergraduate students from an urban Canadian university. The data were collected from July 2009 to August 2010. **Methods:** In a cross-sectional evaluation, 992 undergraduate participants completed questionnaires that assessed perfectionism cognitions, negative automatic thinking, anxiety sensitivity, and anxiety and depressive symptoms. **Results:** Mediational analysis confirmed the role of anxiety sensitivity and negative automatic thoughts in mediating the association between perfectionistic cognitions, anxiety symptoms, and depressive distress. Furthermore, in line with previous studies, nearly a third of students displayed an elevated prevalence of anxiety and depressive symptoms. **Conclusions:** This study further clarified the associations and mediating relationships among mood states associated with perfectionism.

Keywords: anxiety sensitivity, maladaptive perfectionism, mediational analysis, mental health, negative automatic thoughts

In past years, increasing attention has focused on maladaptive perfectionism (MP) and its impact on student mental health and academic performance. MP is defined as the cognitive tendency to demand flawless performance and to perceive minor deviations from self-defined ideals as significant threats to self-esteem.¹⁻³ More specifi-

cally, it involves unrealistic self-expectations, persistent self-criticism, and all-or-nothing thinking when evaluating performance and self-worth.²⁻⁵ These perfectionistic tendencies have long been known to be risk factors for anxiety,^{6,7} eating,^{3,8} and depressive disorders.^{4,9,10}

Current research suggests perfectionistic thinking is a prevalent concern in academic settings.^{11,12} This may not be surprising, given the evaluative stressors of academia and the normative desire to perform well. However, in those manifesting MP, the desire for high-level performance is coupled with distorted cognitions that negatively affect academic performance and add to mental health burdens.^{13,14} In light of this, there have been many efforts to reduce perfectionism-related distress in university students using cost-effective interventions.¹⁵⁻¹⁸

In 2 previously published randomized controlled trials with university students demonstrating elevated perfectionistic cognitions,^{15,16} our research group found significant reductions in perfectionism cognitions, depression, and anxiety symptoms. These self-directed Web-based programs followed a cognitive-behavioral therapy approach where negative automatic thoughts were a primary modification target.¹⁹ This was in accord with the hypothesis that the cognitions of perfectionists, even when confronting minor variations from ideals, are susceptible to the dominance of negative automatic thoughts.²⁰ Our intervention approach further emphasized mindfulness meditation, which focused on reducing anxiety sensitivity. Anxiety sensitivity, the fear of anxiety symptoms, is based on beliefs in the harmful consequences of anxiety (eg, negative social evaluation when anxiety symptoms are outwardly displayed).^{21,22} Anxiety sensitivity was targeted following the perspective that individuals contending with MP attempt to avoid failure and

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resulting anxieties about failing, by focusing on achieving perfection at all costs.^{23,24} Elevated anxiety sensitivity can motivate perfectionists to seek perfection, in contrast to more realistic levels of achievement where reasonable degrees of failure are tolerated. Therefore, reductions in anxiety sensitivity could hypothetically result in more tolerance for failure and a more adaptive focus on realistic achievement levels.

Although our experience with randomized controlled trials was useful in evaluating the intact intervention approach, it did not prioritize which intervention components were the most important and effective. Thus, in further refining our intervention model, we sought to assess whether assumptions about the importance of negative automatic thoughts and anxiety sensitivity, particularly in depressive and anxiety symptomatology, were warranted using structural equation mediation–modeling methodology.

Accordingly, the current study empirically assessed the hypotheses that negative automatic thoughts and anxiety sensitivity mediate relationships between perfectionism cognitions and depression, and between perfectionism cognitions and anxiety symptoms. Identification of these cognitive mediators is theoretically and empirically important, as this goes beyond establishing variable associations to identifying hypothesized third variables that serve as underlying mechanisms for the associations observed.²⁵ As a result, mediators can potentially serve as empirically validated indications applicable to intervention research. In relation to the current study, mediation modeling tested whether negative automatic thoughts and anxiety sensitivity are appropriately emphasized in our intervention programming. Although mediational analyses via structural equation modeling are imperfect vehicles for understanding relationships between hypothesized variables, they are a consensually supported methodology for ascertaining mediation relationships.²⁶

METHODS

Participants

Participants were 992 undergraduate students enrolled in an introductory psychology course at York University in Toronto, Ontario, Canada. Upon consenting electronically via the Undergraduate Research Participant Pool secure system, they were administered a Web-based questionnaire package including measures of perfectionistic cognitions, negative automatic thoughts, anxiety sensitivity, and anxiety and depression. Participants were excluded if not fluent in the English language. They received course credit upon completing the study. Age of participants ranged between 17 and 63 years, with a mean age of 21.3. Overall, 227 males with a mean age of 21.6 and 761 females with a mean age of 21.2 participated. Furthermore, over 90% of participants were single and resided primarily in urban communities. Minimal amounts of missing data were found for both demographics and psychometric assessments. The study was approved by the research ethics protocols of the Human Participants Review Subcommittee of York University.

Procedure

Descriptive statistics including means, standard deviations, reliability indices, and Pearson correlations were calculated for all variables included in the model. In addition, because of variation in the age of participants, where applicable, using the median was considered as an alternative to group mean. Using AMOS (IBM SPSS, Chicago, Illinois), a structural model was constructed in which 2 variables, negative automatic thoughts and anxiety sensitivity, were tested for mediating the relationships between perfectionism cognitions and anxiety, and perfectionism cognitions and depression symptoms. Structural equation modeling enables researchers to simultaneously test multiple hypotheses in addressing direct and mediating relationships among variables.²⁶

Measures

Perfectionism Cognitions Inventory (PCI)

The Perfectionism Cognitions Inventory (PCI)²⁰ is a 25-item questionnaire that is designed to measure the frequency of perfectionist thinking. The PCI measures how often an individual engages in comparison-type cognitions focused on the discrepancies between one's current self and ideal self-schema. Participants are asked to indicate how often they experienced perfectionistic thoughts, such as "Why can't I be perfect" and "My work should be flawless" in the previous week on a 5-point Likert scale. The PCI has demonstrated adequate validity and reliability in addition to association with measures of psychological distress.²⁰ Furthermore, there has been no gender difference in mean PCI scores among males and females.²⁰

Automatic Thoughts Questionnaire (ATQ)

The Automatic Thoughts Questionnaire (ATQ)²⁷ is a 30-item questionnaire designed to assess the frequency of negative self-related automatic cognitions focused on (1) personal maladjustment and desire for change, (2) negative self-concepts and negative expectations, (3) low self-esteem, and (4) helplessness. The ATQ asks participants to rate the frequency of a representative sample of negatively themed cognitions in the past week on a 5-point Likert scale. Moreover, the ATQ has demonstrated high internal consistency, with an alpha coefficient of .97.²⁷

Anxiety Sensitivity Index (ASI)

The Anxiety Sensitivity Scale (ASI)²⁸ is a 16-item questionnaire designed to measure the fear of anxiety symptoms. Participants are asked to indicate the degree to which they think anxiety sensations cause embarrassment, illness, or further experience of anxiety on a 5-point Likert scale. The ASI has shown a high level of test–retest reliability of .75,²⁸ and internal consistency with a Cronbach's alpha of .88.²⁹

Beck Anxiety Inventory (BAI)

The Beck Anxiety Inventory (BAI)³⁰ is a 21-item questionnaire designed to assess anxiety symptoms. Participants are asked to rate how severely they have experienced anxiety

symptoms on a 4-point Likert scale during the past week. The BAI has demonstrated a high internal consistency and good test-retest reliability of .75 over a 1-week period. The scale has also shown a moderate degree of concurrent validity with other established anxiety measures, such as the revised Hamilton Anxiety Rating Scale.³⁰

The Center for Epidemiologic Studies Depression Scale (CES-D)

The Center for Epidemiologic Studies Depression Scale (CES-D)³¹ is a 20-item questionnaire that is designed to assess self-reported symptoms of depression in the past week. Respondents indicate the frequency of experiencing depressive symptoms in the previous week on a 4-point Likert scale. Studies have shown a high degree of reliability and validity for this scale, along with Cronbach’s alpha values of .85 and .90 for the general population and psychiatric populations, respectively.³¹ In addition, the CES-D has been deemed a suitable screening instrument for depressed mood amongst young adults and the elderly.^{32,33}

All scales were found to be internally consistent, with high alpha coefficients in accordance with behavioral research standards.³⁴

RESULTS

Descriptive Statistics

Table 1 outlines relevant psychometric characteristics of sample. Although participants varied in age and year of study, the sample was primarily composed of first-year and to a lesser extent second-, third-, and fourth-year university students. Moreover, nearly 33% exhibited elevated levels of depression symptoms on the CES-D according to the cutoff score of ≥ 24 that was previously used by Price and colleagues in a similar student population.³⁵ In general, 27%

of men and 35% of women exhibited a high degree of depressive symptoms. Approximately 33% of participants also exhibited moderate to high degrees of anxiety symptoms according to a cutoff established by Beck and Steer.³⁶ Overall, 8% of men and 15% of women displayed a high degree of anxiety on the BAI. Finally, no differences in scale means were observed among different age groups in the study.

Means, Standard Deviations, and Scale Intercorrelations

Means, standard deviations, scale intercorrelations, and Cronbach’s alpha values are also presented in Table 1. Scores on the depression ($r = .43, p < .01$), negative automatic thoughts ($r = .51, p < .01$), anxiety ($r = .36, p < .01$), and anxiety sensitivity ($r = .41, p < .01$) scales were all significantly and positively correlated with the perfectionism measure. In addition, moderately strong correlations were observed between the measures of anxiety and depression ($r = .67, p < .01$), and the measures of anxiety and anxiety sensitivity ($r = .61, p < .01$). Because of sample size and possible variations in scores among participants, mean scores for all scales were compared with the median to arrive at a better representation of sample characteristics. All means and medians for study measures were compared and were in reasonably close range with a slight indication of positive skew.

Research Model

Data Screening

Although scores on the PCI were normally distributed, scores on the ASI, ATQ, CES-D, and BAI were positively skewed. The skewness was treated by transforming variables: the ASI, CES-D, and BAI were log transformed, and an inverse transformation was applied to the ATQ. Cook’s distance was used to determine if any cases had an extreme

TABLE 1. Score Stratifications, Means (M), Standard Deviations (SD), Internal Consistencies (α), and Correlations Among Variables (N = 992)

Measure	Score	n	%	M	SD	α	1	2	3	4	5
1 Perfectionism Cognitions Inventory (PCI)	≤ 66 Normal	743	74.9	52.4	19.0	.93	—				
	> 66 High	249	25.1								
2 Automatic Thought Questionnaire (ATQ)				63.6	26.3	.97	.51*	—			
3 Center for Epidemiologic Studies Depression Scale (CES-D)	< 16 Low	426	42.9	19.4	10.9	.79	.43*	.75*	—		
	16–23 Moderate	240	24.2								
	≥ 24 High	326	32.9								
4 Beck Anxiety Inventory (BAI)	0–9 Normal	371	37.4	15.4	11.6	.93	.36*	.56*	.67*	—	
	10–18 Mild	295	29.7								
	19–29 Moderate	194	19.6								
	30–63 High	132	13.3								
5 Anxiety Sensitivity Scale (ASI)				22.4	11.5	.87	.41*	.49*	.52*	.61*	—

*p < .01 level (2-tailed test).

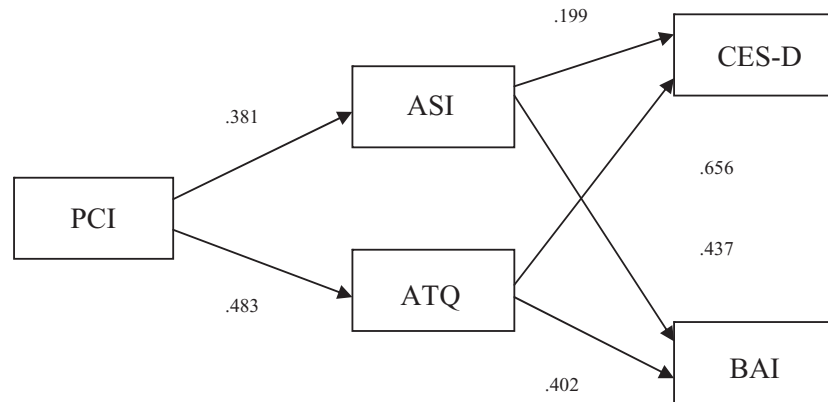


FIGURE 1. Mediated structural model depicting standardized path coefficients in the relationship between Perfectionism Cognitions Inventory (PCI), Center for Epidemiologic Studies Depression Scale (CES-D), and the Beck Anxiety Inventory (BAI). Note. ASI = Anxiety Sensitivity Scale; ATQ = Automatic Thoughts Questionnaire.

influence on the coefficients. Using separate linear models for depression and anxiety, 146 cases were found to have an extreme influence on the coefficients, using a cutoff of $4/N$, and were therefore removed. A sensitivity analysis, however, revealed no change in the statistical significance of any of the coefficients when the analysis was run on the full data set. No issues were detected with respect to linearity or homoscedasticity.

Furthermore, as with many predictive relationships identified by constructs measured via psychometric self-reports, questions arise as to whether the predictive relationship between the ATQ and CES-D is observed because of items with overlapping content. Specifically, the question is whether the items employed reflect experiences so semantically similar that a singular phenomenon is being described rather than 2 different phenomena that are predictably linked. We explored each item of the ATQ and CES-D on purely theoretical grounds and correlations to identify scale items that could be judged as overlapping. Altogether, we identified 2 overlap candidates that we prioritized while assessing all possible Pearson r correlations. The overlap candidates did not have stronger correlations than other items and when they were deleted, the relationships between the PCI, ATQ, and CES-D remained the same. This supported our perspective that the ATQ items represent cognitions that appear with varying frequencies in the lives of subjects without necessarily invoking mood states that extend beyond the experiences reflected in the negative cognition. In contrast, the CES-D is based on cognitions and feelings that describe a consistently dominant depressed mood, or its absence. Theoretically, then, a negative automatic thought could regularly occur without causing depressive distress.

Mediation Model

Structural equation modeling was used to assess whether anxiety sensitivity or automatic negative thoughts mediated the relationship between perfectionism cognitions and de-

pression, or between perfectionism and anxiety. The analyses were conducted using AMOS statistical software. The fit of the model was assessed using the likelihood ratio statistic, the comparative fit index (CFI),³⁷ and the root mean square error of approximation (RMSEA).³⁸ The model was deemed to fit well when $CFI > .95$ and $RMSEA < .05$.³⁹ The statistical significance of the specific indirect effects was assessed in AMOS using phantom latent variables to represent the simple mediation models of interest with bootstrap (10,000 samples)–generated standard errors.⁴⁰

Figure 1 presents the hypothesized mediation model. The model fit the data well, $\chi^2(N = 846, df = 2) = 1.913$, $p = .384$, $CFI = 1.000$, $RMSEA = .0001$. All of the paths in the model were statistically significant (see Figure 1 for the standardized coefficients). Each of the indirect relationships, from perfectionism to depression, and perfectionism to anxiety, was statistically significant; specifically, the indirect effect from perfectionism to depression through automatic negative thoughts was significant ($\beta = .317$, $p < .001$), the indirect effect from perfectionism to depression through anxiety sensitivity was significant ($\beta = .076$, $p < .001$), the indirect effect from perfectionism to anxiety through automatic negative thoughts was significant ($\beta = .192$, $p < .001$), and the indirect effect from perfectionism to anxiety through anxiety sensitivity was significant ($\beta = .167$, $p < .001$). Together, 59.5% of the variability in depression and 52.1% of the variability in anxiety was explained by the indirect effects.

COMMENT

In summary, our results can be interpreted as supporting the key role of negative automatic thoughts and anxiety sensitivity in mediating the relationship between perfectionistic cognitions and depression symptoms and between perfectionistic cognitions and anxiety symptoms. These results add to the increasing literature that helps explain why and when perfectionistic tendencies are maladaptive and what key

variables should be targeted in intervention approaches aimed at preventing and reducing negative MP effects.

We further explored the prevalence of depression and anxiety symptoms in a sample of mainly first-year university students at a large Canadian university and found that about 33% experienced moderate to high levels of depression and anxiety symptoms. This was in agreement with some other current estimates that show nearly 30% of postsecondary students experience significant psychological distress and anxiety symptoms.¹³ Although these elevations could represent normatively transient fluctuations in mood, increasing evidence suggests that university students are an at-risk population for depression and anxiety.¹⁴ Moreover, students are less likely to seek counseling and support because of the stigma of mental illness or because they perceive stress as a normal consequence of academic life.⁴¹

We evaluated a structural model where negative automatic thoughts (ATQ) and anxiety sensitivity (ASI) mediated the relationship between perfectionism cognitions (PCI) and depression (CES-D) and between perfectionism cognitions (PCI) and anxiety symptoms (BAI). This is theoretically relevant because it may help to distinguish between adaptive and maladaptive aspects of perfectionistic cognitions as well as help to improve the focus of interventional activities. Clinically, we have observed that MP often combines a normative aspirational component with a maladaptive demand component. More specifically, the simple desire to execute perfect performances is understandable and, to a degree, normative. However, the activation of a maladaptive demand for perfect performance skews the aspirational process and activates self-negating processes, recapitulating earlier reactions by parental or other authorities. Therefore, instead of self-demands to be perfect being reduced when perfection is not attained, such demands are intensified, with reactions to failure becoming self-deprecating. Theoretically, activation of negative automatic thoughts can define a boundary between adaptive and maladaptive perfectionistic tendencies. Whereas the PCI largely represents aspirational components of perfectionism, the ATQ highlights a departure to self-punitive reactions triggered by failures to attain self-demanded goals.

In our evaluation of anxiety sensitivity as a mediator of the relationship between perfectionism cognitions and depression, and between perfectionism cognitions and anxiety symptoms, the ASI score highlights an overreaction to anxiety that motivates extreme attempts at perfect performance. This overreaction can involve an acute sensitivity to evaluation, loss of control, and disapproval, fear of failure, and demand for perfect performance to avoid future panic and anxiety.²⁴ Our analysis further underscored the mediating role of anxiety sensitivity, suggesting that maladaptive perfectionists place more emphasis on avoiding anxieties brought about by failures than on simpler desires for superior performance.

Limitations

First, results from this study should be cautiously interpreted due to the tendencies of participants to engage in

socially desirable responding in psychometric assessments. Secondly, our results disproportionately represent females (77% of our participants were females). This aligns with our previous studies where similar gender imbalances were found, ranging from 70% to 72% of participants being females.^{15,16} Although the methodology employed, which involved students volunteering for participation, is not appropriate for determining the gender distribution of MP in the general population, or in students, our experience has thus far consisted of working with and finding a gender bias in MP. This study is no exception. Thirdly, a likely predictive relationship might be assumed between negative automatic thoughts (ATQ) and depression (CES-D), on the basis of both constructs emphasizing negative cognition. Nonetheless, other constructs that emphasize negative cognitions and judgments are not necessarily correlated. For example, the negative thoughts implicit in Minnesota Multiphasic Personality Inventory items useful in diagnosing schizophrenia would not be expected to correlate highly with self-judgments concerning nonpsychotic anxious and depressive states. Finally, as with other cross-sectional data, mediation cannot be regarded as evidence for definite causal relationships amongst variables. Therefore, structural models using cross-sectional data should be regarded as associations and hypothesized directional relationships in a theory-building endeavor. In this regard, future studies should seek to study mediation hypotheses longitudinally.

Conclusions

In conclusion, study results clarified the mediating relationships in cognitions and mood states associated with MP. This was the first study to demonstrate the mediating role of negative automatic thoughts and anxiety sensitivity in the association between perfectionistic cognitions and depressive distress, and between perfectionistic cognitions and anxiety. We specifically found that frequent experiences of negative automatic cognitions and anxiety sensitivity jointly mediated the association between perfectionism cognitions and depression and anxiety, highlighting the importance of these interventional focuses with maladaptive perfectionists. Furthermore, our descriptive results once again highlight the elevated prevalence of perfectionistic cognitions, depression, and anxiety symptoms amongst university students. In conclusion, in alignment with our previous intervention efforts, we suggest that addressing the reduction of negative automatic thoughts and anxiety sensitivity is a potentially effective strategy in reducing the impact of MP in postsecondary students.

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No funding was used to support this research and/or the preparation of the manuscript.

CONFLICT OF INTEREST DISCLOSURE

The authors have no conflicts of interest to report. The authors confirm that the research presented in this article

met the ethical guidelines, including adherence to the legal requirements, of Canada and received approval from the Human Participants Review Subcommittee of York University.

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NOTE

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