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SCHREYER HONORS COLLEGE

DEPARTMENT OF PSYCHOLOGY

Trait-level Perceived Job Discrimination Mediates Lower Coworker and Supervisor Support
Predicting Major Depressive Disorder and Generalized Anxiety Disorder 18 Years Later.

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SPRING 2024

A thesis
submitted in partial fulfillment
of the requirements
for baccalaureate degrees
in Psychology and Labor and Human Resources
with honors in Psychology

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ABSTRACT

Theorists have proposed a potential link between trait-level social support at work and adverse mental health outcomes. However, there has been a lack of empirical studies on the longitudinal relationship between these two variables and potential mediators that might account for their association. The current study investigated this longitudinal relationship by testing trait-level perceived job discrimination as a mediator of the relations between social support at work and future generalized anxiety disorder (GAD) and major depressive disorder (MDD) symptom severity. To test these hypotheses, participants (N = 3294) were surveyed at three time points, approximately nine years apart. Time 1 (T1) trait-level coworker and trait-level supervisor support, Time 2 (T2) trait-level perceived job discrimination, and Time 1 (T1) and Time 3 (T3) GAD and MDD severity were measured. GAD and MDD measured examined severity in the past year. Longitudinal structural equation modeling (SEM) mediation analyses showed that T2 trait-level perceived job discrimination significantly mediated the relations between lower T1 trait-level coworker and supervisor support and both T3 GAD and MDD severity. Lower T1 trait-level coworker and supervisor support predicted stronger T2 trait-level perceived job discrimination (Cohen's $d = -0.98$ to -0.56). Stronger T2 trait-level perceived job discrimination thereby predicted higher T3 GAD and MDD severity ($d = 0.53$ to 0.83). Findings emphasize the importance of considering perceived job discrimination in the relationship between social support at work and adverse mental health outcomes. Institutionally embedded interventions to enhance coworker/supervisor support and decrease perceived job discrimination might mitigate GAD and MDD symptoms and enhance employee well-being.

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ACKNOWLEDGEMENTS

I would like to thank everyone who made this honors thesis possible. First, I would like to thank Dr. Michelle Newman for her continuous support of my thesis and wonderful feedback throughout the process. Also, Dr. Nur Hani Zainal, a former graduate student in the Newman Laboratory, was instrumental in making this thesis possible. She was a knowledgeable mentor and taught me many things about research, data analysis, and writing I would have never learned otherwise. I thoroughly appreciate her willingness to explain new concepts to me, her encouragement for me to try things I've never done before, and her consistent communication throughout the whole thesis process. Finally, I would like to thank my honors advisor, Dr. Susan Simkins, for giving me insight into the world of industrial-organizational psychology. Her advice guided me through my last year of undergraduate study and encouraged me to push forward with my thesis until completion.

Chapter 1

Introduction

Major depressive disorder (MDD) and generalized anxiety disorder (GAD) are two of the most prevalent mental health disorders in adults in the US (Otte et al., 2016). MDD and GAD have been associated with chronic physical conditions (Carroll et al., 2009; Otte et al., 2016; Zainal & Newman, 2022), increased absenteeism, and decreased productivity at work (Wang et al., 2022). Further, depressed individuals have various disturbances in their social processing, making it difficult to engage in satisfying relationships with others (Kupferberg et al., 2016). Individuals with GAD also report lower quality of life, greater impairments in social relationships, and greater impairments at work than their non-anxious counterparts (Henning et al., 2007). Given the adverse consequences of these disorders, it is imperative to understand the longitudinal predictors of MDD and GAD.

A work environment lacking emotional and instrumental support from coworkers and supervisors may, over time, lead to heightened MDD and GAD symptom severity since work is a significant part of most working adults' lives. Coworkers and supervisors, especially, occupy much time in one's life, therefore making those relationships crucial to study. Theorists, such as Karasek and Theorell (1990), proposed that a connection exists between lower tendency to perceive social support at work and adverse mental health outcomes by hindering a positive sense of identity. Lower work-related trait-level social support might predict future heightened MDD and GAD through diminished life satisfaction (Trepte et al., 2015). Conversely, lower work-related social support could also promote increased use of active problem-solving and

effective regulation coping strategies over time (Fondacaro & Moos, 1987), protecting against GAD and MDD symptoms at a single time point and across long durations.

Consistent with these theories, empirical studies have found that increased supervisor support and associated factors (e.g., team cohesion) are linked to positive mental health outcomes, suggesting an association between higher social support at work and lower depression or anxiety symptoms (Hennein et al., 2021). Further, a recent study on non-healthcare workers in Japan found that reduced coworker support was related to more depressive and anxiety symptoms (Deguchi et al., 2022). Similarly, another empirical study found that lack of coworker support was salient in explaining depressive and anxiety symptoms in secondary school teachers (Mahan et al., 2010). Finally, though not specifically depression or anxiety, supervisor support has been found to significantly contribute to psychological well-being (Gilbreath & Benson, 2004). These cross-sectional studies support a straightforward link between higher coworker/supervisor support at work and increased depression and anxiety.

However, the lack of temporal precedence of these single time point studies precludes establishing weak causal inferences (Pearl, 2009). The theories and empirical data above highlight the possibility of coworker/supervisor support preceding and predicting increased MDD and GAD severity in a negative direction. Moreover, these studies underscore the importance of discovering the mechanisms via which lower coworker/supervisor support predicts future increased MDD and GAD symptoms across long durations to inform intervention targets and targeted interventions potentially.

One mechanism through which lack of work-related social support may predict greater MDD and GAD severity in the future could be trait-level perceived job discrimination. Theorists (Karasek & Theorell, 1990) posit that work-related social support facilitates a positive sense of

identity, which might buffer against perceived discrimination (Schmitt et al., 2014; Verkuyten, 1998). A higher tendency to perceive job discrimination could also mediate the relationship between work-related social support deficits and future heightened MDD and GAD by discouraging a sense of belonging or similarity among coworkers (Avery et al., 2008) and increasing self-stigma (Mueller et al., 2006; Stuber et al., 2008). Also, work-related social support deficits might predict greater MDD and GAD severity via perceived job discrimination due to cumulative and heightened dysregulated stress over long durations (Taylor & Turner, 2002). Collectively, perceived job discrimination might be a mediator via which work-related social support deficits might precede and predict elevated MDD and GAD severity.

Several longitudinal studies have found that perceived discrimination prospectively predicted higher depression or anxiety symptoms (Qin et al., 2020; Stein et al., 2019; Stein et al., 2016) and reduced psychological well-being (Jasinskaja-Lahti et al., 2007). Though these studies did not focus on workplace settings, it is plausible that these findings might be extended to perceived job discrimination. Indeed, three other prospective studies replicated the pattern that perceived discrimination at work predicted elevated depressed mood (Han et al., 2022; Marchiondo et al., 2019; Pavalko et al., 2003). In addition, no prospective studies have directly examined the link between GAD symptoms and trait-level perceived job discrimination.

Only one study, albeit with a cross-sectional design, has examined potential mediators underlying the relationship between work-related social support and a mental health outcome. Perceived job discrimination mediated the relationship between social support and psychological well-being (Jaguszyn, 2010). The present study thus aimed to remedy the cross-sectional limitation of this study with a three-wave longitudinal study design.

Based on the stated logic and evidence, we examined how trait-level perceived job discrimination might mediate the 18-year longitudinal association between lower trait-level coworker/supervisor support and future higher MDD and GAD severity. More specifically, we hypothesized that trait-level coworker/supervisor support would be negatively related to trait-level perceived job discrimination nine years later. Additionally, we hypothesized that trait-level perceived job discrimination would be positively associated with both GAD and MDD symptoms following nine years. Finally, we predicted that trait-level perceived job discrimination would significantly mediate the relationship between trait-level coworker support and GAD symptom severity (Hypothesis 1A), coworker support and MDD severity (Hypothesis 1B), supervisor support and GAD severity (Hypothesis 2A), and supervisor support and MDD severity (Hypothesis 2B).

Chapter 2

Methods

Participants

Data from the present study were retrieved from the publicly available Midlife Development in the United States (MIDUS) database. Data collection occurred in these three waves: 1995-1996 (T1), 2004-2005 (T2), and 2012-2013 (T3; Brim et al., 2019; Ryff et al., 2019; Ryff et al., 2017). Participants ($N = 3,294$) with data from all three waves were selected for this study. With an overall average age of 45.62 years ($SD = 11.41$, range = 20-74), 54.61% of participants were female, 44.84% were male, and 0.55% chose not to disclose their gender identity. Concerning race, 89.01% of participants identified as White, 3.25% as African American, and 7.73% as Native American, Asian, Pacific Islander, and others. Slightly less than half (42%) of individuals were college-educated.

Procedures

To assess GAD and MDD diagnostic symptom severity, participants consented to complete in-person clinical interviews at T1 and T3. Participants completed trait-level coworker/supervisor support measures at T1 only. Self-reports on trait-level perceived job discrimination were completed at T2.

Measures

GAD and MDD symptom severity. GAD and MDD scores were collected using the *World Health Organization's (WHO) Composite International Diagnostic Interview – Short Form (CIDI-SF; Kessler et al., 1998)*, which was based on the American Psychiatric Association (APA) *Diagnostic and Statistical Manual of Mental Disorders, Revised Third Edition (DSM-III-*

R; American Psychiatric Association, 1987) criteria. In addition to generating diagnostic status, the CIDI-SF produced continuous scales to measure GAD and MDD symptom severity.

GAD scores were based on 10 items linked to excessive and uncontrollable worry in the past 12 months. The 10 items were as follows: restless, keyed up/on edge, irritable, trouble falling asleep, trouble staying asleep, trouble keeping one's mind on tasks/activities, trouble remembering things, low on energy, tired easily, and sore or aching muscles because of tension. Each item's responses were coded so that responses ranged from 1 = *never* to 4 = *most days*. The final GAD symptom severity score was then constructed by taking the number of "most days" responses to the items, which created a continuum of scores from 0 = *lowest anxiety* score to 10 = *highest anxiety* score.

MDD scores were based on 7 items associated with both depressed affect and anhedonia in the past 12 months. The 7 items were as follows: losing interest in most things, feeling more tired/low on energy than usual, appetite loss, trouble falling asleep, trouble concentrating, feeling down/worthless, and thoughts of death. Each item's responses were coded as 1 = *Yes* and 0 = *No*. The final MDD symptom severity score was then constructed by taking the number of "Yes" responses to the items, which resulted in a continuum of scores from 0 = *lowest depression* to 7 = *highest depression*. CIDI-SF scores showed good internal consistency for the dimensional symptom scales (GAD ($\alpha = .89$) and MDD ($\alpha = .94$) herein) as well as good psychometric reliability and validity for GAD and MDD symptom severity (Kessler et al., 1999; Wang et al., 2000). CIDI-SF also showed good construct validity demonstrated by high specificity (93.9-99.8%) and high sensitivity (89.6-96.6%) for MDD and GAD (Kessler et al., 1999).

Trait-level coworker support. The coworker support scale was based on the social support scale from the Whitehall II Studies and consisted of two items (Rick et al., 2001): how

often helped/supported by coworkers and how often coworkers are willing to listen to one's problems. Responses were coded on a 5-point scale ranging from 1 = *never* to 5 = *all the time* and summed so that higher scores denoted stronger coworker support. Coworker support scores showed good internal consistency for the two-item scale ($\alpha = .71$) as well as good construct validity (Rick et al., 2001).

Trait-level supervisor support. The supervisor support scale was based on the social support scale from the Whitehall II Studies and consisted of three items: How often they obtained needed information from the supervisor, how often they were helped/supported by supervisor, and how often the supervisor was willing to listen to one's problems. Responses were coded on a 5-point scale ranging from 1 = *never* to 5 = *all the time* and summed so that higher scores indicated stronger supervisor support. Supervisor support scores showed good internal consistency for the three-item scale ($\alpha = .86$) and good construct validity (Rick et al., 2001).

Trait-level perceived job discrimination. The chronic job discrimination scale consisted of 6 items: How often they were unfairly given jobs, how often they watched more closely; how often supervisor used ethnic, racial, or sexual slurs/jokes; how often coworkers use ethnic, racial, or sexual slurs/jokes; how often they feel ignored by boss, and how often coworker with fewer qualifications promoted before them. Responses were recorded on a 5-point scale ranging from 1 = *all the time* to 5 = *never*. The chronic job discrimination score was constructed by summing the reverse-coded responses to all six items. Chronic job discrimination scores showed good internal consistency for the three-item scale ($\alpha = 0.76$).

Supplementary psychometric property analyses.

To our knowledge, no prior work has thoroughly determined the construct validity of the trait-level coworker support, supervisor support, and job discrimination scales. Therefore, we

decided to conduct those psychometric analyses. Regarding convergent validity, trait-level skill discretion (the degree to which an employee's unique abilities are utilized on the job; Karasek & Theorell, 1990) had significantly positive correlations with trait-level coworker support ($r = .509$) and supervisor support ($r = .403$), and job discrimination had a significant positive correlation with perceived inequality at work ($r = .547$) (all p values $< .001$). Concerning discriminant validity, the trait-level Loyola Generativity Scale scores (the willingness of a person to help promote the well-being of the next generation; McAdams & de St. Aubin, 1992) had significantly small and positive correlations with trait-level coworker support ($r = .155$), supervisor support ($r = .082$) and small, negative correlations with job discrimination ($r = -.160$) (all p values $< .001$).

Data analyses.

RStudio software was used with the *lavaan* R package (Rosseel, 2012) to conduct structural equation modeling (SEM) mediation analyses. Model fit was assessed using the confirmatory fit index (CFI; Bentler, 1990), Tucker-Lewis index (TLI; Tucker & Lewis, 1973), root mean square error of approximation (RMSEA; Steiger, 1990), and standardized root mean square residual (SRMR; Hu & Bentler, 1999). For the mediation analyses, we used the product of coefficients method of indirect effect ($a \times b$) for the regression coefficients of coworker or supervisor support predicting trait-level perceived job discrimination (a path) and trait-level perceived job discrimination predicting GAD or MDD severity (b path). We presented the unstandardized regression coefficients, standard errors, t -value, and p -value, and used bootstrapping with 10,000 resampling draws (Cheung and Lau, 2008). Mediation effect size was calculated by taking the proportion of the indirect effect ($a*b$) relative to the total effect, $c = a*b + c'$ (Cheung & Lau, 2008; Preacher & Kelley, 2011; Wen & Fan, 2015). In this study, this would

be the percentage of variance in the trait-level coworker/supervisor support-MDD/GAD severity relation explained by trait-level perceived job discrimination. The 11.8% of missing data was controlled by full information maximum likelihood (Graham, 2009). Finally, for each beta weight, Cohen's d effect size was calculated using the formula ($d = 2t/\sqrt{df}$) (Cohen, 1988; Dunlap et al., 1996). Small, moderate, and large effect sizes were signified by d values of 0.2, 0.5, and 0.8 respectively (Cohen, 1988).

Chapter 3

Results

T1 Trait-level coworker support predicting T3 GAD and MDD severity mediated by T2 trait-level job discrimination (Hypotheses 1A and 1B)

The model examining T2 trait-level job discrimination as a mediator of T1 trait-level coworker support predicting T3 GAD severity (Table 1; $\chi^2(df = 345) = 994.717, p < .001, CFI = .99, TLI = .99, RMSEA = .02, 90\% CI [0.02, 0.03], SRMR = .04$) and MDD severity (Table 2; $\chi^2(df = 204) = 725.087, p < .001, CFI = .98, TLI = .97, RMSEA = .03, 90\% CI [0.026, 0.03], SRMR = .04$) demonstrated good fit. For T3 GAD severity as the outcome, T1 trait-level coworker support was significantly negatively associated with T2 trait-level job discrimination ($\beta = -1.04, SE = 0.20, t = -5.17, p < .001, d = -0.56$). Additionally, T2 trait-level job discrimination was significantly positively associated with T3 GAD severity ($\beta = 0.17, SE = 0.03, t = 4.94, p < .001, d = 0.53$). The T1 trait-level coworker support \rightarrow T2 trait-level job discrimination \rightarrow T3 GAD severity indirect effect was also found to be significant ($\beta = -0.18, SE = 0.06, t = -3.09, p = .002, d = -0.33$). Similarly, for T3 MDD severity as the outcome, T1 trait-level coworker support was also significantly negatively related to T2 trait-level job discrimination ($\beta = -0.28, SE = 0.04, t = -6.93, p < .001, d = -0.97$), which correspondingly was significantly positively associated with T3 MDD severity ($\beta = 0.031, SE = 0.01, t = 5.94, p < .001, d = 0.83$). The T1 trait-level coworker support \rightarrow T2 trait-level job discrimination \rightarrow T3 MDD indirect effect was also significant ($\beta = -0.01, SE = 0.00, t = -4.33, p < .001, d = -0.61$). Therefore, Hypotheses 1A and 1B were fully supported.

T1 Trait-level supervisor support predicting T3 GAD and MDD severity mediated by T2 trait-level job discrimination (Hypotheses 2A and 2B)

The model examining T2 trait-level job discrimination as a mediator of T1 trait-level supervisor support predicting T3 GAD severity (Table 3; $\chi^2(df = 372) = 1178.282, p < .001$, CFI = .99, TLI = .98, RMSEA = .03, 90% CI [0.02, 0.03], SRMR = .04) and MDD severity (Table 4; $\chi^2(df = 225) = 771.917, p < .001$, CFI = .98, TLI = .97, RMSEA = .027, 90% CI [0.025, 0.029], SRMR = .04) demonstrated good fit. For T3 GAD severity as the outcome, T1 trait-level supervisor support was significantly negatively associated with T2 trait-level job discrimination ($\beta = -0.31, SE = 0.01, t = -9.46, p < .001, d = -0.98$). Additionally, T2 trait-level job discrimination was significantly positively associated with T3 GAD severity ($\beta = 0.15, SE = 0.02, t = 6.38, p < .001, d = 0.66$). The T1 trait-level supervisor support \rightarrow T2 trait-level job discrimination \rightarrow T3 GAD severity indirect effect was also found to be significant ($\beta = -0.05, SE = 0.00, t = -5.05, p < .001, d = -0.52$). Similarly, for T3 MDD severity as the outcome, T1 trait-level supervisor support was also found to be significantly negatively related to T2 trait-level job discrimination ($\beta = -0.25, SE = 0.03, t = -9.66, p < .001, d = -1.29$), which correspondingly was significantly positively associated with T3 MDD severity ($\beta = 0.03, SE = 0.01, t = 5.73, p < .001, d = 0.76$). The T1 trait-level supervisor support \rightarrow T2 trait-level job discrimination \rightarrow T3 MDD severity indirect effect was also significant ($\beta = -0.01, SE = 0.00, t = -4.87, p < .001, d = -0.65$). Thus, Hypotheses 2A and 2B were fully supported.

Chapter 4

Discussion

These results build upon previous literature on the relationship between trait-level coworker/supervisor support, perceived job discrimination, and MDD/GAD severity. Consistent with our hypothesis, we found that trait-level coworker/supervisor support negatively predicted future trait-level job discrimination, and trait-level job discrimination positively predicted subsequent MDD/GAD severity. Moreover, we observed a mediating effect of increased trait-level perceived job discrimination on the inverse 18-year relationship between trait-level coworker/supervisor support and MDD/GAD severity. To our knowledge, this is the first longitudinal analysis of trait-level job discrimination as a mediator of the social support at work MDD/GAD relationship. We propose potential explanations for these findings that future investigations could test to inform theory and optimal industrial-organizational practices.

Why did trait-level perceived job discrimination mediate the 18-year relations between lower trait-level coworker/supervisor support predicting worse future MDD and GAD symptom severity? Self-esteem and interpretation biases might explain these mediating effects. Plausibly, the negative relationship between trait-level coworker/supervisor support and perceived job discrimination may work through self-esteem. Increased levels of perceived support from colleagues and managers could increase one's feeling of value, boosting self-esteem over time. Prior studies consistently evidenced positive correlations between trait-level coworker/supervisor support and self-esteem (Lee, 2003; Tharenou, 1979), which might protect against high trait-level perceived job discrimination. With heightened trait-level self-esteem, one could perceive fewer behaviors as discriminatory and instead interpret the behaviors of

coworkers and supervisors adaptively. Although research on the relationship between trait-level self-esteem and perceived job discrimination is scarce, multiple studies have found that self-esteem was negatively related to perceived overall discrimination, possibly via stronger assertiveness and communication skills (Cassidy et al., 2005; Kobrynowicz & Branscombe, 1997). Consistent with this interpretation, a study found that perceived discrimination was related to both social support and self-esteem across 18 months (Cao et al., 2022). Future prospective panel studies could test these conjectures.

Alternatively, chronic mismanaged stress might explain why reduced trait-level coworker/supervisor support would predict increased GAD/MDD severity via elevated trait-level perceived job discrimination. Plausibly, deficits in emotion regulation (Hammen, 2005) and interpersonal skills contribute to elevated stress (Herzberg et al., 1998; Segrin et al., 2007), which might account for why lower trait-level coworker/supervisor support would predict future increased trait-level perceived job discrimination. Increased trait-level perceived job discrimination might thereby precede subsequent worsened MDD/GAD severity through chronic stress-inducing rumination, worry, and other perseverative cognition tendencies (Borders & Liang, 2011; Miranda et al., 2013). Future studies could test these propositions.

This study has several limitations. First, the MIDUS project did not assess the first onset of the disorders evaluated, nor did we assess the chronicity of these disorders. Unmeasured third variables such as race and gender, type of job held, and mental resilience might confound the relations we observed (Watson et al., 2002; Sloan, 2011; De Freitas et al., 2022). Second, we did not measure whether participants switched jobs between each wave of data collection, which might also serve as a confounding variable. Nonetheless, the measure of *trait-level* coworker/supervisor support and perceived job discrimination could allay this concern since

these measures captured the characterological dispositions of how individuals tend to appraise work-related support and discrimination. Third, the relationship between trait-level coworker/supervisor support and perceived job discrimination could be bidirectional, but the present study focused on examining the consequences of work-related support. Also, we cannot determine any strong causal relationships since only experimental study designs can establish strong causality (Shadish et al., 2002). Our participant pool also lacked ethnic and economic diversity, thus limiting our generalizability. Finally, the CIDI-SF scales used in this study were based on outdated DSM-III-R criteria. Future research could replicate this study with up-to-date DSM-5 standards and a more diverse participant pool. Despite these limitations, the current study has strengths, such as using a latent variable approach that minimizes measurement error with a prospective data set and a large sample size that increases precision.

If replicated, the present study might have essential practice implications in businesses and organizations. For example, our findings implicate the effectiveness of organizational interventions that target work-related social support and perceived job discrimination to protect against or reduce MDD and GAD symptoms. Several interventions have been tested to increase coworker/supervisor support or decrease discrimination in the workplace. Regarding coworker support, one team-building intervention tested on a population of nurses was found to produce higher scores of team cohesion and employee satisfaction (DiMeglio et al., 2005). Another study tested an intervention targeting supervisor support and found that the intervention significantly improved employee well-being and positive emotions (Mohr et al., 2021). Finally, a study assessing the effectiveness of an intervention targeting mental health stigma and discrimination was effective in decreasing subjective social distance, as well as improving the mental health of the participants (Kitchener & Jorm, 2004). Together, the present study emphasizes the

importance of continuing to develop, test, and optimize interventions such as these and focusing on mental health outcomes when testing them. In so doing, organizations could minimize or decrease the severity of their employees' MDD and GAD symptoms, therefore helping them become healthier and more productive overall within workplace organizations and institutions.

Appendix A

Tables

Table 1: Time 2 (T2) job discrimination mediating the effect of Time 1 (T1) coworker support and Time 3 (T3) generalized anxiety disorder (GAD) severity after 18 years

	β	(SE)	z	p	LCI	UCI
Regression Estimates						
T1 Coworker support predicting T2 chronic job discrimination (a path)	-1.04	(0.20)	-5.17	.000	-1.43	-0.64
T2 Chronic job discrimination predicting T3 GAD severity (b path)	0.17	(0.03)	4.94	.000	0.10	0.24
T1 Coworker support predicting T3 GAD severity (c path)	0.24	(0.13)	1.88	.060	-0.01	0.49
T1 GAD severity predicting T3 GAD severity (covariate)	0.34	(0.03)	11.54	.000	0.28	0.39
Residual variances						
T1 CS Coworkers help/support	0.60	(0.02)	24.90	.000	0.55	0.65
T1 CS Coworkers listen	0.59	(0.03)	19.88	.000	0.53	0.65
T2 JD Unfairly given jobs	1.11	(0.04)	26.60	.000	1.03	1.19
T2 JD Watched more closely	0.72	(0.04)	18.15	.000	0.65	0.80
T2 JD Boss uses slurs	0.58	(0.03)	18.78	.000	0.52	0.64
T2 JD Coworkers use slurs	1.14	(0.04)	27.88	.000	1.06	1.22
T2 JD Ignored by boss	0.62	(0.05)	13.21	.000	0.53	0.71
T2 JD Coworker promoted	0.37	(0.02)	18.36	.000	0.33	0.41
T3 GAD Restless because worry	0.12	(0.01)	11.89	.000	0.10	0.14
T3 GAD Keyed up	0.16	(0.01)	12.59	.000	0.13	0.18
T3 GAD Irritable because worry	0.13	(0.01)	12.52	.000	0.11	0.15
T3 GAD Trouble falling asleep	0.18	(0.01)	12.26	.000	0.15	0.20
T3 GAD Trouble staying asleep	0.16	(0.01)	12.76	.000	0.14	0.19

T3 GAD Trouble concentrating	0.12	(0.01)	11.69	.000	0.10	0.14
T3 GAD Trouble remembering	0.13	(0.01)	13.10	.000	0.11	0.15
T3 GAD Low on energy	0.14	(0.01)	11.00	.000	0.12	0.17
T3 GAD Tire easily	0.13	(0.01)	11.82	.000	0.11	0.15
T3 GAD Sore muscles	0.17	(0.01)	14.39	.000	0.15	0.19
T1 GAD Restless because worry	0.12	(0.01)	10.92	.000	0.10	0.14
T1 GAD Keyed up	0.19	(0.01)	12.44	.000	0.16	0.21
T1 GAD Irritable because worry	0.13	(0.01)	11.70	.000	0.11	0.16
T1 GAD Trouble falling asleep	0.20	(0.01)	14.56	.000	0.17	0.23
T1 GAD Trouble staying asleep	0.18	(0.01)	15.33	.000	0.16	0.21
T1 GAD Trouble concentrating	0.13	(0.01)	13.23	.000	0.11	0.15
T1 GAD Trouble remembering	0.14	(0.01)	15.23	.000	0.12	0.16
T1 GAD Low on energy	0.18	(0.01)	14.01	.000	0.16	0.21
T1 GAD Tire easily	0.15	(0.01)	14.44	.000	0.13	0.17
T1 GAD Sore muscles	0.23	(0.01)	16.82	.000	0.20	0.26
Latent T1 Demands Scale	0.09	(0.02)	4.61	.000	0.05	0.13
Latent T2 Chronic job discrimination	0.39	(0.04)	9.49	.000	0.31	0.48
Latent T3 GAD severity	0.33	(0.02)	16.88	.000	0.29	0.37
Latent T1 GAD severity	0.47	(0.02)	20.32	.000	0.42	0.51
Indirect effect and total effect						
Indirect effect	-0.18	(0.06)	-3.09	.002	-0.29	-0.06
Total effect	0.06	(0.09)	0.69	.490	-0.12	0.24

CS, coworker support; JD, chronic job discrimination; GAD, generalized anxiety disorder; T1, time 1; T2, time 2; T3, time 3.

Table 2: Time 2 (T2) job discrimination mediating the effect of Time 1 (T1) coworker support and Time 3 (T3) major depressive disorder (MDD) severity after 18 years

	β	(SE)	<i>z</i>	<i>p</i>	LCI	UCI
Regression Estimates						
T1 Coworker support predicting T2 chronic job discrimination (a path)	-0.28	(0.04)	-6.93	.000	-0.36	-0.20
T2 Chronic job discrimination predicting T3 MDD severity (b path)	0.03	(0.01)	5.94	.000	0.02	0.04
T1 Coworker support predicting T3 MDD severity (c path)	0.02	(0.01)	2.83	.005	0.01	0.03
T1 MDD severity predicting T3 MDD severity (covariate)	0.29	(0.03)	10.52	.000	0.23	0.34
Residual variances						
T1 CS Coworkers help/support	0.36	(0.04)	8.84	.000	0.28	0.44
T1 CS Coworkers listen	0.33	(0.05)	6.98	.000	0.24	0.43
T2 JD Unfairly given jobs	1.02	(0.04)	28.26	.000	0.95	1.10
T2 JD Watched more closely	0.74	(0.03)	22.02	.000	0.67	0.80
T2 JD Boss uses slurs	0.59	(0.03)	21.09	.000	0.53	0.64
T2 JD Coworkers use slurs	1.12	(0.04)	30.67	.000	1.05	1.19
T2 JD Ignored by boss	0.66	(0.04)	18.36	.000	0.59	0.73
T2 JD Coworker promoted	0.40	(0.02)	21.98	.000	0.36	0.43
T3 MDD Felt more tired (sad + interest)	0.00	(0.00)	6.02	.000	0.00	0.00
T3 MDD Change in appetite (sad + interest)	0.00	(0.00)	9.76	.000	0.00	0.00
T3 MDD Trouble falling asleep (sad + interest)	0.01	(0.00)	10.51	.000	0.01	0.01
T3 MDD Trouble concentrating (sad + interest)	0.00	(0.00)	7.54	.000	0.00	0.00
T3 MDD Felt down/no good/worthless (sad + interest)	0.01	(0.00)	11.73	.000	0.00	0.01
T3 MDD Thoughts about death (sad + interest)	0.01	(0.00)	12.91	.000	0.01	0.01
T3 MDD Lose interest in most thing (sad)	0.02	(0.00)	12.56	.000	0.02	0.03
T1 MDD Felt more tired (sad + interest)	0.00	(0.00)	6.43	.000	0.00	0.00
T1 MDD Change in appetite (sad + interest)	0.00	(0.00)	10.33	.000	0.00	0.00
T1 MDD Trouble falling asleep (sad + interest)	0.01	(0.00)	12.30	.000	0.01	0.01

T1 MDD Trouble concentrating (sad + interest)	0.00	(0.00)	7.02	.000	0.00	0.00
T1 MDD Felt down/no good/worthless (sad + interest)	0.01	(0.00)	12.44	.000	0.01	0.01
T1 MDD Thoughts about death (sad + interest)	0.01	(0.00)	14.72	.000	0.01	0.01
T1 MDD Lose interest in most thing (sad)	0.02	(0.00)	10.42	.000	0.02	0.02
Latent T1 Coworker support	0.34	(0.04)	7.99	.000	0.25	0.42
Latent T2 Chronic job discrimination	0.55	(0.04)	14.53	.000	0.48	0.63
Latent T3 MDD severity	0.02	(0.00)	20.84	.000	0.02	0.02
Latent T1 MDD severity	0.02	(0.00)	21.38	.000	0.02	0.03
Indirect effect and total effect						
Indirect effect	-0.01	(0.00)	-4.33	.000	-0.01	0.00
Total effect	0.01	(0.01)	1.65	.098	0.00	0.02

CS, coworker support; JD, chronic job discrimination; MDD, major depressive disorder; T1, time 1; T2, time 2; T3, time 3.

Table 3: Time 2 (T2) job discrimination mediating the effect of Time 1 (T1) supervisor support and Time 3 (T3) generalized anxiety disorder (GAD) severity after 18 years

	β	(SE)	<i>z</i>	<i>p</i>	LCI	UCI
Regression Estimates						
T1 Supervisor support predicting T2 chronic job discrimination (a path)	-0.31	(0.03)	-9.46	.000	-0.37	-0.25
T2 Chronic job discrimination predicting T3 GAD severity (b path)	0.15	(0.02)	6.38	.000	0.11	0.20
T1 Supervisor support predicting T3 GAD severity (c path)	0.03	(0.02)	1.13	.259	-0.02	0.07
T1 GAD severity predicting T3 GAD severity (covariate)	0.32	(0.03)	12.68	.000	0.27	0.37
Residual variances						
T1 SS Supervisor gives necess info	0.43	(0.02)	17.60	.000	0.38	0.48
T1 SS Supervisor helps and supports	0.31	(0.03)	9.41	.000	0.25	0.38
T1 SS Supervisor listens	0.34	(0.03)	10.26	.000	0.27	0.40
T2 JD Unfairly given jobs	1.08	(0.04)	27.78	.000	1.01	1.16
T2 JD Watched more closely	0.73	(0.04)	19.31	.000	0.66	0.81
T2 JD Boss uses slurs	0.57	(0.03)	19.05	.000	0.51	0.63
T2 JD Coworkers use slurs	1.12	(0.04)	28.54	.000	1.04	1.20
T2 JD Ignored by boss	0.65	(0.04)	15.27	.000	0.56	0.73
T2 JD Coworker promoted	0.39	(0.02)	19.57	.000	0.35	0.43
T3 GAD Restless because worry	0.12	(0.01)	11.92	.000	0.10	0.14
T3 GAD Keyed up	0.16	(0.01)	12.64	.000	0.13	0.18
T3 GAD Irritable because worry	0.13	(0.01)	12.55	.000	0.11	0.15
T3 GAD Trouble falling asleep	0.18	(0.01)	12.20	.000	0.15	0.20
T3 GAD Trouble staying asleep	0.16	(0.01)	12.68	.000	0.14	0.19
T3 GAD Trouble concentrating	0.12	(0.01)	11.61	.000	0.10	0.14
T3 GAD Trouble remembering	0.13	(0.01)	12.94	.000	0.11	0.15
T3 GAD Low on energy	0.14	(0.01)	11.01	.000	0.12	0.17
T3 GAD Tire easily	0.13	(0.01)	11.74	.000	0.11	0.15

T3 GAD Sore muscles	0.17	(0.01)	14.29	.000	0.15	0.19
T1 GAD Restless because worry	0.12	(0.01)	11.17	.000	0.10	0.14
T1 GAD Keyed up	0.19	(0.01)	12.56	.000	0.16	0.21
T1 GAD Irritable because worry	0.13	(0.01)	11.56	.000	0.11	0.15
T1 GAD Trouble falling asleep	0.20	(0.01)	14.60	.000	0.17	0.23
T1 GAD Trouble staying asleep	0.18	(0.01)	15.19	.000	0.16	0.21
T1 GAD Trouble concentrating	0.13	(0.01)	13.19	.000	0.11	0.15
T1 GAD Trouble remembering	0.14	(0.01)	15.14	.000	0.12	0.16
T1 GAD Low on energy	0.18	(0.01)	14.00	.000	0.16	0.21
T1 GAD Tire easily	0.15	(0.01)	14.29	.000	0.13	0.17
T1 GAD Sore muscles	0.23	(0.01)	16.78	.000	0.20	0.26
Latent T1 Supervisor Support	0.41	(0.03)	15.23	.000	0.36	0.47
Latent T2 Chronic job discrimination	0.48	(0.04)	12.59	.000	0.41	0.56
Latent T3 GAD severity	0.33	(0.02)	17.09	.000	0.29	0.37
Latent T1 GAD severity	0.47	(0.02)	20.34	.000	0.42	0.51
Indirect effect and total effect						
Indirect effect	-0.05	(0.01)	-5.05	.000	-0.07	-0.03
Total effect	-0.02	(0.02)	-1.13	.259	-0.06	0.02

SS, supervisor support; JD, chronic job discrimination; GAD, generalized anxiety disorder; T1, time 1; T2, time 2; T3, time 3.

Table 4: Time 2 (T2) job discrimination mediating the effect of Time 1 (T1) supervisor support and Time 3 (T3) major depressive disorder (MDD) severity after 18 years

	β	(SE)	z	p	LCI	UCI
Regression Estimates						
T1 Supervisor support predicting T2 chronic job discrimination (a path)	-0.25	(0.03)	-9.66	.000	-0.30	-0.20
T2 Chronic job discrimination predicting T3 MDD severity (b path)	0.03	(0.01)	5.73	.000	0.02	0.04
T1 Supervisor support predicting T3 MDD severity (c path)	0.00	(0.00)	0.90	.366	0.00	0.01
T1 MDD severity predicting T3 MDD severity (covariate)	0.28	(0.03)	10.41	.000	0.23	0.33
Residual variances						
T1 SS Supervisor gives necess info	0.36	(0.02)	19.58	.000	0.32	0.40
T1 SS Supervisor helps and supports	0.24	(0.02)	10.53	.000	0.20	0.29
T1 SS Supervisor listens	0.38	(0.02)	16.67	.000	0.33	0.42
T2 JD Unfairly given jobs	1.01	(0.04)	27.54	.000	0.94	1.08
T2 JD Watched more closely	0.74	(0.03)	21.64	.000	0.67	0.80
T2 JD Boss uses slurs	0.59	(0.03)	20.65	.000	0.53	0.64
T2 JD Coworkers use slurs	1.13	(0.04)	30.81	.000	1.05	1.20
T2 JD Ignored by boss	0.67	(0.04)	18.31	.000	0.60	0.74
T2 JD Coworker promoted	0.40	(0.02)	21.44	.000	0.36	0.44
T3 MDD Felt more tired (sad + interest)	0.00	(0.00)	5.98	.000	0.00	0.00
T3 MDD Change in appetite (sad + interest)	0.00	(0.00)	9.74	.000	0.00	0.00
T3 MDD Trouble falling asleep (sad + interest)	0.01	(0.00)	10.56	.000	0.01	0.01
T3 MDD Trouble concentrating (sad + interest)	0.00	(0.00)	7.63	.000	0.00	0.00
T3 MDD Felt down/no good/worthless (sad + interest)	0.01	(0.00)	11.68	.000	0.00	0.01
T3 MDD Thoughts about death (sad + interest)	0.01	(0.00)	12.85	.000	0.01	0.01
T3 MDD Lose interest in most thing (sad)	0.02	(0.00)	12.49	.000	0.02	0.03
T1 MDD Felt more tired (sad + interest)	0.00	(0.00)	6.38	.000	0.00	0.00
T1 MDD Change in appetite (sad + interest)	0.00	(0.00)	10.44	.000	0.00	0.00

T1 MDD Trouble falling asleep (sad + interest)	0.01	(0.00)	12.17	.000	0.01	0.01
T1 MDD Trouble concentrating (sad + interest)	0.00	(0.00)	7.04	.000	0.00	0.00
T1 MDD Felt down/no good/worthless (sad + interest)	0.01	(0.00)	12.45	.000	0.01	0.01
T1 MDD Thoughts about death (sad + interest)	0.01	(0.00)	14.65	.000	0.01	0.01
T1 MDD Lose interest in most thing (sad)	0.02	(0.00)	10.43	.000	0.02	0.02
Latent T1 Supervisor Support	0.48	(0.02)	20.62	.000	0.44	0.53
Latent T2 Chronic job discrimination	0.57	(0.04)	14.92	.000	0.49	0.64
Latent T3 MDD severity	0.02	(0.00)	20.98	.000	0.02	0.02
Latent T1 MDD severity	0.02	(0.00)	21.39	.000	0.02	0.03
Indirect effect and total effect						
Indirect effect	-0.01	(0.00)	-4.87	.000	-0.01	0.00
Total effect	0.00	(0.00)	-0.81	.417	-0.01	0.00

SS, supervisor support; JD, chronic job discrimination; MDD, major depressive disorder; T1, time 1; T2, time 2; T3, time 3.

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ACADEMIC VITA

EDUCATION

The Pennsylvania State University **University Park, PA**
 Schreyer Honors College Graduation: May 2024
 Dual Degree: B.S. Psychology, B.S. Labor and Human Resources
 Honors thesis: *Trait-level Perceived Job Discrimination Mediates Lower Coworker and Supervisor Support Predicting Major Depressive Disorder and Generalized Anxiety Disorder 18 Years Later.*

RESEARCH EXPERIENCE

Laboratory for Anxiety and Depression Research | Undergraduate Research Assistant *Sept 2021 – Mar 2023*
 University Park, PA

Supervised by Prof. Michelle G. Newman, Ph.D., and Nur Hani Zainal, Ph.D.

- Undergraduate research assistant for a study testing the efficacy of smartphone treatments for persons with Generalized Anxiety Disorder in a randomized controlled trial
- Administered the Mini International Neuropsychiatric Interview (Version 7.0.2) on multiple participants
- Administered and scored multiple neuropsychological tests from the following assessment batteries: Delis-Kaplan Executive Functioning Test; Wechsler Adult Intelligence Scale-Fourth Edition.
- Guided participants through using the smartphone-delivered mindfulness treatment app.
- Managed databases of different projects with sample sizes ranging from about 150 to more than 5000 for treatment studies and psychiatric epidemiological studies.
- Evaluated participant compliance checks into an Excel sheet seven days after initial visit.

LEADERSHIP EXPERIENCE

U-Belong | Treasurer *Mar 2023 – Present*
 University Park, PA

- Acquired over \$10,000 in funding for speaker events on campus and over Zoom
- Collaborated with a team to grow organization from 0 to 60 dedicated members in just one semester
- Led community and speaker events with over 50 people in attendance

The Pennsylvania State University | Resident Assistant *Jan 2023 – Present*
 University Park, PA

- Oversee over 40 undergraduate residents
- Responsibly and efficiently handle critical situations within a moment's notice
- Organize events by creating flyers, acquiring materials, and arranging locations to increase community engagement
- Collaborate with 14 other RAs to conduct building-wide events

VOLUNTEER EXPERIENCE

Proctor | Psychology Department *Sept 2022 – Dec 2022*
 University Park, PA

- Worked with a team to distribute testing material and identify possible cases of dishonest activity
- Answered basic questions from students and escalated as needed
- Ethically handled sensitive testing material
- Recorded in detail possible cases of dishonest activity

WORK EXPERIENCE

Wawa, Inc. | People Operations Intern
Media, PA

May 2023 – Aug 2023

- Collaborated with team members to assist employees with their human resources related requests
- Oversaw over 700 unemployment claims by efficiently responding to emails and optimizing workflow to assist in team effort to lighten weekly email load
- Worked with human resources information system Workday to complete daily tasks
- Gained knowledge about front-end human resources practices by attending strategic meetings and feedback sessions

Whole Foods Market | Team Member
Newtown Square, PA

Jun 2022 – Aug 2022

- Optimized workflow to ensure efficient movement of stock onto floor
- Proactively recognized where product ran out on shelves, increasing product movement efficiency
- Assessed quality of product on floor and pulled items as needed, increasing rotation of product by over 40%
- Collaborated with a team of over 10 people to keep product stocked and increase sales
- Consistently and reliably kept stock room neat and organized, decreasing time spent searching for products