RESEARCH ARTICLE

Chronic Illness in the Workplace: Stigma, Identity Threat and Strain

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Abstract

Chronic illness affects a large and growing number of workers in the United States and globally. Stigmatization (devaluation) at work based on chronic illness may be stressful for individuals and therefore may lead to negative psychological consequences (i.e. strains). In order to better understand stressful experiences of stigma for workers with chronic illnesses, a model of stigma-related identity threat (perceptions that one is at risk of being treated negatively at work because of chronic illness) was tested on a sample of 203 working adults with chronic illnesses. The following variables related to workers' perceptions of chronic illness-related identity threat: workers' boundary flexibility (flexibility in managing their work and life), their meta-perceptions of devaluation (perceptions of others' devaluation of them based on illness) and their job self-efficacy (feelings of confidence related to performing their job). In turn, perceptions of identity threat related to both feelings of psychological strain and (lower levels of) perceived work ability. Surprisingly, neither stigma centrality (how fundamental illness is to one's identity) nor supervisor support related to workers' identity threat perceptions.

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Keywords
chronic illness; stigma; stress; identity threat; strain

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Introduction

Chronic health conditions, or those that '…last a year or more and require ongoing medical attention and/or limit activities of living' (Anderson & Hovarth, 2004), affect more than half of all Americans (DeVol, Bedroussian, Charuworn, & Chatterjee, 2007). Moreover, an estimated 68% of the US working population has a chronic physical or mental health condition or chronic pain, including high blood pressure, high cholesterol, cancer, diabetes, asthma, depression and recurring physical pain in the neck, back, knee or leg (Witters & Agrawal, 2011). Advances in disease management, coupled with an ageing workforce and trends to delay retirement, are contributing to rising numbers of individuals with chronic illness in the workplace.

Individuals with chronic illness are vulnerable to stigmatization, or devaluation, in the workplace, where values of productivity, competence and the ability to maintain a regular schedule conflict with the sometimes unpredictable nature of chronic illness symptoms and the need to be away from work for treatment, medical appointments or sickness (Beatty & Joffe, 2006). Individuals experience social identity threat when they believe they are at risk of being stigmatized (Major & O'Brien, 2005; Steele, Spencer, & Aronson, 2002). In a review of the identity threat literature, Petriglieri (2011) defined identity threat experiences as those 'appraised as indicating potential harm to the value, meanings, or enactment of an identity' (p. 644). As such, identity threat directly relates to psychological stress processes (Petriglieri, 2011). According to the transactional theory of stress, individuals perceive events or situations as threatening or challenging; to the extent that individuals perceive situations as threatening, they will experience stress (for additional details, see Lazarus & Folkman, 1984). Perceptions of identity threat at work may be stressful because they represent an appraisal of devaluation along with likely future harm (e.g. threats to job or career success through discrimination; Petriglieri, 2011). For individuals who appraise a situation as stressful and cope unsuccessfully, strains occur. Strains are defined as 'long term or chronic changes in response to a stressor' (Sulsky & Smith, 2006). Strains include detriments to an employee's well-being, including their physical or mental health.

Despite the prevalence of chronic illness in the workplace, research related to stigma and stress of

working with chronic illness is lacking. Conceptual articles highlight social and legal issues related to working with chronic illness (Beatty & Joffe, 2006; Beatty & Kirby, 2006); yet empirical data are needed. In order to better understand experiences of workplace chronic illness stigma, we present an empirical test of a theoretically based model of stigma-related identity threat and strain using survey responses from a sample of workers with chronic illnesses. In doing so, we also answer calls for more research on stigma at work (Paetzold, Dipboye, & Elsbach, 2008) and marginalized worker populations (Maynard & Ferdman, 2009).

Major and O'Brien (2005) categorized factors affecting an individual's perceptions of identity threat into the following: (a) situational cues (characteristics of the situation in which stigma manifests); (b) meta-perceptions of devaluation of stigma (how others in society see the stigmatized characteristic, as known by the stigmatized individual); and (c) personal characteristics. Further, the authors posit that identity threat will lead to strain-related outcomes. Although the model has yet to be tested as a whole, situational cues have been found to prompt race and gender-based identity threat (Logel et al., 2009; Purdie-Vaughns, Steele, Davies, Ditlmann, & Randall Crosby, 2008; Quinn, Kahng, & Crocker, 2004), and identity threat has been related to stress-related outcomes (Scheepers, 2009). Next, we apply this model to chronic illness in the workplace (see Figure 1 for an illustration of the adapted model).

Situational characteristics

'Settings themselves have the power to signal the degree of threat or safety a person will experience' (Purdie-Vaughns et al., 2008: 615). Moreover, Steele et al. (2002) described identity threat as a 'theory of context'. Workers with chronic illness may feel identity threat at work because of implicit workplace values of productivity and performance, which are seemingly at odds with ill health; yet some working environments will be more threatening than others. We identified two workplace characteristics that likely contribute to the degree to which it is perceived as threatening: supervisor support and boundary flexibility. Firstly, the degree to which a supervisor is supportive will likely affect an individual's identity threat perceptions. A supportive supervisor should generally indicate a low likelihood of devaluation based on illness to an individual. Support may be instrumental, providing tangible, direct assistance or aid, such as money, or emotional, providing caring, concern, love, sympathy, reassurance or affirmation (House, 1981; Kahn & Antonucci, 1980; Schaefer, Coyne, & Lazarus, 1981). Support may also be informational, including information to help a person solve a problem (Schaefer et al., 1981). A supportive supervisor may be willing to assist a worker with getting his or her work done when he or she has difficulties because of chronic illness, provide accommodations needed for the worker to help manage illness, provide career development opportunities, feedback, needed resources or other valued work-related resources or he or she may display concern for an employee's well-being, an interest in him or her as a person and/or sensitivity to his or her situation.

Hypothesis 1a: Supervisor support will negatively relate to identity threat perceptions.

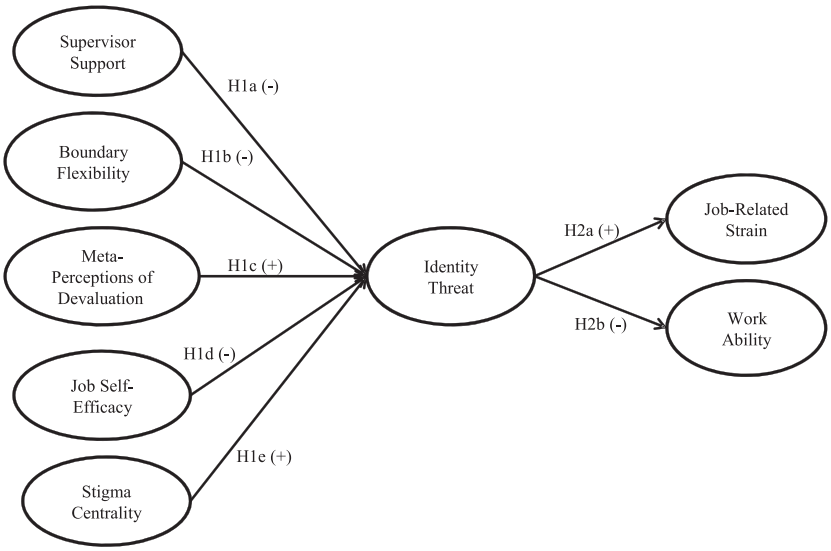

Figure 1 Model with hypothesized paths. Indirect paths hypothesized for the following: supervisor support to strain (H3a) and work ability (3b), boundary flexibility to strain (4a) and work ability (4b), meta-perceptions of devaluation to strain (5a) and work ability (5b), job self-efficacy to strain (6a) and work ability (6b), and stigma centrality to strain (7a) and work ability (7b)

Secondly, we propose that the extent to which workers are allowed flexibility in terms of managing boundaries between their personal lives and work will affect identity threat perceptions. Boundary flexibility is the degree to which an individual is able to move from one domain (i.e. work) to another (i.e. personal life; Matthews & Barnes-Farrell, 2010). Workers with chronic illness may benefit from flexible boundaries in managing work and health; such flexibility may allow workers to 'self-accommodate' (for instance, attend doctor's appointments during work hours) without having to request formal work accommodations. Conversely, the need to maintain strict boundaries between work and non-work may feel threatening to a worker with chronic illness, signalling that the worker is valued for his or her ability to physically be at work during certain hours (which may not be possible when doctor's appointments and treatments, or symptom flare-ups interfere with attendance).

Hypothesis 1b: Boundary flexibility will negatively relate to identity threat perceptions.

Meta-perceptions of devaluation

Overall, people are aware of and maintain consensus regarding which groups are stigmatized in a given society (e.g. Gardner, 1994). Steele et al. (2002) noted that such 'collective representations', i.e. knowledge regarding how different groups of people are perceived and valued in a particular context, affects identity threat. Put simply, the awareness that an identity is devalued by fellow employees can have a detrimental impact (Major & O'Brien, 2005). Perceptions of collective representations are akin to meta-perceptions—individuals' perceptions of how others perceive them based on chronic illness.

Hypothesis 1c: Meta-perceptions of devaluation will positively relate to identity threat.

Personal characteristics

Individual differences also influence the extent to which an individual feels stigma-related identity threat at work. We examine two personal characteristics: job self-efficacy and stigma centrality. Firstly, job self-efficacy (feelings of competence and confidence in one's abilities to perform effectively in one's job; Chen, Goddard, & Casper, 2004) is a resource that may prevent identity threat appraisals. According to Lazarus and Folkman (1984), stressful appraisals may be prevented or mitigated when levels of resources to handle threats are appropriate to match the threat. Research supports this notion: for example, Jex and Bliese (1999) found that soldiers with a stronger sense of self-efficacy had lesser amounts of strain in response to long work hours and work overload than soldiers with lower levels of self-efficacy. In addition, high levels of self-efficacy are usually associated with higher levels of performance (e.g. Stajkovic & Luthans, 1998), which would further buffer against identity threat at work based on illness (if one is performing well, they are unlikely to be targets of stigmatization).

Hypothesis 1d: Job self-efficacy will negatively relate to perceived identity threat.

Stigma centrality refers to the extent to which an individual identifies with a devalued social group, in this case chronic illness. The more important a stigmatized identity is to an individual, the more self-threatening negative stereotypes associated with that identity will feel (Major, 2004). Because those with high levels of stigma centrality are especially likely to perceive themselves to be potential targets of discrimination (e.g. Branscombe, Schmitt, & Harvey, 1999; Sellers & Shelton, 2003), Major and O'Brien (2005) proposed that stigma centrality would relate to identity threat perceptions.

Hypothesis 1e: Stigma centrality will positively relate to perceived identity threat.

Responses to identity threat

We examined two stress-related outcomes of identity threat for workers with chronic illness: job-related strain and work ability. Firstly, those who perceive high levels of threat (a stressor) will tend to experience strains (Lazarus & Folkman, 1984). Job-related strain (Barnes-Farrell et al., 2004) includes physical and mental exhaustion and feelings of tension at the end of the work day. Work ability refers to a worker's perceived capacity to sustain employment in his or her current job, given the demands of the job and his or her individual resources (Ilmarinen, Gould, Järvikoski, & Järvisalo, 2008). Low levels of work ability are predictive of receiving disability pension (Ilmarinen et al., 1991), thoughts of retirement and turnover intentions (Camerino et al., 2006; Hopsu, Leppänen, Tanta, & Louhevaara, 2005) and sick leave (Ahlstrom, Grimby-Ekman, Hagberg, & Dellve, 2010). Stress theory dictates that as a stressor, identity threat should to lead to strains in general, including declines in work ability. Although empirical support for the link between identity threat and work ability is lacking, a related construct, age discrimination, was found to negatively relate to work ability in samples of older workers from Norway, Finland and Sweden (Furunes & Mykletun, 2010).

Hypothesis 2a: Identity threat will be positively related to strain.
Hypothesis 2b: Identity threat will be negatively related to work ability.

Finally, we expected to observe indirect effects of supervisor support, boundary flexibility, meta-perceptions of devaluation, job self-efficacy and stigma centrality on work ability and strain, through their associations with identity threat.

Hypotheses 3a and 3b: Supervisor support will indirectly relate to (a) strain (negatively) and (b) work ability (positively), through an association with identity threat.
Hypotheses 4a and 4b: Boundary flexibility will indirectly relate to (a) strain (negatively) and (b) work ability (positively), through an association with identity threat.
Hypotheses 5a and 5b: Meta-perceptions of devaluation will indirectly relate to (a) strain (positively) and (b) work ability (negatively), through an association with identity threat.
Hypotheses 6a and 6b: Job self-efficacy will indirectly relate to (a) strain (negatively) and (b) work ability (positively), through an association with identity threat.
Hypotheses 7a and 7b: Stigma centrality will indirectly relate to (a) strain (positively) and (b) work ability (negatively), through an association with identity threat.

Additional variables influencing identity threat experiences

There is likely variation in experiences of stigma based on illness type. For example, mental illnesses are typically more stigmatizing than illnesses with primarily physical manifestations. In an attempt to control for some of the variation in stigma experiences between illness types, we limited the study sample to individuals with autoimmune diseases. According to Jones et al. (1984), six dimensions of stigma exist, including concealability, course (pattern of change and ultimate outcome), disruptiveness (degree to which the characteristic hampers communication), aesthetic qualities (degree to which the characteristic makes the individual unattractive), origin (how the condition originated) and peril (degree to which the characteristic poses a hazard to other people). Autoimmune diseases are similar to one another in terms of concealability (most are concealable), course (most become progressively worse over time), disruptiveness (most are not disruptive to communication), origin (most individuals are not seen as 'responsible' for the illness) and peril (most not causing harm to others).

Several additional variables should be considered when examining the hypothesized relationships in an attempt to isolate effects of study variables. We examined illness severity, along with demographic variables (age, gender, education level and organizational tenure) and union status (as it may protect workers against discrimination). Length of time since diagnosis was also considered, as those going through a recent diagnosis may feel more strain and potential stigma as they adjust to their diagnosis. Finally, we also controlled for disclosure of illness, as it likely covaries with both supervisor support and perceived identity threat.

Method

Participants and procedure

Individuals working at least 30 h/week and who self-identified as having at least one chronic illness were recruited to complete an anonymous online survey. Recruitment was handled as follows. Firstly, links to the survey were posted in various online forums for people living with a chronic illness. Secondly, two chronic illness bloggers posted information about the study on their blogs. Thirdly, two classes of undergraduate students at the researchers' institutions were trained on field research data collection methods and were given an opportunity to recruit working adults to complete the survey for extra course credit. A small monetary incentive was used for all participants. To ensure that each person completed only one survey, the researchers programmed the survey software to allow one survey completion per IP address.

In total, 350 workers with various chronic illnesses completed the survey. Eighteen responses were deleted because of excessive missing data (more than 20% of responses left blank) in an effort to ensure data quality. Participants were asked to report all of their chronic illness(es), to select the one illness that currently affected their lives the most and to keep that one illness in mind when responding. In an attempt to control for the potentially wide variation in experiences of stigma between different types of illnesses, we restricted the study sample to include only participants who reported that the illness affecting their lives the most was an autoimmune disease, which resulted in a final sample size of $n = 203$. The illnesses workers reported to most affect their lives are listed in Table I. Demographics are summarized in Table II.

Measures

In an effort to reduce bias, survey items were ordered such that those about chronic illness appeared after non-illness-related survey items. Unless otherwise indicated, a five-point response scale was used for all survey items, ranging from (1) *strongly disagree* to (5) *strongly agree*. In some cases, we shortened the scales in order to decrease the burden on participants' time and potential response fatigue. Therefore, we paid particular attention to the measurement model prior to estimating path coefficients. Coefficient alphas were all above 0.70 (Table IV).

Supervisor support

Four items from Rusbasan and Magley (2009) were used: 'When I talk to my supervisor I feel like he or she is truly listening to me', 'My supervisor cares about my well-being', 'My supervisor makes sure I am recognized for my accomplishments' and 'My supervisor can and would inform me of potential promotional opportunities'.

Boundary flexibility

A modified four-item measure was used (Matthews & Barnes-Farrell, 2010). A sample item is 'I am able to arrive and depart from work when I want in order to meet personal responsibilities'.

Table I Chronic health conditions that most affect participants' lives

Chronic health condition	*n*	%
Rheumatoid arthritis	88	36
Crohn's disease	36	15
Multiple sclerosis	20	8
Diabetes*	10	4
SLE	10	4
Ulcerative colitis	10	4
Diabetes (type 1)	3	1
Mixed connective tissue disease	3	1
Psoriatic arthritis	3	1

Note: The diseases shown in the table represent those that were reported by at least 1% of the sample. The following diseases were also reported: adrenal fatigue, anaemia, ankylosing spondylitis, autoimmune inflammatory polyarthritis, coeliac disease, chronic Lyme disease, dysautonomia, Grave's disease, Hashimoto's disease, hypothyroid disease, lichen sclerosus, neuromyelitis optica and Sjogren's syndrome. Total $n = 203$.

n: frequency of illness; %: percentage of total sample; SLE: systemic lupus erythematosus.

*These individuals did not state whether their diabetes was type 1 or type 2. Type 2 diabetes is not universally recognized as autoimmune, although emerging research suggests that it is (Syed, Barinas-Mitchell, Pietropaolo, Zhang, & Henderson, 2002; Winer et al., 2011). Therefore, we included these individuals in our sample.

Meta-perceptions of devaluation

Three items were created for the current study. Participants were asked to rate the extent to which *other people* generally feel their illness: '…would negatively affect my job performance', '…would negatively affect my work capabilities' and '…would lead to absences from work'. The response scale ranged from (1) *others do not think this at all* to (4) *others think this a lot*.

Job self-efficacy

Three items from an eight-item scale (Chen et al., 2004) were used to measure job self-efficacy. A sample item is 'I can successfully overcome obstacles at work'.

Stigma centrality

Two items were used from the Importance to Identity Subscale of the Self-Esteem scale (Luhtanen & Crocker, 1992); two additional items were used from Quinn and Williams (2012). The items were 'My chronic illness is an important reflection of who I am', 'In general, chronic illness is an important part of the way I see myself', 'My chronic illness defines who I am' and 'My chronic illness is an important part of my self-definition'.

Identity threat

Items were written for the study based on the definition of identity threat as an appraisal of likelihood of devaluation at work. Similar to the measure of Ragins, Singh, and Cornwell (2007), items assessed perceived likelihood of stigma-related occurrences: 'Your behavior at work would be overly scrutinized', 'Some people at work would feel anxious or uncomfortable around you', 'Others would gossip about you behind your back', 'You would be excluded from things you would normally be a part of (e.g., meetings, phone calls)' and 'Someone at work would think that you cannot fulfill your work responsibilities'. Participants were asked 'How likely is it that this would happen to you due to your chronic illness at work, if most people you worked with (including supervisors) knew about your chronic illness?' The response scale ranged from (1) *not at all likely* to (5) *extremely likely*.[1]

Work-related strain

Three items measured work strain (Barnes-Farrell et al., 2004): 'When you leave work at the end of a normal work day… how physically tired (mentally tired, tense) do you usually feel?' The response scale ranged from (1) *not at all* to (4) *extremely*.

Work ability

A single item from the Work Ability Index (WAI; Tuomi, Ilmarinen, Jahkola, Katajarinne, & Tulkki, 1998) was used: 'Please rate your current work ability, compared to its lifetime best'. A numeric scale was used, with endpoints (0) *cannot currently work at all* and (10) *best possible work ability*. This single item has been validated for use as a substitute for the full WAI by Ahlstrom et al. (2010): the full WAI showed similar correlations with sick leave, health and symptoms; and the predictive value of the single-item measure was equivalent to the full WAI for health-related quality of life and length of sick leave.

Social desirability

Nine items from the 10-item Marlowe–Crowne scale (Strahan & Gerbasi, 1972) were used.[2] Participants

[1]A confirmatory factor analysis was conducted to verify the proposed single-factor structure of the identity threat variable. All five items were constrained to load on one latent factor. The fit of this model was good; fit indices were: $\chi^2(5) = 7.50$, $p > 0.05$; comparative fit index (*CFI*) = 0.99; root mean square error of approximation (*RMSEA*) = 0.05 and standardized root mean square residual (*SRMR*) = 0.02.

[2]One item, 'I have played sick to get out of something', was omitted from the survey in an effort to be sensitive to the target population.

Table II Demographics

Variable	%			
Gender (female)	88			
Education level (4-year college degree or higher)	58			
Union status (union)	19			
Supervisor status (supervisor)	27			
Breadwinner status (breadwinner)	50			
Health insurance (covered)	86			
Variable	Min	Max	Mean	SD
Age	20	68	40.31	10.98
Organizational tenure (years)	0	31	7.88	7.14
Years diagnosed with illness	1	11	6.33	3.97
Illness severity: medications	0	>15	4.83	3.51
Illness severity: appointments	0	>24	11.59	7.32
Illness severity: hospitalizations	0	>4	0.93	1.46
Disclosure to supervisor(s)	1	5	2.80	1.37
Disclosure to coworkers	1	5	3.20	1.27
Illness visibility	0	4	2.56	1.51

Note: $N = 203$.

%: percentage of total; Min: minimum value; Max: maximum value; SD: standard deviation.

indicated 'True' or 'False', and responses were compared with socially desirable responses (Strahan & Gerbasi, 1972). Socially desirable responses were given a score of '1' and others were coded '0'. A sum of responses was used as a single indicator of a latent social desirability variable to model measured method effects.

Control variables

Gender was coded as (0) *male* and (1) *female*. Age, organizational tenure and years diagnosed with illness were entered in years. Education level was coded as (1) *less than high school to* (6) *graduate degree*. Union status was coded as (0) *not union member* and (1) *union member*. Participants reported (a) number of medications currently taken for the illness, (b) number of medical appointments in the past year for the illness, and (c) number of emergency room visits or hospitalizations for the illness in the past year. Responses were standardized, and a mean was calculated to represent illness severity. Stigma dimensions were measured with a response scale ranging from (1) *others do not think this at all* to (4) *others think this a lot*: 'In general, other people probably think my illness…' '…affects how I appear physically', '…would cause disruptions to social interactions', '…would put others at risk', '…would get worse with time' and '…it is my own fault for getting this illness'. Disclosure items were 'How many people above your level (your supervisors or organizational leaders) at your organization at your work know that you have a chronic illness?' and 'How many coworkers and/or subordinates know that you have a chronic illness?' on a scale from (1) *none* to (5) *all*.

Statistical analyses

A series of confirmatory factor analyses (CFAs) using all multi-item scales were conducted to test a measurement model prior to estimating any structural paths (Anderson & Gerbing, 1988). Then control variables and structural paths were added to the model. Model fit was assessed using the *SRMR*; a value of less than 0.10 is considered to be indicative of good model fit (Kline, 2005). The *CFI*, which indicates reasonably good fit at 0.90 or higher, was also used. Additionally, the *RMSEA* (Hu & Bentler, 1999) was used; values between 0.05 and 0.08 indicate reasonably good fit (Browne & Cudeck, 1993). Because of non-linearity of the product terms measuring indirect effects (Cheung & Lau, 2008; MacKinnon, Lockwood, & Williams, 2004), a bias-corrected bootstrapping method (2000 draws) was used to obtain indirect effect estimates.

Results

Descriptive statistics are reported in Table III. Correlations between study variables, presented in Table IV, were in the expected directions. Correlations between control variables and each study variable were also calculated, and, following the recommendations of Carlson and Wu (2012), control variables that did not have significant bivariate correlations with identity threat, strain or work ability were excluded from further analysis. This also maximized power for estimating the remaining parameters. Excluded variables were age, gender, tenure, disclosure to supervisor(s), illness

Table III Descriptive statistics

Scale	Min	Max	M	SD
Boundary flexibility	1	5	3.37	1.09
Supervisor support	1	5	3.29	0.96
Meta-perceptions of devaluation	1	5	3.09	1.40
Stigma centrality	1	5	3.03	0.75
Job self-efficacy	1	5	3.61	0.71
Identity threat	1	5	2.25	0.94
Work ability	0	10	6.59	1.83
Work-related strain	1	4	2.85	0.69

Note. $N = 203$.
Min: minimum value; Max: maximum value; M: mean; SD: standard deviation.

causing disruptions to social interactions, the individuals' responsibility for getting the illness and number of years diagnosed. The remaining seven control variables (illness severity, disclosure to coworkers, union status, education, illness visibility, illness getting worse over time and illness putting others at risk) were each correlated with every study variable while estimating hypothesized paths.

Firstly, we describe the measurement model results. We compared the fit of an eight-latent factor model with the fit of a single latent factor model (all items loading on one latent factor).[3] The fit of the eight-factor model was good: $\chi^2(297) = 487.88$, $p < 0.01$; $CFI = 0.93$; $RMSEA = 0.06$; $SRMR = 0.06$. The hypothesized model fit the data better than a single-factor model, which was $\chi^2(324) = 2085.42$, $p < 0.01$; $CFI = 0.37$; $RMSEA = 0.16$; $SRMR = 0.14$. The difference was significant [$\Delta\chi^2(27) = 1597.54$, $p < 0.001$]. All factor loadings in the eight-factor model were statistically significant ($p < 0.01$) in the expected directions. Standardized factor loadings/variance accounted for ranged from 0.82–0.86/0.67–0.74 (boundary flexibility), 0.65–0.90/0.42–0.76 (supervisor support), 0.76–0.96/0.57–0.91 (meta-perceptions), 0.70–0.81/0.49–0.66 (stigma centrality), 0.67–0.74/0.48–0.55 (job self-efficacy), 0.66–0.84/0.43–0.70 (identity threat) and 0.62–0.84/0.39–0.70 (strain). We further tested the discriminant validity of the identity threat variable by comparing the eight-factor model with several seven-factor models in which each of the identity threat items was constrained to load on a common latent factor with items from each of the other variables. In every case, the eight-factor model had better fit than the seven-factor model (Table V).

We tested for method effects using a measured method factor approach recommended by Podsakoff, MacKenzie, Lee, and Podsakoff (2005); Williams and Anderson (1994), and Williams, Ford, and Nguyen (2002). As social desirability responding may contaminate relationships between study variables (e.g. Podsakoff, MacKenzie, & Podsakoff, 2012), we examined potential method effects by adding a latent social desirability variable to the CFA model (again, using a single-indicator approach).[4] We conducted a chi-square difference test between (a) a model with latent social desirability having factor loadings to each other latent variable indicator and latent social desirability uncorrelated with each of the other latent variables and (b) a model in which the factor loadings from the latent social desirability variable to each of the other indicators were constrained to zero (Williams et al., 2002). The fit statistic for (a) was $\chi^2(297) = 487.63$ and for (b) was $\chi^2(324) = 518.77$; the difference was non-significant ($p < 0.05$). Therefore, we omitted social desirability from further model testing.

We then tested the structural model. We started with a model with both direct and indirect effects of the five exogenous variables to work ability and strain. Unstandardized coefficients are reported. Fit of the hypothesized model was good: $\chi^2(430) = 703.35$, $p < 0.01$; $CFI = 0.91$; $RMSEA = 0.06$; $SRMR = 0.05$. When estimating all paths, the direct paths from all five exogenous variables to both strain and work ability were non-significant: supervisor support—strain $b = -0.01$, $p > 0.05$; supervisor support—work ability $b = 0.01$, $p > 0.05$; boundary flexibility—strain $b = 0.03$, $p > 0.05$; boundary flexibility—work ability $b = 0.13$, $p > 0.05$; meta-perceptions—strain $b = 0.06$, $p > 0.05$; meta-perceptions—work ability $b = -0.20$, $p > 0.05$; job self-efficacy—strain $b = -0.16$, $p > 0.05$; job self-efficacy—work ability $b = 0.41$, $p > 0.05$; stigma centrality—strain $b = 0.03$, $p > 0.05$; stigma centrality—work ability $b = 0.07$, $p > 0.05$. Therefore, we tested a model in which all non-significant direct paths from the exogenous variables to work ability and strain were dropped, and the fit was $\chi^2(440) = 714.93$, $p < 0.01$; $CFI = 0.91$; $RMSEA = 0.05$; $SRMR = 0.05$. Because of a non-significant decrease in model fit [$\Delta\chi^2(10) = 11.58, p > 0.05$], we retained a model that excluded these non-significant direct paths.

Hypothesis 1 stated that (a) supervisor support, (b) boundary flexibility, (c) meta-perceptions of devaluation, (d) job self-efficacy and (e) stigma centrality would relate to perceived identity threat. Results supported relationships of identity threat with (b) boundary

[3]A single-indicator latent variable approach was taken with the work ability variable. The factor loading was fixed to 1 and the error variance fixed to the value of 1 minus coefficient alpha times the variance of the composite, using am estimated reliability of 0.75 (Radkiewicz & Widerszal-Bazyl, 2005). For details, see Williams and Hazer (1986).

[4]The sum of social desirability responses was a single indicator of a latent variable, and the path from the latent variable to indicator was fixed to 1. We also fixed the error variance of the social desirability indicator to the value of 1 minus coefficient alpha (estimated to be 0.67; Strahan, 2007) times the variance of the composite.

Table IV Correlations between study variables and coefficient alphas

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	Supervisor support	(0.86)															
2	Boundary flexibility	0.42**	(0.91)														
3	Meta-perception	−0.08	−0.11*	(0.91)													
4	Stigma centrality	−0.12	−0.08	0.20**	(0.85)												
5	Job self-efficacy	0.35**	0.28**	−0.15*	−0.16*	(0.75)											
6	Identity threat	−0.35**	−0.36**	0.48**	0.21**	−0.34**	(0.84)										
7	Work ability	0.18**	0.24**	−0.31**	−0.09	0.26**	−0.39**	—									
8	Strain	−0.17**	−0.22*	0.32**	0.15*	−0.30**	0.44**	−0.37**	(0.75)								
9	Social desirability	0.01	−0.08	−0.11	−0.10	0.13	−0.08*	−0.06	−0.01	—							
10	Education	0.04	0.08	−0.14	−0.01	0.13	−0.02	0.23**	−0.12	−0.04	—						
11	Union status	−0.01	−0.23**	−0.12	0.09	0.09	−0.14	0.03	−0.13	−0.01	0.06	—					
12	Illness severity	−0.14*	−0.16*	0.33**	0.20**	−0.06	0.42**	−0.36*	0.33**	0.03	0.01	−0.13	—				
13	Disclosure	0.05	0.10	0.01	0.10	0.05	−0.13	0.01	0.08	0.12	−0.15*	−0.01	0.07	—			
14	Concealability	−0.10	−0.08	0.40**	0.20*	−0.14	0.26**	−0.28**	0.28**	−0.07	−0.19*	−0.06	0.35**	0.18*	—		
15	Peril	0.01	−0.07	0.33**	0.10	−0.21*	0.24**	−0.29**	0.07	−0.17*	−0.15*	0.12	0.10	−0.18*	0.31**	—	
16	Course	0.11	0.01	0.30**	0.08	−0.10	0.13	−0.16*	0.30**	−0.05	−0.16*	−0.05	0.11	0.17*	0.33**	0.23**	—

Note: $N = 203$.

*$p < 0.05$;

**$p < 0.01$.

Table V Model comparison results

Model	Fit of eight-factor model	Fit of seven-factor model	Chi-square difference
Eight separate latent factors (as hypothesized)	$\chi^2(297) = 487.88$		
Boundary flexibility items loading on identity threat		$\chi^2(304) = 848.72$	$\Delta\chi^2(7) = 360.84$, $p < 0.01$
Supervisor support items loading on identity threat		$\chi^2(304) = 825.77$	$\Delta\chi^2(7) = 337.89$, $p < 0.01$
Meta-perceptions items loading on identity threat		$\chi^2(304) = 773.74$	$\Delta\chi^2(7) = 285.86$, $p < 0.01$
Job self-efficacy items loading on identity threat		$\chi^2(304) = 618.13$	$\Delta\chi^2(7) = 130.95$, $p < 0.01$
Stigma centrality items loading on identity threat		$\chi^2(304) = 789.58$	$\Delta\chi^2(7) = 301.70$, $p < 0.01$
Work-related strain items loading on identity threat		$\chi^2(304) = 598.35$	$\Delta\chi^2(7) = 110.47$, $p < 0.01$
Work ability item loading on identity threat		$\chi^2(304) = 497.98$	$\Delta\chi^2(7) = 10.1$, $p < 0.01$

flexibility $b = -0.14$, $p = 0.01$, (c) meta-perceptions $b = 0.25$, $p < 0.01$ and (d) job self-efficacy $b = -0.24$, $p < 0.05$. Yet results did not support relationships of identity threat with (a) supervisor support $b = -0.11$, $p > 0.05$ or (e) stigma centrality $b = 0.08$, $p > 0.05$. Hypothesis 2 was supported: identity threat related to (a) job-related strain $b = 0.36$, $p < 0.01$ and (b) work ability $b = -1.08$, $p < 0.01$. The non-significant exogenous variables were removed from the model (precluding tests of Hypotheses 3a, 3b 7a, and 7b); the resulting fit was good: $\chi^2(235) = 413.39$, $p < 0.01$; $CFI = 0.92$; $RMSEA = 0.06$; $SRMR = 0.05$.

Hypotheses 4a and 4b were supported: the indirect effect estimate from boundary flexibility to strain was $ab = -0.07$, $p = 0.05$; 95% CI [−0.12, −0.03], and the estimate from boundary flexibility to work ability was $ab = 0.20$, $p < 0.01$; 95% CI [0.09, 0.35]. Hypotheses 5a and 5b were also supported: the indirect effect estimate for meta-perceptions to strain was $ab = 0.09$, $p < 0.01$; 95% CI [0.05, 0.14], and the indirect effect estimate for meta-perceptions to work ability was $ab = -0.28$, $p < 0.01$; 95% CI [−0.42, −0.17]. Hypotheses 6a and 6b were also supported: the indirect effect estimate for job self-efficacy to strain was $ab = -0.11$, $p = 0.05$; 95% CI [−0.25, −0.02], and the indirect effect estimate for job self-efficacy to work ability was $ab = 0.33$, $p < 0.05$; 95% CI [0.04, 0.65]. Overall, paths from three of five exogenous variables (boundary flexibility, meta-perceptions and job self-efficacy) to identity threat were significant, paths from identity threat to strain and work ability were significant, and the three significant exogenous variables each showed significant indirect effects to both strain and work ability (Figure 2).

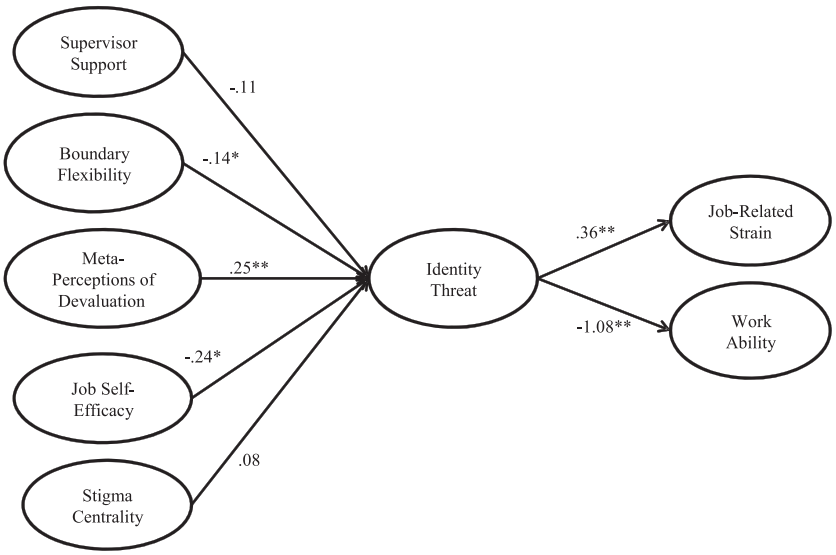

Figure 2 Final model with unstandardized estimates. *$p < 0.05$; **$p < 0.01$. Fit of the model was good: $\chi^2(440) = 714.93$, $p < 0.01$; comparative fit index = 0.91; root mean square error of approximation = 0.05; standardized root mean square residual = 0.05. Statistically significant indirect effects found for boundary flexibility—strain ($ab = -0.07$, $p < 0.01$), boundary flexibility—work ability ($ab = 0.20$, $p < 0.01$), meta-perceptions of devaluation—strain ($ab = 0.09$, $p < 0.01$), meta-perceptions of devaluation—work ability ($ab = -0.28$, $p < 0.01$), job self-efficacy to strain ($ab = -0.11$, $p = 0.05$) and job self-efficacy—work ability ($ab = 0.33$, $p < 0.05$)

Discussion

The purpose of this study was to examine work-related chronic illness stigma, identity threat and strain from the perspective of the individual worker through an application and empirical test of an established theoretical model (Major & O'Brien, 2005). We found some support for the proposed model: a situational factor (boundary flexibility), a personal characteristic (job self-efficacy) and meta-perceptions of devaluation each related to identity threat perceptions, which in turn related to both strain and work ability. Yet supervisor support and stigma centrality did not relate to identity threat as proposed.

It is not surprising, on the basis of prior research linking stigmatization to stress and strain (e.g. Major, Quinton, & McCoy, 2002; Miller & Kaiser, 2001; Miller & Major, 2000), that workers' perceptions of identity threat related to both feelings of strain and (lower) perceptions of work ability. These results support the notion that identity threat perceptions are stressful for workers with chronic illness. Notably, this population is especially vulnerable to effects of stress, as stress is often cited as a contributing factor to autoimmune disease progression and symptom flare-ups (e.g. Falgarone, Heshmati, Cohen, & Reach, 2013; McCray & Agarwal, 2011; Mohr et al., 2000; Walker, Littlejohn, McMurray, & Cutolo, 1999). Workplace stress-related interventions may, therefore, be particularly valuable for this population. Other interventions may focus on the model's exogenous variables, particularly boundary flexibility and job self-efficacy. As the number of individuals working with chronic illnesses is quite high, organizations conscious of being sensitive to this population may consider implementing some flexibility for all workers. Additionally, as we know that self-efficacy may be developed through social modelling and social persuasion (support; Bandura, 1994), job coaching may be helpful. Particularly, it may help enhance job self-efficacy to prevent identity threat experiences for workers with chronic illnesses.

Overall, of 17 hypotheses, 11 were supported. Therefore, we cannot state unequivocal support for the proposed model. As noted, it was surprising that neither supervisor support nor stigma centrality was significantly related to identity threat. Supervisor support had a significant bivariate correlation with identity threat ($r = -0.35$, $p < 0.01$), as well as with boundary flexibility ($r = 0.42$, $p < 0.01$). Therefore, modelling identity threat on both supervisor support and boundary flexibility simultaneously may have precluded finding significant effects for both. It is also possible that stigma centrality operates differently for different stigmas (e.g. chronic illness stigma versus race/ethnicity stigma); future research may test the meaning and correlates of stigma centrality focused on chronic illness as compared with other stigmatizing characteristics.

Overall, our adaptation of the model serves as a useful starting point for studying identity threat in this stigmatized worker population; our results also point to the need for replication and possible model modification. Our application of Major and O'Brien's (2005) theory contributes to a sparse literature exploring the psychological consequences of chronic illness-related stressors for individuals in the workplace. Notably, the targeted population is also a difficult one to reach. People managing chronic illness and working may not self-identify. Individuals who are working and who have chronic illness may also be reluctant to complete a survey about their chronic illness out of fear that their illness status would get back to their employer. It was, therefore, critical that the survey be anonymous. We feel fortunate to have attained a fairly large sample for this study.

Limitations

A primary limitation of this study is its cross-sectional design. Because all responses were obtained at one time point, we cannot make any assertions regarding causality. Yet we based the model upon an empirically and theoretically supported model (Major & O'Brien, 2005), so we had reason to expect the relationships would be as hypothesized. Additionally, because we used single-source, self-report data, common method variance is a concern. Nonetheless, we did not find evidence to support measured method effects of social desirability in our measurement model testing. Also, since responses were kept anonymous, and respondents could quit the survey at any time without repercussion, it is unlikely that individuals would intentionally distort their responses. As this study dealt with individuals' perceptions and attitudes, self-report is appropriate and, perhaps, the best way to measure these constructs (Spector, 1994). A final limitation to note is that it is possible that the recruitment methods used for this study influenced the results. Individuals who have experienced more stigma and identity threat may have been more likely to participate in the study, and subsequently levels of stigma and responses may be over-reported.

Conclusion

Chronic illness is a large and growing issue for individuals and the organizations that employ them, yet empirical research on this population is lacking. Stigmatization and the related concept of identity threat are understudied issues in this population and are distinct from physical challenges these workers may face. This study adds to the literature in that it is a first attempt to empirically examine a model of stigma, identity threat and strain as it relates to chronic illness in the workplace from the

perspective of the stigmatized worker. Boundary flexibility and job self-efficacy may be critical variables to target for interventions targeted toward this worker population. We hope to see work in this important area continue.

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