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Pregnancy and workplace accidents: The impact of stereotype threat

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ABSTRACT

This study examines the impact of stereotype threat (ST), the fear of confirming negative assumptions about a group to which one belongs (Steele, C. M. [1997]. A threat in the air: How stereotypes shape intellectual identity and performance. *American Psychologist*, *52*(6), 613–629), on the safety performance of pregnant workers. To avoid being stereotyped, pregnant employees may engage in concealing or supra-performance as coping strategies, which is predicted to jeopardise their safety. The strength and direction of the proposed causal relationships was tested using a rigorous longitudinal design with survey data from pregnant employees working in physically demanding jobs at three separate time points over two months ($N_1 = 402$; $N_2 = 229$; $N_3 = 191$). Latent growth curve modelling analysis indicated that ST is associated with greater use of concealment and supra-performance as coping strategies, as well as more experienced workplace accidents. Moreover, supra-performance appears to partially account for the relationship between ST and accidents. Scientifically, this study uniquely contributes to the literature by bridging two areas of research (stereotype threat and occupational safety) that have largely proceeded independently of each other. Given that pregnant workers represent a vulnerable and increasing sector of the workforce, it is critical to establish an empirical basis that can inform targeted and strategic interventions for improving the safety and health of pregnant employees.

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Occupational health; safety; stereotype threat; pregnancy; accidents

Women undergo many psychological and physical changes during pregnancy. These changes may necessitate alterations in behaviour (e.g. avoid lifting heavy objects) and/or job-related accommodations in order to protect the health and well-being of both mother-to-be and growing unborn child (Silver-Greenberg & Kitroeff, 2018). Despite physician recommendations and laws protecting the use of such reasonable accommodations, there are often discrepancies between recommended behaviours for working pregnant women and their actual on-the-job behaviours (Swarns, 2014), such as nurses standing through long shifts.

Unfortunately, research on the relationship between pregnancy and occupational safety outcomes as well as mechanisms underlying these relationships is scant. Research on pregnant employees largely focuses on direct risk factors for the unborn child. For example,

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research indicates pregnant employees' exposure to occupational stressors (e.g. psychosocial stress, economic stress, job strain, emotional stress, physical stress) as well as occupational conditions (e.g. irregular or long hours, standing, lifting loads, noise, exposure to hazardous materials, repetitive tasks, inadequate breaks, staying in a confined area) can have a negative impact on birth weight (Carlson, 2015; Loomans et al., 2012), preterm delivery (Harland, 2010; Lee et al., 2011), spontaneous abortion (Attarchi et al., 2012; Yang et al., 2014), and neurodevelopment (Kim et al., 2015). What little research there is on pregnant employees shows working while pregnant is related to back pain (Cheng et al., 2009) and long-term sick leave (Kaerlev et al., 2004).

Not surprisingly, given the dearth of studies investigating impacts on the pregnant employee's health, the relationship between pregnancy and occupational safety outcomes remains a largely unexplored area in the organisational literature. To address this gap, the current study proposes that stereotype threat (ST) – the fear of confirming negative assumptions about a group to which one belongs (Steele, 1997) – will be associated with increased efforts to conceal one's pregnancy and supra-perform at work. In turn, these will be related to an increase in experienced workplace accidents. Using a longitudinal design and latent growth curve modelling, we tested the proposed paths in this model by gathering survey data from pregnant employees at three separate time points over a two month span to evaluate the strength and direction of the proposed causal relationships. In this fashion, both within-person changes and between-person effects were assessed over time.

The effects of stereotype threat on safety performance

ST occurs when one feels at risk of confirming a negative stereotype about a social group in which they are a member (Steele, 1997; Steele & Aronson, 1995). There are an array of social group stereotypes within society including but not limited to race, gender, sexual orientation, age, political affiliation, religion, nationality and socioeconomic status. According to Steele and colleagues (Steele, 1997; Steele & Aronson, 1995) there are short- and long-term consequences of ST, such that acute ST leads to decreased performance, whereas chronic ST leads to disengagement from the negatively stereotyped group. Our study focuses on the performance-related outcomes of pregnancy-related ST.

Numerous studies replicated under a variety of conditions and contexts demonstrate that ST has a detrimental impact on performance of individuals who are negatively stereotyped (for a meta-analysis, see Nguyen & Ryan, 2008). Unfortunately, studies within an organisational context other than personnel selection have been scant (Kalokerinos et al., 2014), as the existing literature is largely based on student populations and laboratory studies.

Nevertheless, stereotypes in the work setting are common. In an initial study of the types and prevalence of stereotypes regarding pregnancy at work, Morgan et al. (2013) identified four specific stereotypes regarding pregnant workers which are prevalent in the workplace: incompetence, lack of commitment, inflexibility, and a need for accommodation. Moreover, managers who held these stereotypes about pregnant workers were more likely to discriminate against a pregnant job applicant unless the applicant provided counterstereotypic information during the interview. Recent work by Little et al. (2015) indicates pregnant women are aware of and concerned with how they are viewed by others at work. Specifically, they found a negative relationship between image maintenance and perceived

discrimination, such that workers who perceive discrimination at work allocate more effort toward proactively managing the image others have of them.

We propose that in an attempt to maintain their professional social identity, women may avoid enacting behaviours that could potentially confirm negative stereotypes of pregnant workers – even if this means placing themselves and the unborn child at risk. Pregnant employees' concern over negative stereotypes is not unfounded; indeed, research indicates that pregnant women face discrimination at work (Hebl et al., 2007; Morgan et al., 2013). Moreover, even when pregnant employees request pregnancy-related accommodations, these requests may be denied (Silver-Greenberg & Kitroeff, 2018) resulting in pregnant employees having to choose between losing their job or continuing to perform potentially risky job-related behaviours (e.g. lifting heavy objects).

According to the ST model (Steele, 1997), within a stereotyped group there is a controlling mechanism which essentially triggers ST; for the group of pregnant employees this trigger is when one becomes pregnant while employed. ST is salient for pregnant women specifically when they are at work. Additionally, Steele (1997) suggests that the effort one puts forth to counter a negative stereotype can be exhaustive. Indeed, in support of this, an unpublished study by Isgrigg (2010) examined cognitive performance among pregnant women in response to exposure to stereotypes of pregnant women as having "heightened emotions and decreased attention." In response to exposure to that stereotype threat, pregnant women exhibited a significant decline in cognitive performance. Attempts to disprove negative stereotypes by working harder or longer hours or continuing to perform risky behaviours (e.g. heavy lifting) may potentially put pregnant employees at risk of poor safety performance outcomes, i.e. increased workplace accidents.

Based on Steele's (1997) ST model and the extant empirical evidence, we predict:

Hypothesis 1: Higher levels of ST (between-person differences) will be related to reduced safety performance, specifically increased accidents.

Additionally, we expect that ST will increase as the pregnancy advances and becomes more visible to others within the organisation. These within-person changes as the pregnancy advances will be related to increases in poor safety-related outcomes over time. Thus,

Hypothesis 2a: ST will increase over time (within-person effect).

Hypothesis 2b: These increases in ST will be related to increased accidents.

The effect of stereotype threat on coping with concealable stigmas

We propose that ST will be related to increased accidents due to two coping mechanisms that research (Clair et al., 2005) indicates employees use in response to the concealable stigma of pregnancy at work as a means of identity management: (1) avoiding telling others about your invisible social identity (concealing), and (2) revealing this social identity to coworkers.

Research shows that pregnant employees feel ostracised at work and result to secrecy, silence, or supra-performance to combat unwelcome stereotypes about their performance at work (Gatrell, 2011). Secrecy is when a woman hides her pregnancy. Silence is when an employee keeps her pregnancy out of conversations at work. Lastly, supra-performance is when an employee goes above and beyond her regular work in order to exceed performance

expectations. Therefore, ST may influence pregnant employees' concealment of pregnancy (via secrecy or silence) in an effort to blend in while at work and avoid differential treatment or possible discrimination, or due to supra-performing. Either may be detrimental to safety.

Because pregnancy is a dynamic condition, for individuals affected by ST, it is also plausible these strategies may change as the pregnancy progresses. For example, during the early stages of pregnancy, women may find that concealing their pregnancy is a viable coping mechanism in response to ST. However, when the pregnant employee begins to physically show, concealment may no longer remain an option and supra-performance may increase.

Unfortunately, research on the use of concealment and supra-performance in response to pregnancy-related ST, how these strategies may change over time, or how these coping strategies relate to health outcomes is scarce. One recent study by Jones et al. (2016) found that when a pregnant employee revealed their pregnancy they experienced an increased frequency of physical health symptoms, which then led to decreased revealing (i.e. increased concealing). Thus, that study found concealment to be a protective measure for pregnant employees. However, it is still unknown how concealing or revealing one's pregnancy at work may impact other outcomes such as workplace accidents.

We contend that both concealment and supra-performance may lead to poor safety-related outcomes. For example, concealing one's pregnancy may make it more difficult to request or obtain a lighter workload duty or take additional work breaks to alleviate long hours of standing. The use of supra-performance may lead one to be more hesitant to request or utilise such accommodations in the first place.

In sum, empirical evidence indicates that invisible social identities play an important role in one's social interactions (Clair et al., 2005) and that pregnant women do feel stereotyped at work (Gatrell, 2011; Ridgeway & Correll, 2004; von Hippel et al., 2011a, 2011b). Moreover, research has shown these employees resort to either concealment efforts as a means of protecting themselves (Gatrell, 2011; Jones et al., 2016; von Hippel et al., 2011a, 2011b) or revealing which may lead to supra-performance (Gatrell, 2011) and increased physical health symptoms (Jones et al., 2016). Given these findings, we predict:

Hypothesis 3a: Higher levels of ST will be related to greater concealment of pregnancy status while at work (between-subjects effect).

Hypothesis 3b: ST will increase as a woman's pregnancy advances, which will lead to greater concealment efforts over time (within-subjects effect).

Hypothesis 3c: Higher levels of ST will be related to increased supra-performance (between-subjects effect).

Hypothesis 3d: ST will increase as a woman's pregnancy advances, which will lead to increased supra-performance over time (within-subjects effect).

Pregnancy concealment and supra-performance as mediators of the stereotype threat - Safety relationship

According to Conservation of Resources Theory (COR; Hobfoll, 1989), individuals aim to maintain resources, personal characteristics and beneficial conditions. Stress occurs for the individual when there is a loss or perceived potential loss of resources, personal

characteristics, or beneficial conditions. According to COR, a stressor such as ST could risk the loss of resources (e.g. perceived competence), personal characteristics (e.g. self-esteem) and/or beneficial conditions (e.g. social support or supervisor support) that an individual aims to maintain. Thus, ST represents a potentially stressful loss of resources.

We propose that employees will attempt to conserve their resources via the mechanisms of pregnancy concealment and/or supra-performance. Specifically, in order to maintain resources and avoid possible losses, an individual may conceal their pregnancy and/or supra-perform in an attempt to avoid being negatively stereotyped into the group of pregnant worker. These coping strategies could potentially lead to engaging in normal work behaviour (e.g. lifting heavy loads, standing for long periods of time) that is no longer safe given the employee's pregnant status. Additionally, with supra-performance one may actually increase one's workload to more than normal in an attempt to go above and beyond. Thus, we predict:

Hypothesis 4: Pregnancy concealment will partially mediate the relationship between ST and accidents (between-subjects effect).

Hypothesis 5: There will be a partial mediation effect of supra-performance on the relationship between ST and accidents (between-subjects effect).

Method

Participants

In order to test our hypotheses, we recruited pregnant employees at all stages (trimesters) of their pregnancy. All participants were initially screened to ensure they were employed in physically demanding jobs that typically require enactment of behaviours that have been classified as risky prenatal behaviours (MacDonald et al., 2013; Palmer et al., 2013), and were working during their pregnancy. Recruitment of participants utilised list-servs, online "mom groups," social media, community flyer-boards, obstetrician office flyer-boards, day care centre flyer-boards, elementary school flyer-boards, postings on Craigslist and Amazon's Mechanical Turk. Recruitment materials explicitly stated that participants must be pregnant and working in a job which was physically demanding (e.g. long work hours, shift work, lifting, standing, or high physical work load). The most frequently represented occupational sectors were Manufacturing (14.1%), Health Care and Social Assistance (11.1%), Retail Trade (8.1%), Finance and Insurance (8.1%), and Educational Services (7.8%). Others (among the 20 total represented) included Accommodation and Food Services, Utilities, Agriculture, and Construction. Although a convenience sample, this sampling strategy provided a representative and diverse set of participants with respect to: stage of pregnancy, age, ethnicity, industry sector, and geographic location.

As might be expected, there was sample attrition over time, with final sample sizes of $N_1 = 402$ at Time 1, $N_2 = 229$ at Time 2, and $N_3 = 191$ at Time 3. At Time 1, 64.1% of participants were Caucasian, 20.9% Asian American, 7.2% African American, 6.2% Latina, 0.5% Native American, 0.7% Native Hawaiian or Pacific Islander, and 0.2% more than one ethnicity. The average age was $M = 29$ years, $SD = 4.59$ years. The plurality of participants had a Bachelor's degree (44.7%), with other educational attainments as follows: 0.7%

some high school, 8.3% high school degree, 17.1% some college, 14.7% Associate's degree, 11.2% Master's degree, 1.2% Doctoral or professional degree, and 0.2% other type of degree. For 76% of the sample, this was their first pregnancy; 50.5% were in their first trimester, 34.6% in the second, and 8.4% in the third at the start of the study. Most women (89.5%) intended to return to their job after giving birth. A majority of pregnant employees had a male supervisor (53.7%).

Measures

Pregnant working women completed a three-wave web-based survey containing the following measures administered via Qualtrics with a one month lag between each survey.

Stereotype Threat: We used an existing self-report measure of stereotype threat (Shapiro, 2011) that has been previously used in a variety of different negatively stereotyped groups (e.g. race, mental illness, weight, religion, blindness) and specifically adapted in this study for use with a pregnant population. To adapt the scale for this group, the scale first asked respondents to provide "a negative stereotype about pregnant employees" and indicate a situation in which their "behaviours at work might confirm that stereotype." Their personalised response was then piped into the text of the 12-item stereotype threat scale assessing self-concept threat, group-concept threat, own-reputation threat, and group-reputation threat. This validated method of measuring stereotype threat allows the individual's own perceptions of the specific stereotype to be incorporated in the questions about potential threat. In other words, the scale did not just assess whether participants were aware of potential stereotypes, but specifically gauged the extent to which they were worried that they might confirm those negative stereotypes. A sample item is " … to what extent are you concerned that because you are a pregnant worker, your actions could influence the way other people interact with you?" Another sample includes " … to what extent are you concerned that your actions will reinforce the negative stereotypes, to others, about pregnant workers?" Additionally, in an exploration of the stereotypes reported in this sample, the top five most represented themes and sample behaviours were that pregnant women are perceived as "incompetent" (e.g. can't complete work duties, can't concentrate), "physically weak" (e.g. tired, slow), "lazy," "lacking commitment" (e.g. won't return after giving birth), and "needing special treatment" (e.g. asking for accommodations).

All items used a 7-point Likert-type scale (1 = strongly disagree, 7 = strongly agree) to indicate the extent to which respondents experienced ST regarding their pregnancy status at work. Responses were averaged such that higher scores reflect greater ST.

Concealment of pregnancy and supra-performance. In order to assess supra-performance and concealment efforts, we used the 23-item Social Identity-based Impression Strategies Scale during Pregnancy developed and validated in a multi-study project by Little et al. (2015). According to Little et al., items on the scale load onto two higher level factors, image maintenance and decategorization, which correspond to supra-performance and concealment, respectively (e.g. Clair et al., 2005; Gatrell, 2011; Jones et al., 2016).

Supra-performance reflects employee efforts to: maintain one's work pace, not request special accommodations, go the extra mile, and reduce one's leave time. A sample item is, "I try to work harder in my job since I became pregnant." The *concealment* scale reflects efforts to pass as non-pregnant and downplay their pregnancy. A sample item is, "I try to

hide my physical signs of pregnancy." Item responses ranged from strongly disagree (1) to strongly agree (5), and coded such that higher numbers reflect greater supra-performance or concealment.

Accidents: Two open-ended response items originally developed and validated by Smecko and Hayes (1999) and later adapted by Probst and Brubaker (2001) asked how many work-related accidents participants had experienced and reported over the past month, as well as how many were experienced but not reported. Responses to the two items were summed to give a total number of experienced workplace accidents.

Supervisor Support. In order to avoid mis-specifying our model, we included a 14-item measure of Family Supportive Supervisor Behaviors (FSSB; Hammer et al., 2011) as a control variable. Participants used a 5-point scale to indicate the extent to which they agreed with statements such as "My supervisor is willing to listen to my problems in juggling work and nonwork life." Responses were coded such that higher numbers indicate greater perceived supervisor support.

Analysis plan

Because we were interested in both between-person and within-person effects, we used parallel process latent growth curve modelling (LGCM) within MPlus (Muthén & Muthén, 2015) to simultaneously test our hypothesised between- and within-person main and indirect hypotheses. Such an analysis allows us to test the between-person effects, including whether individuals who are higher in ST also report higher levels of supra-performance, concealment, and workplace accidents, compared to individuals lower in ST. These are referred to as cross-sectional associations. It also evaluates whether within-person changes in ST over the course of the study correspond to within-person changes (increases/decreases over time) in supra-performance, concealment, or accidents. These are known as parallel associations. Finally, the LGCM analysis evaluates whether concealment or supra-performance explain the relationships between ST and workplace accidents, i.e. tests our hypothesised indirect effects.

Because participant attrition often poses a concern regarding potential differences between study completers and non-completers (Graham, 2009), we followed recommendations by Collins et al. (2001) and Graham (2009) to identify and include auxiliary variables that were predictive of Time 3 missingness as controls in our analysis. It is also important to note that in addition to offering a parsimonious test of our hypothesis, the robust maximum likelihood (ML) estimation used to analyze our data in MPlus is a full information modelling technique that is robust to violations of the assumption that data are missing completely at random (MCAR). Indeed, researchers argue (e.g. Graham, 2009) that the ML estimation used in MPlus performs better than listwise deletion.

Results

Analysis of participant attrition

Comparisons of those who completed the study to those who did not complete the study showed significant differences on a number of demographic variables. Specifically, the variables that best predicted participant attrition were minority status ($r = -.32$, $p < .01$),

age (.25, $p < .01$), and first pregnancy (−.24, $p < .01$), such that racial/ethnic minorities, younger participants, and those experiencing their first pregnancy were *less likely* to drop out from the study. Given this, we compared the model fit and parameter estimates of a LGCM model including minority status, age, and first pregnancy as controls to our originally hypothesised more parsimonious model without these controls.

Preliminary analyses

Table 1 presents the descriptive statistics and correlations among the study's measures at Time 1; correlations at Time 2 and 3 are available upon request. As expected, ST was significantly associated with higher levels of supra-performance ($r = .38$, $p < .01$), concealment efforts ($r = .35$, $p < .01$), and experienced workplace accidents ($r = .22$, $p < .01$). Interestingly, supra-performance ($r = .14$, $p < .01$) but not concealment ($r = .04$, *ns*) was correlated with accidents. This suggests that supra-performance may be the more pertinent mediating mechanism explaining the relationship between ST and accidents. However, to more rigorously test our between- and within-person hypotheses, we next conducted the LGCM analyses.

Model fit comparisons with and without potential controls

As noted earlier, participant attrition was associated with age, race, and whether it was the woman's first pregnancy; additionally, we had included FSSB as a pre-planned control variable. Therefore, two LGCM models were tested with and without these control variables. The first LGCM model (without the controls) exhibited good model fit, according to traditional model fit indices (Hooper et al., 2008): $\chi^2(46) = 91.70$, $p < .01$; RMSEA = .048; CFI = .966; and, TLI = .951. The LGCM model with controls exhibited poorer model fit (likely due to the fact that many of the controls were unrelated to accidents): $\chi^2(90) = 251.34$, $p < .01$; RMSEA = .067; CFI = .893; and, TLI = .864.

Based on these model fit indices, the best fitting model appeared to be the originally hypothesised (more parsimonious) model without the control variables. However, because Collins et al. (2001) and Graham (2009) recommend including variables accounting for missingness in order to reduce the bias in parameter estimation (which is our

Table 1. Correlations and descriptive statistics at Time 1.

	M (SD)	1	2	3	4	5	6	7	8	9
1. ST	4.37(1.32)	(.95)								
2. Cncl	4.49(.74)	.35**	(.88)							
3. SP	3.49(.58)	.38**	.55**	(.85)						
4. Accid	.96(2.37)	.22**	.04	.14**	–					
5. Age	29.11(4.59)	−.17**	−.09	−.13*	−.06	–				
6. Stage	1.55(.66)	−.16**	−.01	−.05	−.10*	.12*	–			
7. FSSB	5.15(1.03)	.20**	.39**	.37**	.03	−.04	.08	(.95)		
8. 1st Preg	0.76(.43)	.30**	.09	.12*	.12*	−.47**	−.21**	.07	–	
9. Minority	.36(.48)	.25**	.23**	.36**	.04	−.28**	−.07	.16**	.16**	–

Notes: Used to test between-person hypotheses; Cronbach's alpha along the diagonal; *$p < .05$; **$p < .01$; ST = stereotype threat; Cncl = Concealing; SP = supra-performance; Accid = accidents; Age = in years; Stage = pregnancy trimester; FSSB = family supportive supervisor behaviours; 1st pregnancy was coded so 0 = not the first pregnancy and 1 = first pregnancy; minority was coded so 0 = Caucasian and 1 = minority. Tables for T2 and T3 are available upon request from the 1st author.

primary interest in this study), we report below the results from the model including the controls. It is important to note, however, that both models demonstrated the same pattern of results, and none of the hypothesis tests of interest differed between the two models. Results from the original model are available upon request from the first author.

Tests of between-subjects hypotheses

Table 2 presents the intercept and slope coefficients for the variables within the LGCM model, as well as the cross-sectional and parallel associations among the model intercepts and slopes. To facilitate the interpretation of these results, Figure 1 presents the LGCM path coefficients only for the between-subjects effects. These intercept coefficients can be interpreted as traditional structural equation path coefficients, i.e. the associations among the variables at baseline. As can be seen, only one of the control variables was

Table 2. Parameter estimates from the latent growth curve model.

	Estimate	95% Confidence interval
Latent growth parameters		
Stereotype Threat		
Intercept (I)	4.394**	4.268, 4.521
Slope (S)	.294**	.131, .457
Cov(I,S)	−.630**	−.909, −.351
Var (S)	1.113**	.529, 1.697
Accidents		
Intercept (I)	.969**	.730, 1.209
Slope (S)	.187	−.006, .379
Cov(I,S)	−2.752*	−4.915, −.590
Var (S)	2.216*	.468, 3.963
Supra-performance		
Intercept (I)	3.498**	3.443, 3.554
Slope (S)	0.016	−.044, .075
Cov(I,S)	−.046**	−.079, −.012
Var (S)	.202**	.146, .257
Concealment		
Intercept (I)	4.495**	4.424, 4.566
Slope (S)	−1.231**	−1.339, −1.124
Cov(I,S)	−.101*	−.195, −.008
Var (S)	.611**	.479, .743
Cross-sectional associations		
Intercept(ST)→Intercept(SP)	.311**	.216, .406
Intercept(ST)→Intercept(Conceal)	.350**	.239, .462
Intercept(ST)→Intercept(Acc)	.368*	.025, .710
Intercept(SP)→Intercept(Acc)	.667*	.083, 1.251
Intercept(Conceal)→Intercept(Acc)	.011	−.746, .767
Parallel associations		
Slope(ST)→Slope(SP)	.699*	.163, 1.235
Slope(ST)→Slope(Conceal)	2.18**	.732, 3.628
Slope(ST)→Slope(Acc)	−3.077	−15.026, 8.871
Slope(SP)→Slope(Acc)	−4.354	−33.417, 24.710
Slope(Conceal)→Slope(Acc)	3.034	−11.572, 17.641
Indirect effects		
ST(I)→Conceal(I)→Acc(I)	.004	−.261, .269
ST(I)→SP(I)→Acc(I)	.208*	.024, .391

Note: ST = Stereotype threat; *SP* = Supra-performance; Conceal = Concealment; Acc = Accidents. Intercept coefficients represent the average levels of the variable at baseline. Slope coefficients represent the average monthly change (positive or negative) in each variable. The covariance coefficients represent the association between the intercept (i.e. mean Time 1 level) and slope (i.e. average monthly change). Intercept → Intercept coefficients represent the cross-sectional associations between variables at baseline. Slope → Slope coefficients represent the parallel association between monthly changes in X and monthly changes in Y.

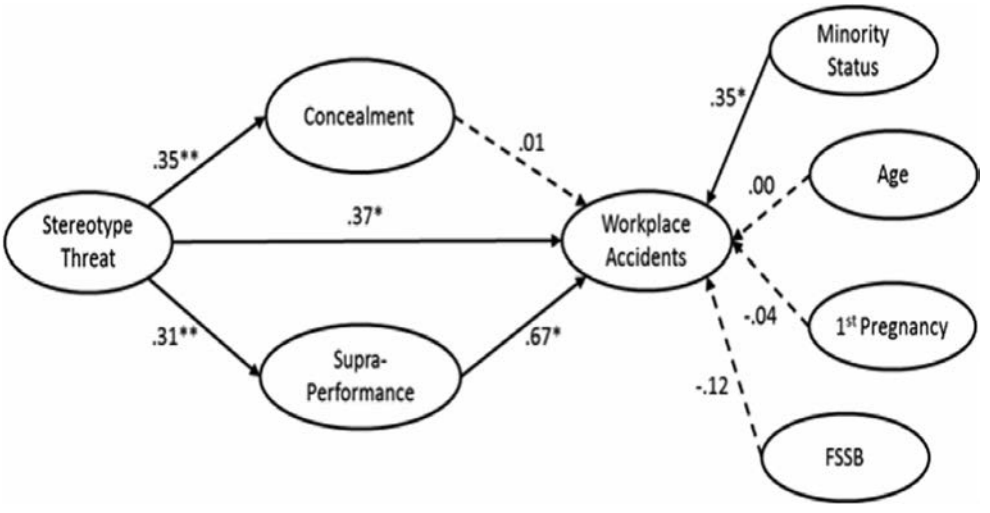

Figure 1. Unstandardised between-subjects parameter estimates of ST predicting concealment, supra-performance, and accidents. The solid lines represent significant relationships which are also signified by the *when significant at the .05 or **for the .01 level. Dotted lines represent non-significant relationships.

significantly associated with workplace accidents: minority status (.35, $p < .01$), such that racial/ethnic minorities experienced more accidents compared to Caucasian pregnant workers. In support of Hypothesis 1, participants reporting higher levels of ST experienced significantly more workplace accidents (.37, $p < .01$). In support of Hypothesis 3a and 3c, pregnant employees who had higher levels of ST also exhibited significantly greater concealment efforts (.35, $p < .01$) and more supra-performance (.31, $p < .01$).

Finally, to evaluate the potential mechanisms explaining the relationship between ST and accidents, we requested MPlus to provide estimates of the indirect effects via concealment and supra-performance. Contrary to Hypothesis 4, the indirect effect of ST on accidents via concealment was non-significant (.004, *ns*; 95% CI: −.261–.269). However, in support of Hypothesis 5, the indirect effect of ST on accidents via supra-performance was significant (.208, $p < .05$; 95% CI: .024–.391).

Tests of within-subjects (growth) hypotheses

Hypothesis 2a predicted that ST would increase (within-person) as the women's pregnancy progresses. In support of this, the mean slope coefficient for ST was .192 ($p < .05$). In other words, regardless of how much ST a women perceived at Time 1, in general her levels of ST increased significantly over the next two months. The variance in this slope coefficient was not significant (.046, $p = .18$), meaning that increasing levels of ST (i.e. the growth in ST) over time as the pregnancy progressed occurred equivalently among participants in our study.

Although we did not make predictions regarding the slope coefficients (or growth over time) for our two predicted mediators, knowing those coefficients is necessary to interpret the results of the relationships among the growth coefficients presented in Figure 2. Specifically, as shown in Table 2, the mean growth coefficient for concealment was

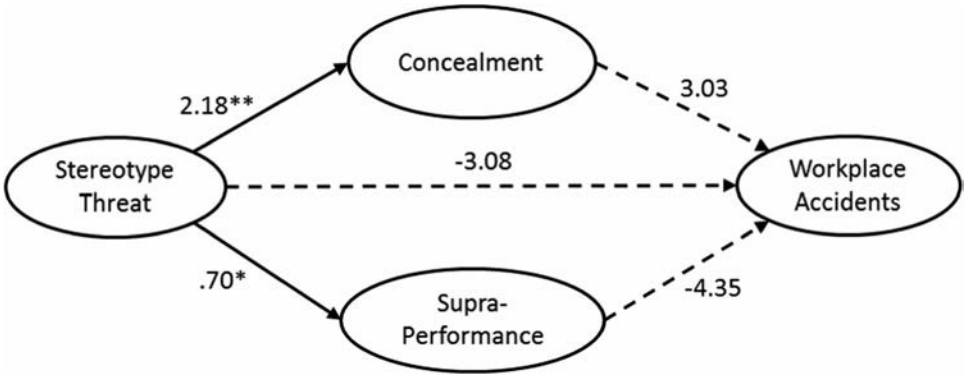

Figure 2. Unstandardised within-subjects parameter estimates of growth in ST predicting growth in concealment, supra-performance, and accidents. The solid lines represent significant relationships which are also signified by the *when significant at the .05 or **for the .01 level. Dotted lines represent non-significant relationships.

negative (−1.231, $p < .01$), i.e. concealment significantly declined within person over time. In other words, as their pregnancies progressed, pregnant workers engaged in significantly fewer concealment efforts. The variance in the slope coefficient was also significant (.611, $p < .01$), meaning that some pregnant workers decreased their concealment efforts more than others over time.

The mean growth coefficient for supra-performance was positive but non-significant (.016, *ns*). In other words, as their pregnancies progressed, pregnant workers generally engaged in the same levels of supra-performance across the three timepoints. However, the variance in the slope coefficient was significant (.202, $p < .01$), indicating that some pregnant workers increased their supra-performance efforts more than others over time.

Finally, the mean growth coefficient for accidents was positive (.187, $p = .058$). While the coefficient appears to indicate that accidents experienced by pregnant workers increased as their pregnancies progressed, this did not reach statistical significance. However, as with the other variables, the variance in the slope coefficient was significant (2.216, $p < .05$), indicating that some pregnant workers exhibited greater increases in experienced accidents over time than others.

Given that the above results indicate significant variability across our participants in their growth rates over time on the constructs of interest, our next step was to determine whether our hypothesised predictors of those changes over time were supported.

Figure 2 presents the path coefficients among our slope coefficients across time, i.e. the associations between monthly changes in one variable and monthly changes in another variable. In other words, the slope coefficients indicate whether growth over time in X predicts change or growth over time in Y. As can be seen in Figure 2, the coefficient between ST and concealment was significant (2.18, $p < .01$), supporting Hypothesis 3b. Because the growth coefficient for concealment was negative, this path coefficient indicates that greater increases in ST over time were associated with smaller decreases in concealment over time. In other words, individuals who experienced increasing levels of ST as their pregnancy progressed did not show as large a decrease in concealment efforts over time as individuals who experienced less growth in ST over time.

The path coefficient between ST and supra-performance was also significant (.70, $p < .01$), supporting Hypothesis 3d. Because the growth coefficient for supra-performance was positive, this path coefficient can be interpreted as indicating that greater increases in ST over time were associated with larger increases in supra-performance over time. In other words, individuals who experienced increasing levels of ST as their pregnancy progressed exhibited larger increases in supra-performance efforts over time compared to individuals who experienced less growth in ST over time.

As can be seen in Figure 2, the remaining paths among the slope coefficients were non-significant. In particular, within-person changes in ST over time were unrelated to within-person changes in accidents over time, thus failing to find support for Hypothesis 2b.

Discussion

In light of a changing work force with increasingly representative numbers of both women and men, we expect to see more women experience pregnancy while working. Despite this, little research thus far has attempted to understand how psychosocial variables could impact the safety experiences of pregnant workers. The current study aimed to fill this gap by exploring relationships between ST and workplace accidents as well as explain the relationships through two potential mediating variables, concealing and supra-performing.

Specifically, we found that ST was significantly related to an increase in workplace accidents. Thus, pregnancy-related ST appears to be a risk factor for poor occupational safety outcomes. Additionally, pregnancy-related ST increases intra-individually over time suggesting that pregnancy can be viewed as a dynamic and increasing social stigma throughout the pregnancy. ST was also significantly related to increases in concealment and supra-performance, indicating that pregnant employees utilise both coping strategies to combat the negative effects of ST.

Interestingly, increases in ST over time were associated with smaller decreases in concealment by pregnant workers over time. Thus, although concealing inherently tends to become more difficult as a pregnancy progresses, women who experienced increases in ST over time decreased their concealment in smaller increments compared to women whose levels of ST stayed the same or declined over the course of the study. On the other hand, increases in ST over time were also associated with larger increases in supra-performance over time, suggesting that women who utilise supra-performance as a coping mechanism to combat experiences of ST maintain this strategy over time by increasing their supra-performance efforts.

To explore these relationships further, we tested whether concealment and supra-performance act as mediators of the ST-accident relationship. While concealment did not mediate the relationship between ST and accidents, supra-performance was a significant mediator. Thus, the use of supra-performance as a coping strategy for ST appears to negatively impact safety outcomes and is associated with pregnant workers experiencing more accidents.

Theoretical and practical implications

COR theory (Hobfoll, 1989), was used to develop and test the hypotheses in the current study. When potential loss seems plausible, we experience stress and we may engage in

using resources we have as a coping mechanism or strategy. This study found support for COR theory as the results showed that ST (a stressor) was related to unsafe outcomes during pregnancy, and these relationships were mediated by a coping strategy (supra-performance). As expected, the stressor of ST leads pregnant employees to engage in a coping strategy of supra-performance to combat the potential loss of resources and maintain their current resources at work, thus finding support for the COR theory. However, support was not found when testing the concealment mediator. Thus, while concealment was used in response to the psychosocial stressor of ST for pregnant workers, its use did not explain the relationship between ST and accidents.

Nonetheless, the current study was the first to explore the relationships between ST and employee safety via concealment or supra-performance. The call for more research on ST in organisations (Kalokerinos et al., 2014) still stands as an important area of exploration both theoretically and practically. Better understanding of how ST impacts pregnant employees through increases in supra-performance and concealment may have relevance for other important employee outcomes such as experienced discrimination, work-family dynamics, and social support, as well as have implications for organisational policy making.

Practically speaking, better understanding of the relationship between ST and employee safety via concealment or supra-performance could further inform organisational level policy changes, leadership training, organisational culture, and employee treatment. The study of pregnancy in the workplace thus far has shown that despite laws and policy, discrimination persists (Hebl et al., 2007; Morgan et al., 2013). Indeed, a recent popular press article (Silver-Greenberg & Kitroeff, 2018) documented numerous instances of pregnant women who work in strenuous jobs having their requests for lighter workloads denied and subsequently miscarrying. The current study finds that pregnant women are aware of pregnancy-related stereotypes and discrimination and that they engage in potentially harmful supra-performance and concealment strategies as coping mechanisms.

A purposeful first step for any organisation would be to ensure that stereotypic messages are not being explicitly or implicitly conveyed by management or those in leadership roles. Duguid and Thomas-Hunt (2015) note that organisational leaders need to take great care when discussing the existence of stereotypes. Specifically, leaders should avoid the "simple awareness" approach which acknowledges that "everyone stereotypes" and that this is an "unavoidable reality." Rather than resulting in individuals becoming more open to discussing these stereotypes and actively working against their natural inclinations to stereotype simply by being aware of their existence, research shows that this simple awareness approach may actually have a negative impact by expressing to others that stereotyping is socially normative (Duguid & Thomas-Hunt, 2015). Thus, simply pointing out that stereotypes exist will not lead to the intended outcome, although the intention may be well-meant.

It may potentially be more impactful for organisations' leaders to proactively model appropriate behaviour by ensuring they are not conveying stereotypic messages to co-workers or subordinates in the first place. Another potential place for organisations to intervene on behalf of their employees would be through showing counter-stereotypic examples. Dasgupta and Asgari (2004) showed that by simple exposure to counter-stereotypic individuals (e.g. female science professor, male nurse, female CEO) one could decrease their own stereotypic expectations and beliefs. Exploring this in an organisational setting could be fruitful.

Limitations and future directions

While this study makes a novel contribution to the literature, the study is not without limitations. The longitudinal design of the current study allowed us to explore the growth and interrelationships among our variables of interest over time. While a strength of the current study design, it may be more ideal to follow an employee throughout her entire pregnancy to see how this dynamic experience impacts safety behaviours over the full range of pregnancy. While such an extended longitudinal design would be ideal for studying the dynamic social stigma of pregnancy, at least within the workplace, this would be a costly and time intensive endeavour.

Another potential limitation to the current study is the level of attrition over the course of the study. Specifically, racial/ethnic minorities, younger participants, and those experiencing their first pregnancy (i.e. primigravida) were *less likely* to drop out from the study than non-Hispanic Caucasian, older, or multigravida women. Considering these differences, we cannot claim to have data that are missing completely at random (MCAR). Therefore, it is unknown how our results may have differed if those individuals had remained within the study.

Additionally, while we intentionally limited recruitment to pregnant women in physically demanding jobs because of the specific outcomes variables of interest, this does necessarily limit our ability to generalise only to that specific sub-population of employees. Nevertheless, when investigating safety outcomes, one must consider that they are low base-rate occurring phenomena, thus we focused on jobs in which safety issues were likely to be more prevalent. However, ST may impact women in a number of different jobs with lower levels of required physical exertion as well. Additionally, ST may impact women differently at various stages of pregnancy. How ST might interact with pregnancy stage or trimester within the context of workplace safety would be an interesting and fruitful investigation for future research.

While ST appears to grow over time and be related to the growth of both concealment and supra-performance over time, our safety outcome was difficult to analyze in growth models as accidents are very low base-rate occurring phenomena and thus highly skewed variables. Exploring other variables as outcomes within this nomological network or model may be a fruitful next step. For example, the growth in ST predicting growth in concealment and supra-performance may have detrimental impacts on other outcomes such as mental health, physical health, turnover intention, burnout or economic stressors. Additionally, ST may certainly be impacting employees in other occupations (not safety-related), but there may be other performance-related outcomes (e.g. in-role behaviours, creativity) that would be more likely to be affected than safety.

As previously mentioned, there is no extant literature assessing the impact of ST on workplace safety outcomes of pregnant workers. Therefore, the primary aim was to first establish whether this relationship exists. As noted by Hayes (2012), a programme of research into a novel area typically begins by establishing that a relationship exists between two constructs before expanding that programme of research to clarify the mechanisms through which the relationship operates, as well as potential moderators that may impose boundary conditions on those relationships. Given that we have established that a relationship between ST and accidents exists, and that there are at least two potential explanatory mechanisms, a fruitful avenue for future work may be to identify moderating

variables of these relationships. For example, COR theory would suggest that increased resources may potentially attenuate the adverse effects of ST. Such resources could occur at the individual level, i.e. psychological resources such as psychological capital (e.g. hope, optimism, resilience, and self-efficacy; Luthans et al., 2007) or grit. In theory, such individuals may have extra resources to cope with the stressor of ST and therefore may experience less detrimental outcomes or rely to a lesser degree on concealment or supra-performance as coping strategies. Alternatively, resources may accrue at the organisational-level via the provision of robust maternity leave and accommodation policies and strong social norms in favour of utilising those policies.

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