

**Hidden Barriers: The Relationship between Pain and Work Engagement during  
Menstruation, and the Role of Shame and Perceived Organisational Support**



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### **Abstract**

Menstruation is a natural, biological process experienced by a significant portion of the workforce, yet its impact on engagement and productivity remains underexplored. This study aimed to determine how menstruation affects work engagement on a day-to-day basis. Shame and perceived organisational support were included as potential moderators to assess whether they influenced levels of work engagement in the face of pain during menstruation. A daily diary design was employed with a view to collect data over a period of 10 days [N=101]. Results indicated significantly higher perceptions of pain during menstruation. Secondly, higher levels of pain were significantly related to the depletion of work engagement during menstruation. However, no significant moderating effects of shame or perceived organisational support were found. These findings contribute to the framing of menstrual pain as a barrier to work engagement. This barrier carries adverse effects for both the employee and the organisation, with employee engagement representing a source of competitive advantage. Organisations can protect the well-being of their employees by framing menstrual pain as an impediment to engagement and productivity to create supportive and conducive work environments through policy, practice, and intervention.

*Keywords:* menstruation, pain, work engagement, perceived organisational support, shame,

## **Hidden Barriers: The Relationship between Pain and Work Engagement During Menstruation, and the Role of Shame and Perceived Organisational Support**

### **Introduction**

Menstruation is a life-altering event that initiates a series of physiological and psychological changes within the body. Presently, menstruation is considered a ‘taboo topic’ that constrains the career of those who experience it (Grandey et al, 2015). Although it remains heavily under-represented in literature, a growing body of research has begun to examine experiences of menstruation in the workplace. According to Smith (2008), adverse symptoms of the menstrual cycle represent an important occupational health challenge for modern organisations. A recurring biological process, menstruation yields predictable effects on employee well-being and behaviours at work (Motro et al., 2019). Given that half of the workforce are female (World Bank Group, 2023), there is reason to believe that menstruation interferes with organisational functioning. Modern organisations strive to develop an engaged, productive workforce. Employee engagement represents a powerful source of competitive advantage (Bedarkar & Pandita, 2013) as engaged employees tend to contribute more in terms of organisational productivity and performance (Mehta et al., 2013). Menstruation has the potential to influence work engagement via physiological and psychological changes introduced to the body, impacting an individual's ability to fully engage in work-related tasks. Therefore, it is vital to examine the extent to which organisations can influence the engagement of People Who Menstruate (PWM) in the presence of menstrual pain. The present study investigates the relationship between pain and work engagement, alongside moderating factors that impact this relationship.

This study aims to explore how menstruation and its associated pain interfere with work engagement (WE) in the modern organisation, and how this association is altered by the presence of shame and perceived organisational support (POS). Traditionally, there has been a dearth of research regarding menstruation in the workplace, with menstruation often being cited as a source of inferiority among workers (Harlow, 1986). Harlow (1986) argued that scientists fail to consider the topic of menstrual dysfunction in the workplace as one requiring scientific scrutiny. These failures have led to the perpetuation of myths about the menstrual cycle and have damaged the search for causes of menstrual dysfunction. However, this publication originated in 1986, with minimal advances observed in research since. Furthermore, oppressive attitudes and beliefs about menstruation in the workplace that

permeate the literature may have negatively affected employee well-being and professional achievements (Bobel et al., 2020). In some cultures, women are believed to be unclean during their menstrual periods, leading to ostracisation (Bobel et al., 2020). Thus, it is likely that previous research concerning beliefs about menstruation has produced systematically biased results.

The objective of this study is to determine the extent to which pain is related to WE in a sample of working PWM. Furthermore, this research will determine the impact of POS and shame as moderators. The focus and scope of this research include participants' experiences of menstruation in the workplace. Specifically, this refers to the way shame and POS interplay within the negative relationship between pain and WE during menstruation. This line of questioning is apt, given that menstruation is an often-overlooked barrier that carries adverse social and environmental implications for the PWM. Removing this barrier hopes to decrease negative attitudes towards menstruation, tackling the taboo that surrounds it.

## **Theoretical Background**

### **Menstruation and Pain**

The Biopsychosocial Model of Pain (BPS Model) (Engel, 1977) proposes that pain is a complex phenomenon resulting from the interaction of biological, psychological, and social factors. Firstly, menstrual pain is attributed to processes related to uterine contractions and hormonal imbalances (Deligeoroglou, 2000). These contribute to the discomfort associated with menstrual pain. Secondly, psychological factors such as stress, anxiety, and negative emotional states may amplify pain perception during menstruation (Gagnon et al., 2022). Finally, social factors, namely cultural beliefs, peer relationships, and societal attitudes toward menstruation influence higher perceptions of pain (Gagnon et al., 2022).

Previous research upholds the notion that individuals experience increased pain during the menstrual phase. A decrease in oestrogen levels in the body is cited as a potential reason for various physical symptoms, including heightened pain sensitivity, joint and bone pain, and orofacial pain (Isselée et al., 2002). Since oestrogen levels are particularly low during the menstrual phase, this leads to the formulation of the first hypothesis:

*Hypothesis 1: Levels of pain are higher during menstruation.*

### **Pain and Work Engagement**

The Conservation of Resources (COR) theory (Hobfoll, 1998) proposes a model of human motivation in which the acquisition and accumulation of resources are instrumental in maintaining behavior in the workplace. People are motivated to obtain, retain, and foster resources to prevent stressful conditions and negative outcomes. Although a stress theory in its origin, it may be applied to the examination of WE (Salanova et al., 2010). According to COR theory, negative work-related outcomes occur when resources are lost or threatened with loss, or when there is a failure to gain resources following significant effort. Resources are objects, personal characteristics, or conditions that individuals perceive as valuable when achieving goals and maintaining well-being (Hobfoll, 1989). People lose emotional and cognitive resources in the attempt to manage discomfort, redirect attention and suppress ruminative thoughts about pain (Eccleston & Crombez, 1999). Therefore, pain signifies a loss of personal resources for PWM and may result in decreased WE.

WE is a “positive, affective-motivational state of fulfilment that is characterised by vigor, dedication, and absorption” (Schaufeli & Salanova, 2007). Although sparse, research has shown that menstrual dysfunction may be associated with symptoms that compromise one’s engagement with work (Sang, Remnant & Calvard, 2021). When an individual experiences pain, it can lead to decreased attentional span (Eccleston & Crombez, 1999), decreased motivation to complete goal-directed tasks (Mochon et al, 2017), and increased fatigue (Louati & Berenbaum, 2015), all of which contribute to diminished cognitive capacity, hindering WE.

Numerous studies have investigated the role of pain and work engagement in student cohorts, providing a wide berth for more research into this relationship among working professionals. Chen and colleagues (2019) found that menstrual pain significantly impacts learning engagement. Among 463 menstruating university students, results showed that higher levels of absence, less time investing in coursework, and a reduced learning state were reported during menstruation. Similarly, a systematic review appertaining to university students showed that a diminished sense of agency and decreased engagement with work were all attributed to menstrual pain and stigma (Munro et. al., 2021). Thus, there is clear territory for investigation towards finding relations between pain and WE in a sample of working PWM. This leads to the formulation of the second hypothesis:

*Hypothesis 2: During menstruation, there exists a negative relationship between pain and work engagement, such that higher levels of pain result in lower levels of work engagement.*

### **The Moderating Role of Menstrual Shame**

There exist numerous backdrops, such as the work environment, against which the PWM experiences tremendous shame (Sommer et. al., 2015). It is an aversive, painful emotion rooted in social interactions such as exclusion and isolation (Elison, Garofalo & Velotti, 2014). Eisenberger and colleagues (Eisenberger, 2011; Eisenberger et al, 2003) demonstrated that social exclusion, and its subsequent shame, elicit perceptions of physical pain. In a similar vein to pain, COR theory can be used to frame feelings of shame as a loss of personal resources in the PWM. Therefore, it is predicted that shame will reinforce the negative relationship between pain and WE, resulting in further depleted levels of WE.

Social emotions of shame, fear, and guilt are all shown to have strong negative effects on the well-being and performance of PWM. Remnant, Calvard, and Myhill (2021) acknowledge a culture of silence surrounding menstruation in the workplace, emanating feelings of shame and disgust toward the menstruating body. Analysis from qualitative survey data of 627 participants revealed bleak findings which highlighted concern about being identified and shamed for menstruating. Avoidance of exposure and feelings of shame were major themes reported in the analysis (Remnant, Calvard & Myhill, 2021). Another study employed a mixed-methods approach to examine the stance on menstruation in the workplace (Fitzgerald, 2015). “Masking symptoms” emerged as a theme during qualitative coding, suggesting fear of reprisal and subsequent shame. Therefore, it is vital to examine the role of shame during menstruation and how this exacerbates the relationship between pain and WE. The third hypothesis formulates as such:

*Hypothesis 3: During menstruation, the negative relationship between pain and work engagement is moderated positively by shame, in such a way that this relationship is stronger for people with higher levels of shame.*

### **The Moderating Role of Perceived Organisational Support**

POS refers to employees' beliefs concerning the extent to which their organisation values their contributions and cares about their well-being (Eisenberger et al., 1986, p. 501). Employees perceive organisational support when they are treated fairly, backed up by their

superiors, and rewarded for work well done (Rhoades & Eisenberger, 2002). According to COR theory, people strive to retain resources to enhance overall welfare (Hobfoll, 1989). Employees' perception of support from the organisation diminishes their perception of losing resources and feeling incapable of acquiring them (Marchand & Vandenberghe, 2015). Therefore, the present study assumes that the perception of POS enables the PWM to deal with a stressful condition (i.e., depleted work engagement in the face of pain).

In a similar vein, the Job Demand-Resource Model (Bakker & Demerouti, 2017) is appropriate to explain the role of POS during menstruation. This model states that higher WE is linked to the presence of personal and job resources (Bakker & Demerouti, 2014). In turn, this may buffer the negative effects of pain on WE because POS can be perceived as a job resource that fosters personal resources. It may reduce the perceived severity of organisational stressors such as pain by providing solace to the PWM via identification with the organisation, or by providing assurance that help will be available when needed (Kurtessis et al., 2017). When employees feel valued by their organisation, they tend to work harder to help achieve the organisation's goals (Eisenberger et al., 1986). In addition, POS may encourage active coping strategies by leading employees to believe that the organisation will not take advantage of their vulnerabilities as they attempt to deal with stressful conditions.

Presently, there exists sparse research which examines the effects of POS on WE during menstruation. Scott and colleagues (2014) found that employees experiencing co-worker exclusion demonstrate higher work performance in the presence of high POS. However, social support (SS) at work can contribute to an individual's perception of organisational support (Ahmed & Nawaz, 2015). Furthermore, supervisor and coworker support are important signals of POS (Kurtessis et al., 2017). An overlap between the two constructs is apparent, with POS and SS sharing similarities while exhibiting distinct characteristics in terms of the sources and scope of support. SS refers to support received from individuals, whereas POS reflects a broader perception of the organisation. Therefore, it is reasonable to expect that POS may function similarly to SS as employees manage their menstrual cycle. According to the literature, severance of social support networks of PWM has been shown to lead to menstrual pain (Lee et. al, 2006). Similarly, PWM who lost access to previous providers of social support displayed more symptoms of menstrual pain than did PWM with stable social support (Alonso & Coe, 2001). This interruption in the network of social support had moderating effects on the connection between distress and menstrual pain,

indicating that loss of social support contributes significantly to menstrual pain. Given that POS represents a form of support against an organisational backdrop, it is plausible to anticipate that it would also have a positive impact on WE in the presence of pain. In line with this theory and research, the fourth hypothesis is formulated as such:

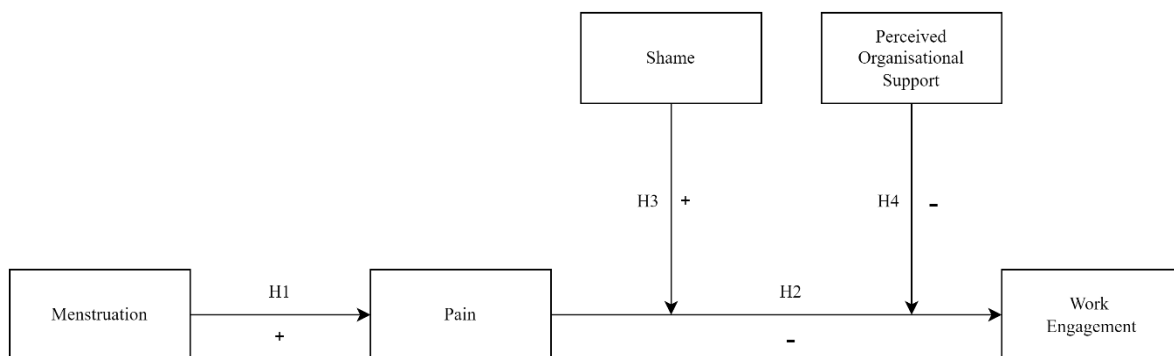
*Hypothesis 4: During menstruation, POS has a negative moderating effect on the negative relationship between pain and WE, in such a way that this relationship is weaker for people who experience higher levels of POS.*

### The Present Study

Despite growing awareness of the impact of menstruation on work-related activities and employee well-being, there remains a gap in understanding the specific mechanisms through which menstrual pain affects WE. Therefore, this study will investigate this relationship in light of the moderating roles of shame and POS. The research question guiding this study is ‘To what extent does menstrual pain affect WE, and what are the roles of POS and shame?’ Figure 1 illustrates the hypotheses that have been formulated in this respect.

### Figure 1

#### *The Hypothesized Model*





## Method

### Design and Procedure

This study employed a daily diary design to investigate the relationship between pain and WE, and the moderating effects of shame and POS. This refers to experiences and processes occurring during the day without reference to a particular event, with diaries being filled out at the end of the day (Ohly et al., 2010). Daily diaries allow for the study of thoughts, feelings, and behaviours within the natural work context which fluctuate daily (Ohly et al., 2010). It can assess the frequency, intensity, and patterning of psychological states including emotional and cognitive dimensions of experience (Csikszentmihalyi & Larson, 2014). The present research is based on a previous study that investigated the effects of menstruation on women's helping behaviour in the workplace (Motro et al., 2019). Therefore, this design has been previously tested during a study of a similar nature.

Using convenience sampling, an infographic (Appendix A) with details of the study was posted to social media channels such as LinkedIn and Twitter. Advantages of student-recruited convenience samples include low cost and heterogeneity of participant characteristics, which is beneficial for the generalizability of findings (Demerouti & Rispens, 2014). Data were collected using two questionnaires a person-level and day-level questionnaire, via Qualtrics XM. The person-level questionnaire contained questions about demographic variables, stable work-related variables, control variables, and the estimated start date of menstruation. The day-level questionnaire assessed variables that fluctuate daily including menstruation, pain, use of pain medication, hours worked, WE, and shame. As this study occurred in collaboration with five other researchers, more variables were measured by the questionnaire which are not mentioned in this study.

After participants expressed interest in participation, they received the person-level questionnaire in which they provided their email addresses and expected start date of their next menstrual cycle. A unique start date was created for each participant based on this date, such that the first day-level questionnaire was distributed via email approximately 2 days before menstruation. The day-level questionnaire was sent to each participant for a period of 10 consecutive days to be filled in between 16:00 and 20:00, facilitating retrospective responses. The total data collection took place between the end of March 2023 and the beginning of May 2023.

This study was approved by and conducted following the guidelines set forth by the Faculty Ethical Review Committee (FERC). Before the study, participants were provided with an Information Letter (Appendix B) and an Informed Consent Form (Appendix C) per the guidelines set forth by the FERC of the Faculty of Social Sciences at Utrecht University.

Privacy and confidentiality of participants were maintained by ensuring that no personal information was present in the data. Participants' email addresses were used to provide a link to both the initial questionnaire and each day-level questionnaire.

## **Participants**

Of the 254 participants who completed the person-level survey, 124 (48.43%) were excluded for not meeting inclusion criteria. The remaining 130 participants were invited to complete the series of online surveys for a period of 10 days. However, an additional 29 participants failed to participate who were manually removed from the dataset. This resulted in a final total of [N=101].

Inclusion criteria required that participants menstruate, and work at least 24 hours of paid work per week within an organisation. This was to collect sufficient data in which the participant both menstruated and worked. Exclusion criteria for the study required that participants must not be pregnant or breastfeeding, have gone or be going through menopause, or have irregular menstrual cycles outside the 21- to 35-day window. These issues interfere with the production and metabolism of oestrogen (Fleischman, Navarrete, & Fessler, 2010) which results in menstrual irregularities (Halbreich & Kahn, 2003). This makes it difficult for participants to track their cycles reliably. Participants must be over 18 years of age and did not receive any compensation or benefit for participation in this study.

Participants' age ranged from 18 to 38 years ( $M = 24.37$  years,  $SD = 3.69$  years), with working hours ranging from 24 to 52 hours per week ( $M = 33.02$  hours,  $SD = 7.11$  hours). Participants represented various nationalities. 52% were Dutch, 18% Irish, 6% Italian, and 25% other nationalities. When asked to indicate their highest level of education completed, 13% had completed high school, 46% held a bachelor's degree, 17% had a master's degree, 23% had HBO/MBO, and 2% other. 2% of participants [N=2] had previously given birth and 43% [N=43] used hormonal contraception.

## **Measures**

### ***Person-level Questionnaire***

**Perceived Organisational Support.**

POS was measured using the Eisenberger Questionnaire (Eisenberger, 1986). The original questionnaire consists of 36 items. However, a shorter version now exists which consists of 3 items, measuring affective commitment, organisational communication, and organisational participation (Eisenberger, 2002; Worley, 2006) Respondents answered on a seven-point scale (1 = strongly disagree, 7 = strongly agree). ( $\alpha = 0.86$ )

**Control Variables.**

In the Person-Level survey, participants were asked about the use of hormonal contraceptives (0=no; 1=yes) and whether they had previously given birth (0=no, 1=yes, 2=prefer not to say), and the presence of menstrual disorders. These variables affect oestrogen production, altering perceptions of pain during menstruation (Halbreich & Kahn, 2003).

***Day-level Questionnaire*****Menstruation.**

To assess menstruation, participants rated a single item asking if they are menstruating (0=no, 1= yes). This was previously used by Motro and colleagues (2019) as a method of assessing menstruation.

**Pain.**

To assess pain, participants rated a single item from Christian, Eisenkraft, and Kapadia (2015) – ‘How much pain were you in during the day?’ – on a 6-point scale (0 = no pain; 5 = excruciating).

**Shame.**

Shame was assessed with a single item: “To what extent did you feel shame today?” This item is previously used by Xing, Sun, and Jepsen (2020) who examined shame in an organisational setting. The use of single items to access discrete emotions facilitates more understanding and better reflects the intended content domain (Gabriel et al., 2019). Response options were rated from 1 (not at all) to 6 (very much).

**Work Engagement.**

Work Engagement was assessed with the Utrecht Work Engagement Scale-3 (UWES-3) (Schaufeli et. al., 2017), adapted to daily use by Zeijen, Petrou, and Bakker (2020). This 3-

item scale measures vigour, dedication, and absorption. Items are scored on a seven-point frequency range from 0 (never) to 6 (always). ( $\alpha = 0.8$ )

### **Control Variables.**

In the Day-Level survey, participants were asked whether they took pain medication for that given day (0 = no; 1 = yes). Pain medication is often used to alter the perception of menstrual pain (Tzafettas, 2006).

### **Data Analysis**

Data used for moderation analysis required information from days where participants both worked and menstruated [N=91]. Participants' responses for each day were aggregated such that each participant was represented by a single line of data. This was performed to streamline the analysis process, reducing time complexity.

IBM's Statistical Package for Social Sciences (SPSS) Version 27 was used for descriptive statistics, correlations, and regression analyses. PROCESS macro (Hayes, 2017) was used to analyse moderation with two continuous moderators (Model 2). Before testing the hypothesised conceptual model, the factor structure of each variable scale was evaluated through factor analysis. Preliminary analyses were performed to test assumptions of multiple regression and to ensure that no violation of normality, multicollinearity, and linearity occurred in the data.

## Results

### Preliminary Analyses

A histogram of standardised residuals indicated that the data contained normally distributed errors, as did the normal P-P plot of standardised residuals, which showed points that were not completely on the line, but close. The scatterplot of standardised predicted values also showed that the data met the assumptions of homogeneity of variance and linearity. A Shapiro-Wilk test revealed that the dependent variable (WE) was normally distributed ( $W= 0.99$ , ns). However, when the distributional characteristics of the variables were examined, it was observed that several variables violated the Shapiro-Wilk test and exhibited substantial skewness and kurtosis. A departure from normality was indicated in pain, shame, and POS. Thus, traditional parametric tests that assume normality were not suitable for the data at hand.

An analysis of standard residuals was performed, which showed that the data contained no outliers (Std. Residual Min = -2.58, Std. Residual Max = 2.47). Multicollinearity was not a concern (Pain, Tolerance = .82, VIF = 1.22; POS, Tolerance = .931, VIF = 1.08; Shame, Tolerance=.786, VIF=1.30). The data met the assumption of independent errors (Durbin-Watson value = 1.73).

Descriptive statistics and intercorrelations of variables are presented in Table 1. Regarding the main variables, small and medium correlations were observed. Unsurprisingly, pain was positively correlated to menstrual disorders ( $r = .21$ ,  $p = .05$ ), and shame ( $r=.42$ ,  $p<.001$ ). Understandably, menstrual disorders were positively correlated to pain medication ( $r=0.26$ ,  $p<.01$ )

The dependent variable (WE) was positively correlated with POS ( $r = .24$ ,  $p <.05$ ). WE was negatively correlated to pain ( $r=-.32$ ,  $p<.01$ ), use of hormonal contraceptives ( $r = -.28$ ,  $p<.01$ ), and shame ( $r = -.33$ ,  $p <.001$ ). Finally, a negative correlation was revealed between shame and POS ( $r=-.26$ ,  $p<.01$ ).

Interestingly, the use of contraceptives was not significantly correlated with menstrual disorders. The direction of the relationship was negative ( $r=-.08$ , ns). Furthermore, although non-significant, shame was found to be weakly positively correlated with pain medication ( $r=.17$ , ns) and contraceptive use ( $r=.12$ , ns).

**Table 1***Correlations and Descriptive Statistics*

<i>Correlations and Descriptive Statistics</i>											
		<i>n</i>	Mean	SD	1	2	3	4	5	6	7
1	Pain Medication	101	1.21	0.28							
2	Contraceptive Use	101	1.58	0.5	.17						
3	Childbirth	101	1.02	0.15	.05	-.02					
4	Menstrual Disorder	101	1.07	0.25	0.26**	-.08	-.04				
5	Pain	101	2.21	0.85	0.42***	-0.003	.16	0.21**			
6	Work Engagement	91	3.87	1.08	-.13	-.28**	.06	.02	-.32**		
7	POS	91	5.24	1.16	-.08	-.15	.06	-.12	-.07	.24**	
8	Shame	101	1.52	0.82	.17	.12	-0.004	.02	.42***	-.33**	-.26**

\* $p < 0.05$ \*\* $p < 0.01$ \*\*\* $p < 0.001$ **Hypothesis Testing**

Hypothesis 1 stated that levels of pain are higher during menstruation.

A Wilcoxon signed-rank test was conducted to determine whether there was a difference in pain during menstruation on workdays ( $M = 2.21$ ,  $SD = .85$ ) and non-menstruation on workdays ( $M = 1.32$ ,  $SD = .57$ ). Results indicated that there was a significant difference, ( $z = -6.8$ ,  $p < .001$ ). Therefore, on workdays, pain is higher during menstruation than during non-menstruation.

A Wilcoxon signed-rank test was conducted to determine whether there was a difference in pain during menstruation on non-working days ( $M = 2.08$ ,  $SD = .95$ ) and non-menstruation on non-working days ( $M = 1.26$ ,  $SD = .59$ ). Results indicated that there was a significant difference, ( $z = -4.8$ ,  $p < .001$ ). Therefore, on non-working days, pain is higher during menstruation than during non-menstruation.

These results indicate that on work- and non-workdays, pain is significantly higher during menstruation. Therefore, Hypothesis 1 is accepted.

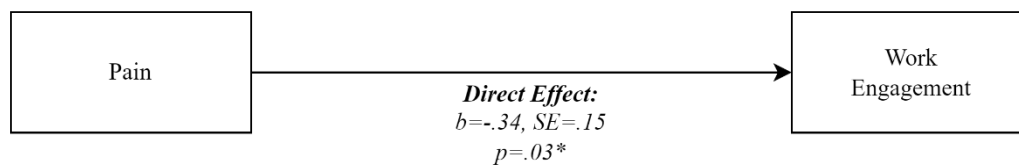
To test hypotheses 2, 3, and 4, Hayes' (2017) model 2 was employed to perform a moderation analysis with two continuous moderators using PROCESS macro for SPSS v4.0.

This examined the relationship between the outcome variable (WE), the predictor variable (pain), and two moderators (Shame and POS). The model summary was found to be significant, ( $R^2 = .26$ ,  $F(9,91)=3.2$ ,  $p<.01$ ). A bootstrap analysis (5000 samples) was used in PROCESS v4.1 Model 2 (Hayes, 2017) to assess the direct effect of pain on WE, at different levels of Shame and POS.

Hypothesis 2 stated that during menstruation, there exists a negative relationship between pain and WE, such that higher levels of pain result in lower levels of WE. The total effect was significant, ( $R^2 = .26$ ,  $F(9,91)=.32$ ,  $p<.01$ ), demonstrating the effect of pain on WE ( $b = -.34$ ,  $SE=.15$ ,  $95\%CI [-.64, -.033]$ ,  $t(91) = -2.2$ ,  $p<.05$ ). The significant negative effect shows that as pain increases, WE tends to decrease (See Figure 2). This indicates that during menstruation, working on days with higher pain is related to less engagement. Therefore, Hypothesis 2 was supported.

## Figure 2

### *Direct Effect of Pain on Work Engagement*



\* Effect size is significant at the 0.05 level.

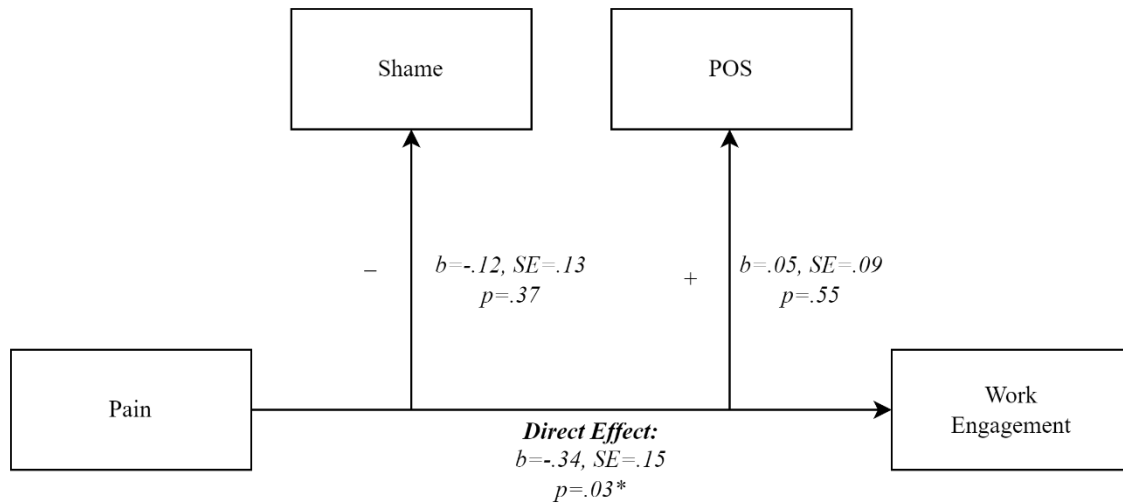
Hypothesis 3 stated during menstruation, the negative relationship between pain and WE is moderated positively by shame, in such a way that this relationship is stronger for people with higher levels of shame. Shame and its interaction with pain had an insignificant impact on WE, ( $b = -.12$ ,  $SE= .13$ ,  $95\%CI [-.38, .14]$ ,  $t(91) = -.91$ , ns). Shame does not significantly moderate the relationship between pain and WE ( $R^2 = .007$ ,  $F(1,91)= .82$ , ns). Therefore, Hypothesis 3 was not accepted.

Hypothesis 4 stated that during menstruation, POS has a negative moderating effect on the negative relationship between pain and WE, in such a way that this relationship is weaker for people who experience higher levels of POS. POS and its interaction with pain had no significant impact on WE ( $b = .05$ ,  $SE = .09$ ,  $95\%CI [-.13, .24]$ ,  $t(91) = .59$ , ns). POS does not significantly moderate the relationship between pain and WE ( $R^2 = .003$ ,  $F(1, 91)= .35$ , ns). Therefore, Hypothesis 4 was not accepted.

There were no significant moderating effects found in the analysis, presented below in Figure 3.

**Figure 3**

*Moderation with two continuous moderators*



\*. Effect size is significant at the  $<.05$  level.

*Note:* POS refers to perceived organisational support

### **Significant Covariate: Hormonal Contraception**

The covariate of contraceptive use had a significant effect on the outcome variable. ( $b = -.5$ ,  $SE = .21$ ,  $95\%CI [-.91, -.06]$ ,  $t(91) = -2.30$ ,  $p < .05$ ). The significant negative effect of birth control suggests that the use of hormonal contraception is related to a decrease in the outcome variable, WE.



## Discussion

The study of menstruation in an organisational context is of paramount importance for the organisation and the employee. It is a step towards an inclusive workplace that promotes an equitable view of menstrual health, enhancing overall organisational performance and productivity. This study aimed to shed light on a vital, yet underexplored, health process, adding to a more comprehensive understanding of pain perception at work. Furthermore, a notable gap exists within existing literature in the field of Occupational Health and Safety regarding the variety of experiences, challenges, and practices that exist concerning menstruation in the workplace (Fry et al., 2022). Addressing this gap is crucial for the development of evidence-based policies, practices, and interventions that promote inclusivity and employee well-being. This research addressed the relationship between pain and work engagement during menstruation, and the moderating effects of shame and perceived organisational support on this relationship. Findings are discussed below.

### Menstruation and Pain

Unsurprisingly, pain was found to be significantly higher when participants experienced menstruation. Dysmenorrhea, or painful menstruation, is a common menstrual complaint with a major impact on the person who menstruates' quality of life, work, and productivity (Ju, Jones & Mishra, 2013). In line with previous research, (Motro et al., 2019; Isselée et al., 2002) higher levels of pain during menstruation may be explained by decreased levels of oestrogen in the body. Similarly, in line with the underpinnings of the Biopsychosocial Model of pain (Engel, 1977), psychological and social factors such as stress and workplace relationships may also increase perceptions of pain during menstruation.

### Pain and Work Engagement

This study suggests that pain is significantly related to decreased work engagement during menstruation. In other words, pain acts as a barrier to work engagement during menstruation. This is in line with previous work which highlighted the role of pain in the depletion of engagement in university student cohorts (Chen et al., 2019; Munro et al., 2021). This may be explained by the notion that when an individual experiences pain, it can contribute to diminished cognitive capacity, hindering work engagement. Additionally, physical pain carries negative emotional consequences, such as feelings of frustration and irritability (Riva et al., 2011). This may have impacted participants' motivation, subsequently

dampening the sense of fulfilment or enthusiasm derived from tasks that are characteristic of work engagement. Finally, in line with COR theory (Hobfoll, 1989), this result supports the line of reasoning that pain represents a loss of resources for the PWM during menstruation.

### **The Moderating Role of Shame**

In the presence of shame, levels of work engagement did not differ due to pain. This result was unexpected, contradicting previous literature which explores a ‘culture of silence’ surrounding menstruation in the workplace (Remnant, Calvard & Myhill, 2021). In line with COR theory (Hobfoll, 1989) it was proposed that shame would represent a further loss of resources in the individual during menstruation. However, an explanation for this unexpected result may be that sufficient personal resources, such as resilience and optimism, were present in participants. Job resources foster the development of personal resources indirectly via positive emotions (Xanthopoulou et al, 2012). Therefore, the presence of an unmentioned job resource, such as social support, may have fostered personal resources within the person who menstruates and overshadowed the moderating effect of shame. Further research on the nuanced effects of social support in the presence of menstrual shame is warranted.

Furthermore, methodological issues may explain why support was not found for the moderating effect of shame. The current study was limited by a single-item measure of shame. Whereas previous research has shown that the use of single items to access discrete emotions facilitates more understanding and better reflects the intended content domain (Gabriel et al., 2019), shorter measures are more likely to contain error variance. They cannot benefit as much from aggregation across multiple items (Harmon-Jones et al, 2016; Epstein, 1983). Finally, the characteristics of the participants must also be considered. The majority of participants were highly educated, having obtained at least a bachelor’s degree. Higher education level is related to lower reports of shame (Buchman-Wildbaum et al, 2021) and shame is more prevalent in women with lower education levels (Sampogna et al, 2011).

### **The Moderating Role of Perceived Organisational Support**

Similarly, perceived organisational support was a non-significant moderator of the relationship between pain and work engagement. Thus, perception of organisational support did not significantly interact with how pain depletes work engagement. However, although non-significant, the reported relationship exhibited a very small positive effect, suggesting that perceived organisational support may slightly exacerbate the relationship between pain and work engagement. In line with the JD-R model (Bakker & Demerouti, 2017), this study

assumed that perceived organisational support would act as a job resource to enable people who menstruate to deal with the stressful condition of depleted work engagement in the face of pain. The present results contradict this reasoning, as well as previous research which shows that high perceptions of organisational support led to higher work engagement, lowering perceived stressors.

The contrast between this result and previous literature may be derived from the quantity of perceived organisational support received from the participants' organisation. The mean score of perceived organisational support was found to be 5.24. This is considerably higher than findings reported across numerous organisational settings (Eder & Eisenberger, 2008; Eisenberger et al, 1990). When organisational support is perceived in excess, it can be interpreted as self-threatening (Caesens & Stinglhamber, 2020). Employees may perceive organisational support as an indication of being incompetent, resulting in negative reactions. Therefore, it may be that an over-reliance on high quantities of perceived organisational support, a job resource, led to the hindrance of the development of personal resources such as self-efficacy or resilience. Scheer et. al (2013) reports that excessive perceived organisational support might lead to an employee not feeling able to or wanting to reciprocate support, reducing their feeling of obligation toward the organisation, failing to increase work engagement.

### **Theoretical Implications**

The current study contributes to the advancement of the theoretical understanding of menstruation in an organisational context. The significant negative relationship between pain and work engagement contributes to the existing theoretical framework by providing empirical evidence to support the link between pain as a loss of resources and work engagement, predicted by COR theory (Hobfoll, 1989). This significant association suggests the need for exploration of possible cognitive and emotional mediating effects, such as decreased attentional span or motivation, to provide a refined explanation of this important relationship. Furthermore, the unexpected result that shame did not exacerbate the link between pain and work engagement provides opportunity for research into the use of personal resources available to people who menstruate to overcome feelings of shame during menstruation.

Additionally, the current study calls for further exploration of the stance of perceived organisational support within the JD-R model (Bakker & Demerouti, 2017). The unexpected

finding that perceived organisational support does not buffer the negative association between pain and work engagement offers the chance for future research to investigate its role in menstrual pain management. Caesens & Stinglhamber (2020) found that excessive perception of organisational support bore negative consequences for work engagement. Exploration of perceived organisational support as a curvilinear moderator may serve to investigate effective levels of this job resource for people who menstruate. The non-significant, yet small and positive, interaction of Hypothesis 4 carves an avenue for future investigation to enrich the JD-R model, thereby advancing theoretical understanding of menstrual pain at work.

### **Practical Implications**

A healthy workforce is a productive workforce, and organisations have become attuned to the idea that employee well-being is important for performance, as health and productivity are implicitly entwined (Loeppke et al., 2009). The research findings can aid organisations as they strive to create an equitable, engaged workplace. The framing of pain as a barrier to work engagement will help managers and human resource (HR) professionals create supportive environments through policy, practice, and intervention. Occupational health and HR practitioners ought to consider pain assessment and management protocols in the workplace. Furthermore, providing resources such as ergonomic equipment, flexible work arrangements, and access to healthcare services to address pain-related concerns may improve employee well-being. In relation to top management, providing training and education to supervisors and employees on pain recognition, communication strategies, and support resources may serve to improve workplace experiences during menstruation. Thus, in line with the aims of Grandey and colleagues (2015), these implications may instigate respect for the menstruating professional, extracting it from the sphere of taboo and shame.

### **Limitations and Future Research**

Daily Diaries offered the opportunity to study dynamic, within-person processes involving affect, behaviour, and transient workplace phenomena over time (Fisher & To, 2012). Nonetheless, it is important to consider limitations in the results. In the present study, data were aggregated upon collection such that each participant was represented by a single line of data. Omi (2012) outlines aggregation of data as a limitation of quantitative research. One such problem created from aggregating data that ought to be examined in a within-person manner is that results obtained are treated as dynamics of intra-individual variation, as

opposed to processes occurring within an individual. Only between-person effects can be detected, which can differ in size and direction from within-person effects and lead to differing interpretations (Ohly et al, 2010). As participants retrospectively completed surveys at the end of each workday, a risk of memory decay was possible which may have produced disproportionate responses to scale items. Substantial evidence relays that retrospective reports of emotions and behaviour can be contaminated by memory errors and cognitive biases (Schwarz, Kahneman, & Xu, 2009). Specifically, retrospective recall of pain can be disproportionately influenced by peak and end pain (Redelmeier & Kahneman, 1996). To resolve this issue, 'signal contingent' daily diaries may be used. This approach relies on random signals to instigate survey completion, capturing immediate experience with minimal memory error. It is also useful when reports of continuous and highly variable current states, such as mood and workload, are needed (Fisher & To, 2012).

Secondly, the sample size and nature may have had implications for the generalisability of findings. With a limited number of participants, [N=91] the sample does not represent the broader menstruating, working population. Small sample size also affects the statistical power and precision of our analyses, potentially limiting the strength of the associations observed. Further research with larger samples is required to validate and extend our findings.

Thirdly, the recruitment method used 'network' or 'convenience' sampling. Convenience sampling is associated with an inability to generalise findings to larger populations (Lopez & Whitehead, 2013). It also relied on participants being active on social media, with participants being limited to the following of the researchers. Furthermore, data collection relied solely on self-report questionnaires. Self-report bias and common method variance often threaten the validity of research conducted in organisational settings (Donaldson & Grant-Vallone, 2002), inflating assumptions about correlational and causal relationships due to differential leniency effects in self-reports. In future research, employee outcomes may be evaluated by data collection from multiple sources within the organisation, such as direct supervisors or peers.

Finally, although the moderating effect of perceived organisational support was non-significant, this does not diminish its importance as a job resource. Organisations should continue to foster a supportive environment that promotes the well-being of employees, including those experiencing pain. 'Too much of a good thing,' or 'the Inverted U' is a

widespread phenomenon in work and organisational psychology (Grant & Schwartz, 2013). It concerns excesses in psychological variables and their effect on employee outcomes (Pierce & Aguinis, 2013; Harris & Kacmar, 2006). Consistent research has shown that positive phenomena reach inflection points at which their effects turn negative (Grant & Schwartz, 2011). Therefore, future research may determine how varying levels of perceived organisational support interact with pain and work engagement during menstruation to establish an optimal amount of encouragement and assistance from the organisation.

### **Conclusion**

Menstruation is an often-neglected barrier that carries adverse social and environmental implications for the person who menstruates at work. This study explored the relationship between pain and work engagement, and how shame and perceived organisational support impact this relationship. Important findings showed that during menstruation, pain was significantly related to depleted work engagement. Although the moderating effects of shame and perceived organisational support were not found to be significant, these results are still important in guiding the architecture of an equitable workplace that facilitates pain management. By recognising and addressing pain as a significant factor, organisations can foster employee well-being, satisfaction, and productivity, contributing to a healthier and more engaged workforce. Hence, for organisations and people who menstruate to avoid the negative consequences of working during menstruation, a work environment that includes resources and strategy for pain management is recommended. The framing of menstrual pain as an impediment to work engagement will help managers and HR professionals create supportive and conducive work environments through policy, practice, and intervention.

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## Appendix A

### Recruitment Infographics




**CALL FOR PARTICIPANTS!**

Hi everyone,

We are recruiting participants for thesis research as part of **MSc Social, Health and Organisational Psychology** at Utrecht University.

This study will explore the relationship between **menstruation and well-being at work!**

 **Utrecht University**

We are conducting a **diary study** in which you complete a **5-minute** questionnaire for **10 consecutive days**.

IF YOU...

1. Are older than **18**
2. Expect to menstruate within a **short period of time** (+/- 4 weeks)
3. Work at least **24 hours per week**

...we would **love** to hear from you!

By participating in this study, you can personally contribute to the current limited knowledge and research on menstruation and its effects on **outcomes in the workplace**.

Additionally, you may be able to gain better understanding and insight towards your own menstruation.



For more information, contact:

Kate Cowhig:  
k.b.cowhig@students.uu.nl

Sign up for the study here:

 **SURVEY.UU.NL**

 **Utrecht University**



## Appendix B

### Information Letter

Dear participant,

Thank you for agreeing to participate in this study. This research concerns the relationship between menstruation and work-related outcomes. To help you make an informed decision about your participation, this letter will explain what the study entails, the potential risks and benefits of this research, and your rights as a research participant. If you have any questions or concerns, please do not hesitate to contact us.

#### 1. What is the aim of the study?

The aim of this study is to investigate the impact of menstruation on work performance and well-being at work. According to previous research, menstruation is still stigmatised in the workplace, which can have a significant negative impact on one's feelings and behaviour in the workplace. With this study, we seek to gain more insight into the effects of menstruation on employees' well-being and performance. In doing so, we hope to fill in the knowledge gap on menstruation and its potential effects on work outcomes. We invite you to join us in this effort by participating in our study.

#### 2. How will the study be conducted?

The design of this study is a daily diary study. Participation entails filling out one brief questionnaire per day for a period of 10 days. Day 1 of participation will occur approximately two or three days before the expected start of your next menstrual cycle.

On Day 1, you will first receive a general questionnaire to assess some personal characteristics such as your age, nationality, educational level, and some questions about your work. On days 1-10, we ask you to fill out one short questionnaire each day. This questionnaire will assess factors that may fluctuate daily, such as exhaustion, work engagement, and strain level.

We invite you to complete the questionnaires once a day, between 16:00 and 20:00 after your day at work is complete.

3. What are the advantages and disadvantages of participating in this research?

There are neither immediate benefits nor drawbacks to participating in this study. One potential disadvantage is that it takes time to complete the daily questionnaires. Potential advantages of participating in this study are that it might provide you with insight into your own menstrual cycle and how it affects your work life. Secondly, participation will contribute to a better understanding of workplace experiences of people who menstruate. This can help workplace supervisors and Human Resource consultants gain more knowledge and awareness about the specific needs of the employee throughout their menstrual cycle which might help them perform and feel well at work.

4. What are the risks and side effects?

The study is approved by the Ethical Review Board of the Faculty of Social Sciences at Utrecht University. This ensures that taking part in this research does not involve any risks or side effects for the participant.

5. Is participation in the diary study voluntary?

Participation in this study is entirely voluntary. You may withdraw from the study at any time, without any explanation and with no negative consequences. If you end your participation, we will use the data collected up to that point, unless you explicitly inform us otherwise.

To participate in this study, you must provide your consent at the beginning of the questionnaire under the heading 'consent form'. After giving consent, you may start with the questionnaire. If you do not give consent, you will automatically be forwarded to the end of the questionnaire and thanked for your time.

6. Will you be informed of the study results?

On the consent form, you can indicate whether you would like to be kept informed about the progress of the study and the publication of the results.

Individual results are not available because participation is anonymous and cannot be traced back to you as an individual.

#### 7. How will your data be processed?

The only information we collect that can be traced back to you as a person is your email address. This email address is used to send you a link to both the initial general questionnaire and each daily questionnaire. At the end of the investigation, the file with e-mail addresses will be destroyed and will not be stored together with the rest of the data. We will not be examining individual patterns of data and will only be analysing data from a group perspective.

The server on which data is stored is secured to the highest standards at Utrecht University, and only researchers involved in this project will have access to this data. The data itself will also be protected by a security code. Your data will be stored for a maximum of 10 years. This is in accordance with the guidelines provided by the VSNU Association of Universities in the Netherlands. Please refer to the website of the Authority for Personal Data. <https://autoriteitpersoonsgegevens.nl/nl/onderwerpen/avg-europese-privacywetgeving>, for more information about privacy.

#### 8. Complaint procedure

If you have any questions or comments about the study, please contact the master coordinator, Dr Veerle Brenninkmeijer at [v.brenninkmeijer@uu.nl](mailto:v.brenninkmeijer@uu.nl).

If you have an official complaint about the study, you can send an email to the complaints officer at [klachtenfunctionaris-fetcsocwet@uu.nl](mailto:klachtenfunctionaris-fetcsocwet@uu.nl).

#### 9. Further information

If you have any questions about this study, please email a member of the research team. You can contact our team representative through the following means:

Rafael van de Hoef: [r.j.vandehoef@students.uu.nl](mailto:r.j.vandehoef@students.uu.nl)

Supervised by:

Prof. Dr Maria Peeters: [m.peeters@uu.nl](mailto:m.peeters@uu.nl)

Dr. Gonneke Ton, MSc: [g.m.ton@uu.nl](mailto:g.m.ton@uu.nl)

### **Appendix C**

#### **Informed Consent**

I hereby declare that:

- I have read and understood the information letter dated ... on the study .....**
  
- I am well informed about the purpose and procedure of the study and I participate in this study voluntarily.**
  
- I know that I can stop the research at any time, without having to give a reason.**

**o Yes (1)**

**o No (2)**

## Appendix D

### Questionnaires

#### *Menstruation*

Are you menstruating today?

- No
- Yes

#### *Pain*

How much pain were you in during the day?

- No pain
- Mild pain
- Moderate pain
- Severe pain
- Very severe pain
- Excruciating

#### *Shame*

To what extent did you feel shame today?

- Not at all
- Mild Shame
- Moderate Shame
- Severe Shame
- Very Severe Shame
- Worst possible shame

#### *Perceived Organisational Support*

	Strongly disagree	Disagree	Somewhat disagree	Neither agree or disagree	Somewhat agree	Agree	Strongly agree
The organisation values my contribution to its well-being.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The organisation strongly considers my goals and values.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The organisation really cares about my well-being.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

#### *Work Engagement*

	Fully disagree	Disagree	Somewhat disagree	Either agree or disagree	Somewhat agree	Agree	Fully agree
I felt bursting with energy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I felt enthusiastic about my job	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I felt immersed in my work	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

#### *Pain Medication*

Did you take pain medication today?

- No
- Yes

### *Contraceptive Use*

Do you use hormonal contraception?

- Yes
- No

### *Childbirth*

Have you previously given birth?

- Yes
- No
- I prefer not to say

### *Menstrual Disorder*

Do you have a menstruation-related disorder? If yes, which one do you have? If you feel uncomfortable sharing this information feel free to skip this question.