


# Dispositional Optimism, Mode of Delivery, and Perceived Labor Control among Recently Delivered Parturients



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## Abstract

**Objective** Dispositional optimism (DO) is an understudied transdiagnostic resilience factor among peripartum individuals. Low DO is associated with increased fear and pain in labor and increased rates of emergent cesarean delivery, but it is unknown whether DO is associated with perceived control over the labor process.

**Study Design** This a planned secondary analysis of a prospective observational cohort of term parturients ( $n = 164$ ) who were recruited in July and August 2021 during their delivery hospitalization at a single, tertiary medical center. Participants completed a baseline demographic survey prior to delivery and then completed evaluations of DO (Revised Life-Orientation Test [LOT-R]) and control over the labor process (Labor Agency Scale [LAS]) during their postpartum hospitalization. DO was dichotomized into low and high by score of  $\leq 14$  or  $> 14$  on LOT-R, respectively, and labor agency scores were compared between groups. Maternal demographics, pregnancy, and delivery characteristics were compared by DO status. Multivariable regression was performed, adjusting for known confounders (induction, labor analgesia, and mode of delivery).

**Results** Demographic, pregnancy, and neonatal characteristics were similar between those with low compared with high DO. People with low DO had significantly higher rates of cesarean section (44 vs. 24%,  $p = 0.02$ ) and overall had lower LAS scores (139.4 vs. 159.4,  $p < 0.001$ ), indicating that they felt less control over their labor process than those with high DO. In the multivariable regression, those with low DO had higher odds of a low LAS score after controlling for induction, labor analgesia, and mode of delivery (adjusted odds ratio = 1.29, 95% confidence interval: 1.20–1.39).

**Conclusion** People with low DO had significantly lower perceived control over their labor, even after controlling for differences in mode of delivery. Interventions to alter DO may be an innovative way to improve birth experience and its associated perinatal mental health morbidities.

## Keywords

- ▶ dispositional optimism
- ▶ labor agency
- ▶ labor control
- ▶ perinatal depression
- ▶ perinatal anxiety

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## Key Points

- It is unknown if there is an association between DO and perceived labor control.
- People with low DO had higher rates of cesarean delivery and lower perceived labor control.
- Altering DO may be a novel mechanism for improving birth experience.

Dispositional optimism (DO) is an understudied resilience factor with widespread health impacts; higher DO is associated with lower cardiovascular risk,<sup>1</sup> postoperative rehospitalization rates,<sup>2</sup> psychiatric conditions,<sup>3–5</sup> and mortality.<sup>6–8</sup> In the perinatal period, data are limited, but lower DO has been associated with higher rates of in vitro fertilization failure,<sup>9</sup> preterm birth and low birth weight,<sup>10</sup> emergent cesarean delivery,<sup>11</sup> and postpartum depression.<sup>9,12,13</sup> It is postulated that baseline differences in DO alter motivational and behavioral factors linked with health outcomes: individuals with higher DO are more likely to engage in health promoting activities (i.e., smoking cessation, medication adherence, and attendance at prenatal care) and, in times of adversity, display healthier psychosocial coping mechanisms such as positive reframing and engagement of their social circle.<sup>14,15</sup>

There is mounting evidence that low DO is also associated with differences in labor experience including increased fear of the labor process<sup>16</sup> and labor pain,<sup>11</sup> as well as mode of delivery.<sup>17</sup> DO,<sup>9,12,13</sup> mode of delivery,<sup>18</sup> and lack of control during labor<sup>19–24</sup> are linked to elevated risk of postpartum depression and anxiety and posttraumatic stress disorder. However, the association of DO with perceived labor control has never been studied. As DO has been demonstrated to be modifiable,<sup>25–35</sup> promoting resilience through interventions to increase DO could optimize labor experience and decrease birth trauma and its associated perinatal mental health impacts. Thus, we aimed to explore the interplay between DO, mode of delivery, and perceived control over the labor and delivery process.

## Materials and Methods

This is a planned secondary analysis of a prospective study of people admitted to the labor and delivery unit at Women and Infants Hospital of Rhode Island, a large tertiary medical center, in July and August 2021. People were eligible if they were nulliparous, English speaking, and had singleton pregnancies at gestational age  $\geq 37$  weeks. Participants were excluded if they were scheduled for cesarean birth (as the parent study focused on labor control) or were non-English speaking. After obtaining consent, participants filled out a detailed survey of past medical and psychiatric history shortly after admission to the labor and delivery unit. After delivery, they completed the Revised Life Orientation Test (LOT-R),<sup>36</sup> a validated 10-item instrument that measures DO, and the Labor Agency Scale (LAS), a validated 29-item instrument as a measure of perceived childbirth control.<sup>37</sup> Values on the LOT-R range from 0 to 24, and values on the LAS range from a score of 29 to 203. The study was approved by the institutional review board prior to

initiation of enrollment. All participants provided written informed consent.

Trained medical personnel then performed a detailed chart review of participant maternal outcomes including baseline medical comorbidities, body mass index (BMI) at delivery, hypertensive diseases of pregnancy, gestational diabetes mellitus, gestational age at delivery, induction of labor, labor analgesia, mode of delivery and postpartum complications including hemorrhage, infection, and anal sphincter injuries. Neonatal outcomes collected included birthweight, Apgar's scores, admission to the neonatal intensive care unit (NICU), oxygen and antibiotic administration, and jaundice.

## Statistical Analyses

All data were analyzed using R.<sup>38</sup> For this analysis, we compared participants with a low DO (LOT-R score of  $\leq 14$ ) to moderate/high DO. Prior studies have utilized one of two approaches in creating a dichotomous low/high DO threshold: either using a score of  $\leq 14$ <sup>2</sup> or using the lowest quartile compared with the other three upper quartiles.<sup>3,8</sup> In our final cohort, the lowest quartile was consistent with a score of 14, supporting use of that threshold. Our primary outcome was LAS score, where differences of 10 to 20 points have generally been considered clinically significant in prior analyses,<sup>39,40</sup> including the initial scale creation and validation study.<sup>37</sup> Nonparametric analyses were performed with the use of Fisher's exact test for categorical variables and Kruskal-Wallis for continuous variables. Multiple logistic regression was performed to assess for confounding, or factors that might be intermediaries on the causal pathway between DO and perceived labor control. Factors were chosen a priori based on prior literature and included induction of labor,<sup>41</sup> delivery analgesia,<sup>42</sup> and mode of delivery.<sup>18</sup>

## Results

A total of 295 people were approached for inclusion in the study, and 164 (55.6%) enrolled. In the analytic sample, 41 (25%) participants had low DO and 123 (75%) had moderate/high DO. The LOT-R score cut-offs by quartile were 14 (Q1), 18 (Q2), 20 (Q3), and 24 (Q4).

Baseline demographic factors were similar between DO groups, including maternal age, type of insurance, level of maternal education, and BMI (**Table 1**). Pregnancy characteristics were also similar between groups, including medical complications (hypertension and diabetes), psychiatric morbidity, gestational age at delivery, and labor anesthesia (**Table 2**). Rates of induction were high in both groups, but did not differ by DO status (80 vs. 72,  $p = 0.7$ ). People with low DO had significantly higher rates of cesarean section (44

**Table 1** Maternal demographics of recently delivered women with low vs. moderate/high dispositional optimism

Characteristic	Low dispositional optimism (N = 41)	Moderate/high dispositional optimism (N = 123)	p-Value
Age (y) Mean (SD)	28.5 (5.4)	28.2 (4.9)	0.5
Race/ethnicity			
Non-Hispanic White	29 (71)	83 (67)	0.7
Non-Hispanic Black	5 (12)	10 (8.1)	0.5
Hispanic	8 (20)	29 (24)	0.6
Other	2 (4.9)	10 (8.1)	0.7
Insurance			
State/federal	13 (33)	41 (33)	0.9
Private	27 (66)	80 (65)	
Education			
< High school	0 (0)	4 (3.3)	0.06
High school/GED	15 (37)	38 (31)	
Associates	4 (9.8)	7 (5.7)	
College	6 (15)	44 (36)	
Graduate school	15 (37)	30 (24)	
BMI at delivery (kg/m <sup>2</sup> ) Mean (SD)	34.02 (8.2)	32.7 (6.6)	0.6

Abbreviations: BMI, body mass index; GED, general education development; SD, standard deviation.

Notes: Value presented in columns as n (%), unless otherwise noted. Low dispositional optimism (DO) was defined as the Revised Life-Orientation Test score of  $\leq 14$ , moderate/high DO was  $> 14$ .

vs. 24%,  $p = 0.02$ ) compared with those with moderate/high DO. No differences in neonatal characteristics were detected between groups, including birth weight, Apgar's score  $< 7$  at 5 minutes, admission to NICU, or neonatal complications (–Table 3).

People with low DO had lower LAS scores than those with moderate/high DO (139.4 vs. 159.4,  $p < 0.001$ ), indicating that they felt less control over their labor process. In the multi-variable regression, those with low DO had higher odds of a low LAS score (odds ratio [OR] = 1.35, 95% confidence interval [CI]: 1.25–1.45), a difference which persisted when controlled for induction, method of labor analgesia, and mode of delivery (adjusted OR [aOR] = 1.29, 95% CI: 1.20–1.39).

## Discussion

Although DO and a lack of control during childbirth have been independently associated with increased risk of postpartum mental illness, to date, the potential association between DO and lack of control during childbirth has yet to be examined. In this prospective study of a diverse cohort, newly postpartum women with low DO had significantly lower scores on the Labor Agency Scale, suggesting that low DO is associated with reduced perception of control over the labor and delivery process.

Our results are consistent with prior studies that have found that higher DO is associated with improved labor experiences including decreased labor pain<sup>11</sup> and decreased

fear of the labor process.<sup>16</sup> Data are accumulating that labor expectations and experience are key tenets in preventing traumatic childbirth<sup>21–24</sup> and, by extension, postpartum mental health disorders.<sup>19,20</sup> However, there is no prior research in the perinatal sphere on leveraging resilience resources such as DO to improve birth experience or prevent perinatal mental health conditions.

DO has been proven to be changeable through various methods including visualization exercises,<sup>25–27</sup> cognitive and behavioral therapy,<sup>28,29</sup> mindfulness training,<sup>30–32</sup> and other programs that foster resilience.<sup>33–35</sup> These methods have yielded durable changes in DO and its associated outcomes, particularly depression and anxiety.<sup>29,35</sup> However, none of these studies evaluated a perinatal population. Thus, targeting alterations in DO is an innovative mechanism to improve perinatal somatic and mental health outcomes.

## Strengths and Limitations

Our study has several strengths and limitations to consider. Our study was completed in a high-volume, tertiary-care medical center, and the study population was diverse. In addition, participants completed their questionnaires during the delivery hospitalization, while birth experience was still recent and before development of postpartum mental health conditions might have impacted their responses. However, there were some study limitations. DO and labor agency were assessed cross-sectionally in the postpartum period, so there is the potential for reverse causality, by which factors

**Table 2** Pregnancy and labor characteristics of recently delivered women with low vs. moderate/high dispositional optimism

Characteristic	Low dispositional optimism (N = 41)	Moderate/high dispositional optimism (N = 123)	p-Value
Gestational age at delivery (wk) Mean (SD)	39.6 (1.3)	39.6 (1.4)	0.9
Hypertensive disorder			
Pregestational	2 (4.9)	3 (2.4)	0.6
Gestational <sup>a</sup>	6 (14.6)	21 (17)	0.7
Diabetes mellitus			
Pregestational	0	2 (1.6)	>0.9
Gestational	2 (4.9)	9 (7.3)	0.7
Psychiatric morbidity <sup>b</sup>			
Anxiety disorder	48 (39)	22 (54)	0.1
Depressive disorder	36 (29)	16 (39)	0.2
Induction of labor	33 (80)	88 (72)	0.7
Anesthesia <sup>c</sup>			
Epidural/spinal	40 (98)	112 (91)	0.3
Nitrous oxide	1 (2.4)	4 (3.3)	>0.9
Intravenous medications	2 (4.9)	3 (2.4)	0.6
None	0 (0)	11 (8.9)	0.07
Mode of delivery			
Vaginal (spontaneous and operative)	23 (56.1)	93 (75.6)	<0.01
Cesarean	18 (43.9)	30 (24.4)	0.017
Labor agency score	139.4 (35.5)	159.4 (26.6)	<0.001

Abbreviation: SD, standard deviation.

Note: Value presented in columns as n (%), unless otherwise noted. Low dispositional optimism (DO) was defined as the Revised Life-Orientation Test score of ≤14, moderate/high DO was >14.

<sup>a</sup>Gestational hypertensive disorders included: gestational hypertension, pre-eclampsia, eclampsia.

<sup>b</sup>Psychiatric morbidity included report of both historical and current psychiatric diagnoses.

<sup>c</sup>Results not additive, could have more than one.

that impacted their labor agency might have changed the assessment of DO. This is unlikely, as prior studies have demonstrated that without targeted intervention, DO is a stable metric, even across stressful life events such as the diagnosis of cancer,<sup>43</sup> or undergoing major cardiac surgery.<sup>44</sup>

Second, while we had self-report data on mood and anxiety disorders (historical and current collected together) we neither collected any mental health measures/scales, nor were we able to follow participants longitudinally into the postpartum period, so we could not evaluate if birth trauma

**Table 3** Neonatal characteristics of recently delivered women with low vs. moderate/high dispositional optimism

Characteristics	Low dispositional optimism (N = 41)	Moderate/high dispositional optimism (N = 123)	p-Value
Birth weight (g) Mean (SD)	3,305 (493)	3,376 (453)	0.4
Apgar's score <7 at 5 min	1 (2.5)	2 (1.6)	0.6
Admission to NICU	5 (13)	11 (8.9)	0.5
Neonatal complications	6 (15)	19 (16)	>0.9
Jaundice	3 (7.5)	9 (7.4)	>0.9
Respiratory support	3 (7.5)	11 (8.9)	>0.9
Antibiotics <sup>a</sup>	2 (5)	2 (1.6)	0.3

Abbreviations: NICU, neonatal intensive care unit; SD, standard deviation.

Notes: Value presented in columns as n (%), unless otherwise noted; Low dispositional optimism (DO) was defined as the Revised Life-Orientation Test score of ≤14, moderate/high DO was >14.

<sup>a</sup>Excluded routine ophthalmic erythromycin administration.

or postpartum mental health conditions developed. Third, we did not evaluate people undergoing a scheduled cesarean section, which is likely a different experience from a perceived control over the birth process perspective. Lastly, this cohort was limited to full term births, which made assessment of adverse perinatal outcomes impractical and might have restricted the range of LAS scores (and traumatic birth experiences) among those who delivered preterm.

## Conclusion

In conclusion, low DO is associated with higher rates of unplanned cesarean section and lower perceived control over the labor process, both of which are risk factors for the development of birth trauma and postpartum mood/anxiety disorders. Thus, leveraging interventions to intentionally build resilience and improve DO prior to childbirth may be an innovative mechanism to improve patient-centered perinatal mental health outcomes.

### Note

This study was previously presented at the North American Society for Psychosocial Obstetrics and Gynecology (NASPOG) Biennial Conference, Ann Arbor, MI, on April 22–24, 2022.

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None.

### Conflict of Interest

None declared.

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