

Pregnancy Intentions and Happiness: Psychological Predictors of Breastfeeding in a National Sample

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Unintended pregnancies (mistimed or unwanted) are linked to lower rates of breastfeeding, yet little research to date has investigated the role of feelings of happiness about the pregnancy on maternal health behaviors. Using data from the 2002 National Survey of Family Growth, we examined whether breastfeeding initiation/duration was explained by (1) socio-demographic characteristics of mothers and (2) pregnancy intentions/feelings of happiness of mothers. Pregnancy intentions/happiness factors significantly explained an increase in the multiplicative odds of initiating breastfeeding better than a model with socio-demographic variables alone, $G^2(5, 798) = 3622.5$. Participants who indicated their pregnancies were unwanted or too soon breastfed for a shorter duration in comparison to those who said it was the right time; these effects remained after controlling for socio-demographic characteristics. Feelings of happiness about the pregnancy did not alter the odds of initiation or affect the duration of breastfeeding. Keywords: breastfeeding initiation, breastfeeding duration, pregnancy intentions, happiness about the pregnancy

While much research has investigated unintended pregnancies and their implications for maternal and infant health, less attention has been placed on the relationship between health behaviors and women's thoughts and feelings about being pregnant (Blake et al., 2007). One particularly important health behavior that is worthy of further investigation due to its proven physiological and psychological health benefits to both mothers and infants is initiation and duration of breastfeeding (Davis, Savitz, & Graubard, 1988; Lawrence, 2000; Mortensen, Michaelsen, Sanders, & Reinsich, 2002; Newcomb et al., 1994; Visness, Kennedy, & Ramos, 1997). The physiological benefits of human breast milk are numerous, and include anti-infective, immunologic, and allergy protective properties; infants who are breastfed demonstrate a reduction in infections and lower rates of child onset malignancies, such as acute leukemia (Davis et al., 1988; Lawrence, 2000). Research has also demonstrated the health benefits of breastfeeding for mothers, including an association between breast stimulation and the control of excessive postpartum hemorrhaging, as well as a decreased risk of premenopausal breast cancer (Newcomb et al., 1994; Visness et al., 1997). Breastfeeding has also been shown to have advantageous psychological associations, including long range developmental and intellectual outcomes for the breastfed infant, and a unique mother-infant attachment bond (Mortensen et al., 2002).

Despite these optimal health outcomes for both infants and mothers, fewer than one third of US infants are breastfed exclusively for the recommended

duration of more than 6 months, followed by continued partial breastfeeding for at least a year ("American Academy," 2013; Chen, Johnson, & Rosenthal, 2012). Successful breastfeeding depends on multiple factors related to the mother, infant, and the environment, and there are a variety of barriers which inhibit initiation and continuation of breastfeeding, such as the mother returning to work, lack of access to breast pumps, sore nipples and pain, and access to free formula (Haughton, Gregorio, & Pérez-Escamilla, 2010). We recognize that not all women are physically able to breastfeed and some may experience difficulty in both initiating breastfeeding and continuing when it proves challenging (Kelleher, 2012).

Socio-Demographic Factors and Breastfeeding

Despite the well-known benefits of breastfeeding in the existing literature, disparities exist in breastfeeding behavior among various population groups (Centers for Disease Control and Prevention [CDC], 2011). A variety of factors are associated with a mother's decision or ability to initiate and continue breastfeeding, including personal characteristics such as age, race/ethnicity, education, socioeconomic status, intrapersonal characteristics, sources of support, childcare status of the infant, and available breastfeeding interventions (Celi, Rich-Edwards, Richardson, Kleinman, & Gillman, 2005; Dennis, 2002; Li, Darling, Maurice, Barker, & Grummer-Strawn, 2005). Research shows that across race, white non-Hispanic mothers breastfeed at a higher rate than black mothers (Smith-Gagen,

Hollen, Walker, Cook, & Yang, 2014). Additionally, studies have shown that black women have a shorter duration of breastfeeding after 6 months (27.9%) compared with white (45.1%) and Hispanic (46%) mothers. By 12 months, only 12.9 % of black mothers still breastfeed in comparison with white (23.6%) and Hispanic (12%) mothers (CDC, 2011). Furthermore, breastfeeding mothers tend to be older with higher levels of education (Jones, Kogan, Singh, Dee, & Grummer-Strawn, 2011; Taylor & Cabral, 2002).

Socio-economic status tends to be higher for those who initiate breastfeeding (Piper & Parks, 1996; Taylor & Cabral, 2002). Among low-income pregnant and postpartum women who receive nutrition and health services through the Women, Infant, and Children (WIC) program, the largest supplemental food program in the United States, only half of participants report breastfeeding their youngest child (Haughton et al., 2010). Research demonstrates that participation in WIC may actually inhibit women from breastfeeding. According to Ryan and Zhou (2006), for mothers with infants at least 6 months of age, WIC status was actually the strongest negative determinant of breastfeeding; mothers who did not participate in WIC (but were eligible) were twice as likely to breastfeed for at least 6 months compared to those who were enrolled in the program (Ryan & Zhou, 2006). Thulier and Mercer (2009) suggest that free samples and distribution of infant formula through WIC inhibits women from initiating and continuing breastfeeding. The role of WIC on low-income women's breastfeeding behavior cannot be ignored when considering the reasons why women of lower socio-economic status tend to initiate breastfeeding less often and have trouble maintaining it for 6 months or more.

Pregnancy Intention and Breastfeeding

Since about half of the pregnancies in the United States are unintended, pregnancy intentions, including mistimed or unwanted pregnancies, have been studied in relation to health behaviors, including breastfeeding (Finer & Zolna, 2014). Several studies have linked unintended pregnancies to lower rates of breastfeeding (Cheng, Schwartz, Douglas, & Horon, 2009; Taylor et al., 2008). Unwanted pregnancy, in particular, is associated with less initiation of breast-

feeding (Joyce, Kaestner, & Korenman, 2000a). Furthermore, research has demonstrated that when both parents intend to conceive, children are the most likely to be breastfed, while discrepancies between the parents regarding pregnancy intentions result in lower rates of breastfeeding. Specifically, children are breastfed at lower rates when the mother does not intend to conceive but the father does, as compared to when the mother does intend to conceive but the father does not (Korenman, Kaestner, & Joyce, 2002). Inconsistent with previous research, Cheng and colleagues (2009) found that mothers with mistimed and unwanted births were as likely as mothers with intended births to initiate breastfeeding; however, mothers with mistimed and unwanted pregnancies were less likely to continue breastfeeding for 8 weeks or more. Cheng et al. (2009) hypothesized that continuing to breastfeed when it becomes challenging may be more difficult for mothers who become pregnant unintentionally compared to those with intended pregnancies.

Psychological Factors and Breastfeeding Intention vs Outcome

Furthermore, researchers have investigated the effects of other psychological factors on breastfeeding intentions and outcomes. Noel-Weiss, Rupp, Cragg, Bassett, and Woodend (2006) found that the mother's confidence in her ability to breastfeed was positively correlated with breastfeeding duration. Research by Fairlie, Gillman, and Rich-Edwards (2009) demonstrated that women with high pregnancy-related anxiety and prenatal depressive symptoms are less likely to plan to breastfeed; however, these symptoms were not associated with failure to initiate breastfeeding in this study. Most research, though, indicates that prenatal breastfeeding intentions predict postnatal breastfeeding behaviors (Forster, McLachlan, & Lumley, 2006; Lawson & Tulloch, 1995). Previous research has also demonstrated that women intending to breastfeed have higher scores on maternal-fetal attachment than those not intending to breastfeed (Foster, Slade, & Wilson, 1996). Other research has found a modest relationship between prenatal attachment and exclusive breastfeeding intentions, in that high maternal-fetal attachment is correlated with the intention to breastfeed exclu-

sively; however, this relationship did not hold after controlling for other relevant covariates such as perceived support and employment status (Lear, 2013).

Pregnancy-Related Happiness and Health Outcomes

While previous research has investigated feelings of pregnancy-related anxiety, pregnancy intention, and maternal-fetal attachment, some research has investigated mothers' perceived well-being and happiness during pregnancy. Su (2012) demonstrated that mothers with unintended births experienced declines in overall happiness and well-being postpartum (rather than just pregnancy-related happiness) relative to childless women. Sable, Washington, Schwartz, & Jorgenson (2007) specifically explored women's feelings of happiness about having a baby. Pregnancy-related happiness was positively correlated with social support and negatively correlated with loneliness and family relationship problems (Sable et al., 2007).

Further research has investigated the link between pregnancy intentions and happiness about being pregnant, and the associated risk for adverse effects for the mother and the infant (Blake et al., 2007). A significantly higher proportion of women who were unhappy about being pregnant (in comparison to those who were moderately happy or happy) reported having smoked cigarettes in the past week, having been depressed in the past month, having experienced intimate partner violence in the past year, and having drunk alcohol or used drugs during the pregnancy (Blake et al., 2007). Additionally, a woman's happiness about being pregnant was more strongly associated with the above-mentioned behavioral and psychosocial risk factors than pregnancy intention, indicating that pregnancy-related happiness may be more related to prenatal care initiation/utilization and pregnancy outcomes than pregnancy intentions (Blake et al., 2007).

Investigation of Pregnancy-Related Happiness and Breastfeeding

Based on the findings demonstrating the relationship between pregnancy-related happiness and prenatal risk factors, further research into breastfeeding, which is one major component of maternal health

behavior, may also reveal an association with pregnancy-related happiness. Even though Blake et al. (2007) found that pregnancy intentions and pregnancy-related happiness are strongly correlated, Sable (1999) states that measuring pregnancy intentions may not be a sufficient proxy for pregnancy attitudes. Considering that pregnancy intentions and pregnancy-related happiness may differentially impact maternal health behaviors, research needs to expand on the role of maternal psychological factors. Although various socio-demographic factors have been identified as predictors of breastfeeding practices, the added impact of psychological factors (feelings of happiness and wantedness) remains limited. Given the public health costs of prenatal and postnatal programs which provide education about the benefits of breastfeeding behavior, it would be advantageous to better understand such psychological factors, rather than simply socio-demographic factors alone. In addition, a better understanding of these psychological factors may help explain low rates of breastfeeding by elucidating the reasons some women have difficulty with initiation and prolonged duration, including experiences of physical discomfort and pain (Kelleher, 2012).

Present Research

We seek to fill this literature gap by investigating the relationship between wantedness and feelings of happiness about the pregnancy in relation to breastfeeding initiation and duration. Our research question is: do wantedness and feelings of happiness about the pregnancy explain initiation and duration of breastfeeding when controlling for socio-demographic factors? Consistent with previous research, we hypothesize that mothers with unintended pregnancies and feelings of unhappiness about the pregnancy are less likely to initiate breastfeeding and more likely to breastfeed for a shorter duration, compared with mothers whose pregnancy was intended and who are happy about their pregnancy. In addition, we hypothesize that demographic characteristics, such as education, race, age, and poverty level will significantly predict initiation and duration of breastfeeding, as is consistent with previous research. Overall, however, we hypothesize that feelings of happiness and wantedness of preg-

nancy will better explain variation in breastfeeding outcomes than socio-demographic factors alone.

Method

Data

In order to investigate these questions, we used data from the National Survey of Family Growth (NSFG), which is a large periodic and population-based survey (NSFG, 2002). The NSFG has been conducted by the National Center for Health Statistics since 1973. It was conducted five times with a national sample of women periodically between 1973 and 1995. A sixth periodic survey was conducted in 2002, which included both men and women. We used data from the 2002 wave that interviewed 12,571 men and women on factors affecting birth rates, pregnancy rates and women's reproductive health. It contains information on 13,593 pregnancies and 9,148 births from 5,033 women.

From the sample of 5,033 women, we created a sub-sample of women whose pregnancy resulted in a live birth, and who answered the questions based on their first child, whether it was an only child or not. In order to create this sub-sample, we excluded individuals who had lost a pregnancy, aborted their pregnancy, or were currently pregnant. The sub-sample includes 4,413 participants. It is worth noting then that the sample only includes responses of those women referring to their first child. While this may potentially limit the generalizability of the results, this exclusion criterion is based on previous research which suggests that mothers are likely to choose the same feeding method for each of their children based on how they fed their first child, regardless of the number of children they have (Taylor et al., 2008). Considerations of this assumption will be made in the limitations section.

Measures

Breastfeeding initiation/duration. The first dependent variable selected was initiation of breastfeeding. Participants were asked whether they breastfed their child at all, so this is a binary outcome measure for either yes or no. The second dependent variable selected was a continuous outcome measure for duration of breastfeeding measured in weeks. To check for non-normality we constructed a PP-plot and his-

togram, which compared the cumulative probabilities of the normal distribution with the distribution of residuals. Our PP-plot showed that our data was slightly skewed to the right. To fix this non-normality problem, we transformed our Y dependent variable (duration of breastfeeding weeks) by taking the natural log and running our regression model again. Non-normality was no longer a problem after transforming the dependent variable. All further analyses with this continuous dependent variable were conducted with logged duration of breastfeeding in weeks. Those who breastfed their child for less than one week were coded as 0.5 to indicate an average between 0 weeks (no breastfeeding) and 1 week. Participants who reported that they were still breastfeeding their child were excluded from analyses because duration of time was impossible to ascertain.

Socio-demographic characteristics. Demographic variables included age, poverty, education, and race. Both age and poverty level were measured as continuous variables. Poverty level was the percentage of the poverty level for the year 2001; participants who exceed 500 percent of the poverty level were grouped together. Education was also a continuous variable, which measured years of completed schooling. Race was a categorical variable and included *Hispanic*, *non-Hispanic black*, *non-Hispanic white*, and *non-Hispanic other*. Hispanic was used as the reference category in all analyses.

Intentions and feelings about pregnancy. Intention variables included wantedness of pregnancy and feelings of happiness about the pregnancy. Wantedness of the pregnancy was scored as a categorical variable, and included the response options of too soon, right time, unwanted, indifferent, and don't know. Participants whose answer was don't know were coded as missing. Right time was used as the reference category in all analyses. Feelings of happiness were measured on a continuous scale where 0 means the participant was very unhappy to find out that she was pregnant, and 10 means the participant was very happy to find out that she was pregnant.

Statistical Analysis

Initiation of breastfeeding. Logistic regression was conducted to explore the relationship be-

tween the dependent variable (initiation of breastfeeding) and the independent variables. Omnibus tests were used to determine whether socio-demographic factors (age, poverty, education, and race) predicted breastfeeding initiation, and whether socio-demographic factors with intentions/happiness variables predicted breastfeeding initiation. A log likelihood ratio test was used to investigate whether a model with socio-demographic factors (age, poverty, education, and race) and wantedness/happiness about the pregnancy explains an increase in the multiplicative odds of breastfeeding better than a model with only socio-demographic factors. Individual coefficients resulting from the second comparison were examined to determine which factors are significant in predicting breastfeeding initiation.

Duration of breastfeeding. Ordinary least squares (OLS) regression was used to examine the relationship between the dependent variables and the independent variable (the logged duration of breastfeeding in weeks). Since little research exists establishing an association between breastfeeding behaviors and happiness about the pregnancy, we decided to conduct two incremental F-tests. The first incremental F-test compared whether a model with socio-demographic factors (age, poverty, education, and race) and wantedness/happiness about the pregnancy explained a significant proportion of the variation in logged duration of breastfeeding better than a model with socio-demographic variables alone. The second incremental F-test was structured the same, except that the second model included socio-demographic factors and only wantedness variables. In addition, individual coefficients resulting from the second comparison were examined to determine which variables were significant in predicting logged breastfeeding duration.

Results

Sample Characteristics

Table 1 describes the characteristics of our sample. Women who initiated breastfeeding, regardless of the duration, comprised 60.6% of the sample, while 39.4% did not breastfeed at all. The average duration of breastfeeding in our sample was 16.37 weeks (SD

= 25.60) with a minimum duration of 0 and a maximum of 208. This indicates that the average length of breastfeeding was about 4 months. Participants were 48.7% white, 22.5% black, 24.5% Hispanic, and 4.3% non-Hispanic other. The average percentage of the poverty level was 228.58, which for a family of 4 was about \$40,000 per year in 2001 ("Annual Update," 2001). Average number of years of schooling was 12.78, and the mean age was about 23 years old with a standard deviation of about 0.5 years. The average for feelings of happiness about the pregnancy was 7.97 out of 10. Almost half of the participants reported that their pregnancy occurred at the right time (47.5%), 7.8% reported they wanted it later, 31.5% indicated it was too soon or mistimed, 1.4% didn't care, and 11.8% reported that the pregnancy was *unwanted*.

Predictors of Breastfeeding Initiation

Table 2 shows results of the logistic regression analyses. Results revealed that the socio-demographic factors (age, race, education, and SES) explain an increase in the multiplicative odds of breastfeeding initiation, $\chi^2(5, 3643) = 442.75, p < .001$. The model predicts 67.6% of breastfeeding initiation correctly. Nagelkerke $R^2 = .151$, meaning that 15.1% of the variation in breastfeeding initiation is explained by socio-demographic variables. The full model with socio-demographic and intention/happiness factors also significantly explains an increase in the multiplicative odds of breastfeeding initiation, $\chi^2(11, 798) = 80.48, p < .001$. The model predicts 72.5% of breastfeeding initiation correctly. Nagelkerke $R^2 = .127$, indicating that 12.7% of the variation in breastfeeding initiation is explained by socio-demographic and intention/happiness factors. Results from the likelihood ratio test indicate that the full model, including socio-demographic and intentions/happiness, explains an increase in the multiplicative odds of initiating breastfeeding better than a model with socio-demographic variables alone, $G^2(5, 798) = 3622.5$.

Upon analyzing the coefficients in the full model, the odds of initiating breastfeeding decrease by .1% for an increase in one year of age, holding constant all other factors, $p = .024$, ($\exp(b) = 0.999$). The odds of initiating breastfeeding decrease by 15% for one more year of schooling, holding constant all other

Table 1: *Sample Characteristics of Women from their First, Live Birth*

Variable	Valid	Missing	Mean	Std. Dev	Percent
Breastfeeding Initiation	3738	675	-	-	60.6
Breastfeeding Duration	3403	1,010	16.37	25.60	
Education	4413	0	12.78	2.55	-
Poverty	4413	0	228.58	151.16	-
Age at Pregnancy Outcome	4413	0	2308.4	529.14	-
Hispanic	1080	-	-	-	24.5
White	2150	-	-	-	48.7
Black	995	-	-	-	22.5
Other	188	-	-	-	4.3
Happiness	827	3586	7.97	2.94	-
Wantedness:					
Right Time	2094	-	-	-	47.5
Later	343	-	-	-	7.8
Too Soon, Mistimed	1390	-	-	-	31.50
Didn't Care/Indifferent	61	-	-	-	1.4
Unwanted	519	-	-	-	11.8
Don't Know	6	-	-	-	.1

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Table 2: *Logistic Regression Analyses Predicting Breastfeeding Initiation from Socio-Demographic Characteristics and Wantedness of Pregnancy Variables*

Variable	Model 1			Model 2		
	Coefficient	SE	Exp(b)	Coefficient	SE	Exp(b)
Constant	2.34**	.22	10.37	1.297*	.65	3.66
Age at Pregnancy	-.001**	.0001	.99	-.0005*	.0002	.99
Poverty Level Income	-.001**	.0003	.99	-.001	.0006	.99
Education	-.15**	.02	.86	-.15**	.04	.86
White	.71**	.10	2.03	.67**	.22	1.94
Black	1.32**	.11	3.74	.97**	.26	2.63
Other	.24	.20	1.27	.47	.43	1.60
Later	-	-	-	.10	.34	1.11
Too Soon, Mistimed	-	-	-	.15	.22	1.17
Indifferent	-	-	-	.77	.84	2.16
Unwanted	-	-	-	.53	.33	1.70
Happiness	-	-	-	.06	.04	.99
Model Chi-Square [df]	442.751 [6]	-	-	80.484 [11]	-	-
Block Chi-Square [df]	-	-	-	3622.5 [5]	-	-
% Correct Predictions	67.6	-	-	72.5	-	-
Nagelkerke R ²	.151	-	-	.134	-	-

* $p < .05$

** $p < .01$

factors, $p < .05$, ($\exp(b) = .85$). The odds of initiating breastfeeding increase by 94.4% for white mothers compared to Hispanic mothers, holding constant all other variables, $p = .003$, ($\exp(b) = 1.94$). The odds of initiating breastfeeding increase by 163.4% for black mothers in comparison to *Hispanic* mothers, holding constant all other variables, $p < .001$, ($\exp(b) = 2.63$). Socio-economic status, *non-Hispanic* other, feelings of happiness, and all of the intention variables (i.e. *later*, *too soon*, *indifferent*, *unwanted*) were not significant factors in the initiation of breastfeeding.

Predictors of Breastfeeding Duration

Table 3 describes the results of the OLS regression on breastfeeding duration. In order to determine the influence of socio-demographics and pregnancy intentions/happiness about the pregnancy on breastfeeding behavior, an omnibus analysis of variance test was conducted. It showed that socio-demographics and intentions/happiness were significant in explaining the logged duration of breastfeeding, $F(11, 650) = 3.53$, $p < .001$. An incremental F -test, however, did not demonstrate that a model with socio-demographic factors and wantedness/happiness variables better explains breastfeeding duration than a model with socio-demographics alone, $F\Delta(5, 435) = 1.54$, $p > .05$. Therefore, we sought to evaluate a model that did not include happiness to be pregnant, only socio-demographic and intention variables. This decision was largely influenced by previous research which has demonstrated that pregnancy intentions predict breastfeeding, and the lack of research establishing a link between feelings of happiness and breastfeeding outcomes (Dye, Wojtowycz, Aubry, Quade, & Kilburn, 1996; Li et al., 2007; Taylor & Cabral, 2002).

In order to determine the influence of socio-demographic and pregnancy intention variables on duration of breastfeeding, an omnibus analysis of variance test was conducted. It revealed that socio-demographics and wantedness of pregnancy were significant in explaining the logged duration of breastfeeding, $F(10, 2163) = 4.70$, $p < .001$ (Table 3). An incremental F -test then demonstrated that a model with socio-demographic and intention factors better explains breastfeeding duration than socio-demographic factors alone, $F\Delta$

(4, 2163) = 4.44, $p = .001$. It is important to note that while a model including socio-demographic factors and wantedness of pregnancy variables better explains breastfeeding duration, socio-demographic factors only explain 1.1% of the variation in breastfeeding, and wantedness explains .6% more variation in outcomes, adjusted $R^2 = .017$, $p = .001$.

Analysis of the coefficients reveals that as age increases by one year, duration of breastfeeding increases, holding constant education, poverty, race, and wantedness of pregnancy; however this does not reach statistical significance, $\beta = .00004$, $p > .05$ (Table 3). As income level increases, duration of breastfeeding increases, holding constant all other variables; yet this increase is not statistically significant, $\beta = .00003$, $p > .05$. As years of completed schooling increases by one year, duration of breastfeeding increases by .02 weeks, holding constant all other variables; however, this increase is not statistically significant, $p > .05$. The average difference in breastfeeding between *Hispanics* and *whites* is .03, holding constant all other variables, $p > .05$. This means that white women breastfed a longer duration than Hispanic women controlling for other factors, but this difference is not statistically significant. The average difference in breastfeeding between *Hispanics* and *blacks* is -.08, holding constant all other variables, which means that blacks breastfed a shorter duration in comparison to *Hispanics*, holding constant all the other variables, but this difference is not statistically significant, $p > .05$. The average difference between *Hispanics* and individuals from other ethnic backgrounds, holding constant all other variables, is .18, indicating that individuals from other ethnic backgrounds breastfed a longer duration than *Hispanics*, controlling for all other variables, but this difference does not reach statistical significance, $p > .05$.

In terms of wantedness of pregnancy, the average difference between those whose pregnancy came *later* than desired compared to those who said it was the *right time* is -.12, meaning that those whose pregnancy came *later* than desired breastfed a shorter duration than those who said it was the *right time*; this difference was not significant though, $p > .05$. The average difference between those who said their pregnancy was *too soon* compared to those who

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Table 3: *Multiple Regression Analyses Predicting Breastfeeding Duration from Socio-Demographic Characteristics and Wantedness of Pregnancy Variables*

Variable	Model 1		Model 2			
	Coefficient	SE	Coefficient	SE	95% CI	
					Lower	Upper
Constant	2.16**	1.49	2.43**	.17	2.101	2.758
Age at Pregnancy	.000*	.00	.000	.00	.000	.000
Outcome						
Poverty Level Income	.000	.00	.02	.00	.000	.000
Education	.02	.01	.03	.01	-.001	.05
White	.03	.07	-.08	.07	-.09	.16
Black	-.12	.08	-.08	.09	-.25	.08
Other	.21	.13	.18	.13	-.08	.44
Later	-	-	-1.2	.09	-.31	.06
Too Soon, Mistimed	-	-	-.18**	.07	-.31	-.05
Indifferent	-	-	-.42	.24	-.89	.04
Unwanted	-	-	-.34**	.09	-.53	-.15
Adjusted R ²	.01	-	0.17	-	-	-
F	4.85	-	4.70	-	-	-
ΔR^2	-	-	.01	-	-	-
ΔF	-	-	4.44	-	-	-

* $p < .05$

** $p < .01$

said it was the *right time* was $-.18$, holding constant all other variables; this indicates that those who felt their pregnancy was *too soon* breastfed a shorter duration than those whose pregnancy was at the *right time*; this difference is statistically significant, $p = .006$, 95% CI $[-.31, -.05]$. The average difference between those who said they felt *indifferent* about their pregnancy timing was $-.42$, holding constant all other variables. This indicates that those who felt *indifferent* about whether they wanted their pregnancy breastfed a shorter time than those who felt it was the *right time*, but this difference was not significant, $p > .05$. The average difference between those who said their pregnancy was *unwanted* and those whose was at the *right time*, holding constant all other variables, was $-.34$; therefore, women whose pregnancy was *unwanted* breastfed a shorter duration than those who indicated it was at the *right time*. This coefficient is statistically significant, $p < .001$, 95% CI $[-.53, -.15]$.

In sum, the only statistically significant coefficients are *too soon* and *unwanted*; women who endorsed their pregnancies as either *too soon* or *unwanted* breastfed for a shorter duration than those who said theirs was at the *right time*. As mentioned previously, preliminary analyses revealed that the data was non-normal, so we transformed our dependent variable (duration of breastfeeding in weeks) by taking the natural log. Other assumption checks were performed to identify any problems relating to homoskedasticity, linearity, outliers, leverage, or influence points; analyses revealed that running the incremental- F test without influence points yielded a negligible change in outcome variation and zero directional change in the variable coefficients.

Discussion

Overall, our results replicate previous research which indicates that breastfeeding initiation is explained by socio-demographic variables (age, education, SES, and race); however, socio-demographic and intention/happiness factors better explain the initiation of breastfeeding than socio-demographics alone. The full model is able to predict breastfeeding initiation with 72.5% accuracy and explains 12.7% of the variation in initiation of breastfeeding. Even though our sample only included data from mothers' first births,

these results might possibly generalize to breastfeeding outcomes at any birth because previous research has demonstrated that mothers are likely to choose the same feeding method for each of their children based on how they breastfed their first child (Taylor et al., 2008). However, in consideration of the fact that pregnancy intentions, pregnancy-related anxiety and happiness, social support, and a multitude of other factors can vary from birth to birth, it seems likely that mothers may have different initiation/duration of breastfeeding from birth to birth. Therefore, these results should be interpreted with caution, and may be generalizable only to new mothers.

In line with previous research, we found that older mothers are more likely to initiate breastfeeding than younger mothers. Inconsistent with previous research, in our sample, individuals with less education are more likely to initiate breastfeeding than those with more years of schooling (Jones et al., 2011; Taylor & Cabral, 2002). Although most studies have demonstrated that more education is associated with an increased likelihood to initiate breastfeeding, the interaction between race/ethnicity and education as it relates to initiation of breastfeeding remains to be determined (Chin, Meyers, & Magnus, 2008). It is possible that such an interaction went undetected in our sample, resulting in findings that are inconsistent with the literature.

Consistent with recent studies, we found that white mothers are more likely to initiate breastfeeding than Hispanic mothers (CDC, 2011). Our model suggests that black mothers are more likely to initiate breastfeeding in comparison to Hispanic mothers, though this is not the typical trend in the literature (CDC, 2011). There is literature to suggest that acculturation status affects breastfeeding behaviors for Hispanic women, such that more acculturated women tend to have lower initiation/duration of breastfeeding. Therefore, varying degrees of acculturation among the Hispanic women in our sample (perhaps more acculturated women) may contribute to why our results indicated that black women were more likely to initiate breastfeeding (Ahluwalia, D'Angelo, Morrow, & McDonald, 2012). Our hypothesis that intentions/happiness factors help to predict initiation of breastfeeding better than so-

cio-demographic factors alone was confirmed; however, these results should be viewed with caution because pregnancy intentions and happiness about the pregnancy do not significantly alter the odds of initiation of breastfeeding as individual covariates.

Furthermore, our results show that breastfeeding duration is explained by socio-demographic factors and wantedness of the pregnancy. Our original hypothesis was not supported because feelings of happiness did not help to explain a significant proportion of the variation in duration of breastfeeding, but a model with just wantedness of the pregnancy and socio-demographic factors does indeed explain a higher proportion of the variance in breastfeeding duration than just socio-demographic factors alone. This result should be interpreted with caution, however, because wantedness of the pregnancy only explains .6% more of the variation in breastfeeding outcomes than socio-demographic factors alone.

Consistent with previous research, as age, education, and income levels increase, duration of breastfeeding increases (Jones et al., 2011; Piper & Parks, 1996; Taylor & Cabral, 2002); these results should be viewed with care because they do not reach statistical significance. Results indicated that both white women and women from other racial/ethnic minorities (who are not white, black, or Hispanic) breastfed their child for a longer time than did Hispanic women, and black women breastfed a shorter duration than Hispanic women. Although these coefficients are not statistically significant, previous research suggests that white women breastfeed for longer durations than minority women, though the results tend to be mixed (Chen et al., 2012; Jones et al., 2011; Thulier & Mercer, 2009). Other research suggests that there are no differences in breastfeeding duration between different racial/ethnic groups, except that black women tend to breastfeed less often than women of other racial/ethnic categories (Thulier & Mercer, 2009).

Women with unwanted pregnancies or pregnancies that occurred too soon breastfed for shorter durations than those who indicated theirs was at the right time; those who felt their pregnancies came later than desired or were indifferent about it also breastfed for a shorter time, but these coefficients did not reach statistical significance. Overall though, these results

replicate previous research which supports that unintended, unwanted, or mistimed pregnancies are associated with a shorter duration of breastfeeding (Cheng et al., 2009; Taylor et al., 2008). Results did not support the hypothesis that feelings of happiness would explain breastfeeding outcomes, in that more positive feelings would yield a longer duration of breastfeeding, but a logistic regression revealed that feelings of happiness taken together with intention variables and socio-demographics did predict higher rates of breastfeeding initiation above just socio-demographics. In sum, women's intentions and desires about her pregnancy do help to explain breastfeeding initiation and duration better than socio-demographic factors alone, but these results need further clarification.

Women with unintended pregnancies and negative pregnancy-related feelings may have a challenging time initiating and sustaining breastfeeding for the recommended length of time. Unintended pregnancies and negative feelings surrounding the pregnancy may make it more difficult for the mother to fantasize about her infant and create a psychological bond with the infant that continues after birth. For these women, there may be a denial of the reality of the pregnancy and a lack of recognition of the infant, its needs, and the role of motherhood, possibly translating to physiological and psychological disengagement in maternal health behaviors, including breastfeeding. Future research should explore these hypotheses.

Limitations

One limitation is that our sample only included women who were asked about their first birth. While previous research suggests that a mother tends to replicate her breastfeeding behavior with each subsequent birth (Taylor et al., 2008), feelings of happiness and wantedness of the pregnancy may change from pregnancy to pregnancy based on a variety of factors. Thus, it would be advantageous to examine a model that takes into account multiple births in order to better elucidate the relationship between breastfeeding behavior and happiness/wantedness of pregnancy. It would be beneficial to compare a woman's pregnancy intentions/feelings of pregnancy-related happiness and breastfeeding initiation/duration for each analogous birth to determine if shifts in intentions/feel-

ings correspond to shifts in breastfeeding behavior.

Another potential confound in our sample is the influence of a diverse array of societal norms regarding breastfeeding behavior. Many women experience a cultural expectation to breastfeed, which has been equated to being a “good enough mother” (Stearns, 2009). Feminist scholars explain that the medical and cultural mandate for women to breastfeed places an undue burden on women, especially those who choose not to breastfeed or who cannot breastfeed (Stearns, 2009). Examining women’s internalized expectations of “good mothering” behavior during pregnancy, along with pregnancy-related anxiety and happiness, may help to better explain their prenatal and postnatal maternal behaviors. Other groups may experience the opposite cultural standards regarding perinatal behaviors, and are ensconced in communities that embrace formula as the preferred method of feeding (Chin, Meyers, & Magnus, 2008). These variations in societal expectations are critical to take into account when addressing breastfeeding behavior, yet were unaccounted for in our sample.

Another limitation is that we did not investigate the father’s feelings of happiness or wantedness about the pregnancy. The father’s sentiments about the pregnancy may influence the mother during gestation, as well as after birth (Vaaler et al., 2011). Previous research has demonstrated that disagreement between the parents’ intentions predicts the mother’s instability in pregnancy intention, which may in turn influence breastfeeding behavior (Joyce, Kaestner, & Korenman, 2000b). Further research by Chang, Valliant, and Bomba (2012) supports the strong evidence for a gender gap in breastfeeding knowledge and attitude (men tend to view breastfeeding as less favorable and formula feeding as more favorable in comparison to women). Therefore, the relationship between the mother’s feelings about the birth and breastfeeding may be far more complex, and interact with her partner’s feelings to influence the initiation and duration of breastfeeding.

One potential confound is that all the data from the NSFG was collected retrospectively. Joyce et al. (2000b) found that in their sample, 30% of the women who reported their pregnancy to be unintended during pregnancy reported that their pregnancy was

intended after delivery. Although other research has suggested that prospective assessments are not necessarily superior to retrospective reports of unintended fertility (Joyce et al., 2000b), we cannot rule out the possibility that retrospective reporting may have confounded the results of our analyses. In regards to the data, another limitation is that our sample is drawn from the 2002 wave of the NSFG. Although this was the most recent wave of the study available, it was twelve years ago. These results should be interpreted with caution since the social climate surrounding breastfeeding has inevitably changed since then, making the results of this study slightly dated.

Another limitation is the way that pregnancy-related happiness was measured in the NSFG. The interview contained only one question about happiness, which asked participants to rate on a scale of one to ten how happy they felt when they found out that they were pregnant (one meaning that they were very unhappy to be pregnant and ten meaning they were very happy to be pregnant). The limited operationalization of the construct of pregnancy-related happiness, combined with a possible social desirability bias, may have contributed to our insignificant findings when conducting our analyses.

Directions for Future Research

Future research should identify potential moderators in order to examine why those who indicate their pregnancies are too soon or unwanted tend to breastfeed for shorter durations. We suggest that women with unwanted or mistimed pregnancies may have a difficult time attaching to their infants both before and after birth. Since research has demonstrated that women with higher levels of maternal fetal attachment have intentions to breastfeed (Foster et al., 1996), one way in which challenges forming an attachment bond may manifest is through breastfeeding, because the mother may lack the motivation to feed naturally when it proves difficult or when formula feeding is convenient. Another way that unwanted sentiments during pregnancy could manifest after birth is through a lack of warmth and responsiveness to the infant’s needs, which can cause an insecure attachment bond between mother and child (Ainsworth, Blehar, Waters, & Wall, 1978).

Since higher sensitivity to an infant's needs is associated with a longer duration of breastfeeding, an absence of breastfeeding may be a sign that the mother is struggling with developing an attachment to her child (Britton, Britton, & Gronwaldt, 2006). Research should investigate whether feelings of unwantedness prenatally translate to a lack of warmth and responsiveness after birth. Future studies should also explore different ways to measure feelings of happiness, wantedness, and satisfaction with the pregnancy throughout gestation in order to better understand how psychological factors influence postnatal behaviors.

Similar to our research, other studies investigating feelings about the pregnancy also use a single item question, rather than a valid scale, to measure pregnancy-related happiness (Blake et al., 2007; Sable et al., 2007). It would be advantageous for researchers to develop and validate a scale measuring pregnancy-related happiness in order to capture the nuances of the construct better than a simple one-item measure can provide. Another methodological consideration for future research is to use an acculturation scale in addition to the demographic variable of "race". Previous research indicates that among Hispanic women, those who are less acculturated initiate and continue breastfeeding longer than those who are more acculturated (Ahluwalia, D'Angelo, Morrow, & McDonald, 2012). The addition of acculturation as a socio-demographic factor may influence the initiation/duration rates of breastfeeding and more accurately capture the experience of individuals who immigrate to another country. It would be interesting to learn how acculturation interacts with pregnancy intentions/feelings of happiness about the pregnancy in regards to prenatal and postnatal behaviors for immigrant mothers.

Future studies should also make a distinction between wantedness of the pregnancy and pregnancy intentions. In the present study and in current research, these two constructs are used interchangeably; however, these are potentially two separate constructs. For example, a woman who may not have planned to get pregnant may still want the pregnancy once she learns that she is pregnant. Conversely, a woman who intends to get pregnant may realize that she does not want to be pregnant once it occurs. The field of research surrounding prenatal and peri-

natal behaviors may make further advances by clarifying the distinction between these two constructs.

Furthermore, even though we suggest an association between pregnancy intentions and breastfeeding outcomes, there are several societal, environmental, and health factors that may impact or be associated with breastfeeding. These factors include prenatal care, working before and after birth, the amount of maternity leave taken, acculturation, and smoking before and after birth. Work barriers may limit the amount of time that the mother has with her infant and make it difficult for her to successfully breastfeed. In addition, socio-economic status may serve as a moderator between postnatal employment and breastfeeding. We acknowledge these factors and limitations, yet push researchers to ask what psychological factors may influence or interact with breastfeeding behavior as well, since experiences of happiness and prenatal attachment-seeking behaviors by the mother may predict the likelihood of breastfeeding outcomes. Future research should explore whether psychological factors may help to address why some women do not intend to breastfeed, do not initiate breastfeeding, experience pain and discomfort with breastfeeding, and why they stop despite its health benefits.

Conclusion

Overall, our results show that when controlling for socio-demographics, pregnancy intentions may influence the duration and initiation of breastfeeding. Pregnancy intentions and happiness about the pregnancy did contribute to an increase in odds of breastfeeding initiation, but these variables were not significant predictors independently. Breastfeeding duration was influenced by pregnancy intentions while controlling for socio-demographic factors. Breastfeeding behavior has been a topic of interest in a variety of sectors, from public health to psychology, due to its health benefits for the mother, such as positive postpartum health outcomes (Newcomb et al., 1994; Visness et al., 1997) and advantageous psychological associations (Mortensen et al., 2002).

Breastfeeding has also been associated with several physiological and psychological health benefits for the child, such as increased immune system

functioning, long range developmental outcomes, and a secure mother-infant attachment bond (Davis et al., 1988; Lawrence, 2000; Mortensen et al., 2002).

Research into breastfeeding behavior has focused heavily on socio-demographic factors, particularly on socio-economic status and how breastfeeding initiation and duration can be enhanced through health education for low-income parents. We argue that interventions designed to improve breastfeeding should include evaluation of the mother's feelings about her pregnancy, and ways to address feelings of unwantedness/unhappiness. Poleschuck and Woods (2014) recommend that health psychologists should assist women who express surprise, ambivalence, or frustration about the pregnancy with exploring their feelings, reframing their expectations, garnering social support and resources, and preparing for the impending changes of a newborn. The assistance from a psychotherapist may help to improve a variety of perinatal behaviors besides just breastfeeding, such as nutrition, smoking, and responsiveness to the infant's needs. Research should explore how psychosocial well-being and intentions about the pregnancy influence perinatal health behaviors and the psychological attachment formed between mother and child. While incentives and health education can be used to improve breastfeeding among women, attending to the psychological variables which influence breastfeeding outcomes could have lasting implications for the physical and mental health of both the mother and the child which transcend far past the first year of life.

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