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Moderators and mediators of the relationship between receiving versus being denied a pregnancy termination and subsequent binge drinking

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Abstract

Background—Women who terminate pregnancies drink more subsequent to the pregnancy than women who give birth, including women who give birth after seeking to terminate a pregnancy.

Methods—Data are from the Turnaway Study, a prospective, longitudinal study of 956 women who sought to terminate pregnancies at 30 U.S. facilities. This paper focuses on the 452 women who received terminations just below facility gestational limits and 231 who were denied terminations because they presented just beyond facility gestational limits. This study examined whether baseline characteristics moderate the relationship between termination and subsequent binge drinking and whether stress, feelings about the pregnancy, and number of social roles mediate the relationship.

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Contributors S.C.M. Roberts developed study questions for this paper, conducted moderation analyses, oversaw interpretation of statistical results, and wrote the first draft of the article. M.S. Subbaraman conducted mediation analyses and contributed to the interpretation of statistical results. K.L. Delucchi provided guidance and feedback about appropriate data analysis approaches and contributed to interpretation of statistical results. S.C. Wilsnack contributed to interpretation of statistical results. D.G. Foster designed the Turnaway Study, helped refine study questions for this paper, and contributed to the interpretation of statistical results. All authors contributed to revising the article.

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Results—Only having had a previous live birth modified the termination-binge drinking relationship. Among women with previous live births, binge drinking was reduced among women carrying to term compared to terminating the pregnancy. Among women who had not had a previous live birth, however, the reduction in binge drinking among those denied termination was not sustained over time, and binge drinking of those who had and had not had terminations converged by 2.5 years. Neither stress, negative emotions, nor social roles mediated effects on binge drinking. Positive emotions at one week mediated effects on binge drinking at six months, although positive emotions at two years did not mediate effects on binge drinking at 2.5 years.

Conclusions—Higher levels of binge drinking among those who terminate pregnancies do not appear due to stress or to negative emotions. Only parous women – and not nulliparous women – denied terminations experienced sustained reductions in binge drinking over time.

Keywords

alcohol; pregnancy termination; pregnancy; parenting

1. INTRODUCTION

Most research about pregnancy termination and subsequent alcohol use and alcohol use disorders (AUDs) finds that women who terminate pregnancies drink more alcohol and are more likely to have AUDs subsequent to the pregnancy than women who continue pregnancies (Coleman, 2005; Major et al., 2009; Pedersen, 2007; Steinberg and Finer, 2011). Some researchers have explained this finding by positing that terminating a pregnancy leads women to drink alcohol to cope with the stress of pregnancy termination (Coleman, 2005; Coleman et al., 2005, 2002; Pedersen, 2007). In contrast to the stress-and- coping explanation, our recent research has found that binge and problem alcohol use among women who terminate stay steady over time (Roberts et al., 2015).

An alternative explanation is that those who continue pregnancies experience a pregnancy/ parenting-related reduction in alcohol consumption (Roberts et al., 2015). Pregnancy/ parenting-related reductions in alcohol consumption are well documented (Alvik et al., 2006; Chambers et al., 2005; Ethen et al., 2009; Gilchrist et al., 1996; Tough et al., 2006). Our recent research found sustained reductions in any and binge alcohol use among women who continued compared to women who terminated pregnancies (Roberts et al., 2015), demonstrating a pregnancy/parenting-related reduction among women who continued pregnancies. Our sample in this previous research consisted entirely of women whose pregnancies were unwanted (which we define for the purposes of this paper as having sought to terminate the pregnancy), indicating that the reduction was not due to willingness and interest in reducing alcohol use among women self-selecting into pregnancy and parenthood.

Our previous research did not examine whether this apparent pregnancy/parenting-related reduction was universal or concentrated among subgroups. Understanding whether the reduction was concentrated among subgroups – especially among women without previous births – can help distinguish whether something about pregnancy and postpartum periods in general or something about the initial transition to parenting (from not parenting) contributes

to this reduction. Our previous research also did not examine whether any subgroups of those terminating pregnancies increased drinking. Thus, this paper presents new findings from a series of moderation analyses that examine whether our overarching findings apply across different subgroups.

This paper also presents findings from mediation analyses that test two hypothesized pathways through which terminating versus continuing an unwanted pregnancy relates to subsequent binge alcohol use: stress/coping and social roles. Stressful events have been linked to alcohol use in general (Hasin et al., 2007), heavy drinking in pregnancy (May et al., 2000), and postpartum tobacco relapse (Carmichael and Ahluwalia, 2000). Pregnancy termination has been hypothesized as a stressful or traumatic event resulting in alcohol and drug disorders (Coleman, 2005; Coleman et al., 2005, 2002; Pedersen, 2007). The fact that we did not find increases in binge drinking or alcohol-related problem symptoms subsequent to termination in previous analyses (Roberts et al., 2015) raises questions about this hypothesis. Mediation analysis that examines whether the relationship between termination and alcohol consumption operates through stress can shed additional light on this hypothesized pathway.

While we did not find increases in drinking among women denied termination, women denied termination could experience stress due to additional economic and relationship difficulties related to the unwanted pregnancy (Foster et al., 2012; Mauldon et al., 2015; Roberts et al., 2014a). This stress could lead women denied terminations to consume alcohol to cope. Our previous analyses found that perceived stress was initially higher after being denied than after receiving terminations, but these differences were temporary (Harris et al., 2014). Further, those who had more difficulty coping – either with termination or continued pregnancy – may also drink more subsequent to the pregnancy. Difficulty coping may be apparent through women's emotional responses to pregnancy. While women experience a range of emotions after terminating or being unable to terminate an unwanted pregnancy, one week after seeking termination, women terminating had fewer positive emotions about the pregnancy than women denied terminations (Rocca et al., 2013). We thus examine both stress and feelings about the pregnancy as potential mediators.

The second hypothesized pathway relates to changes in social roles that may occur as a result of having a baby. Theories related to social roles and alcohol suggest that lower consumption among parents may result both from less time to drink due to caregiving responsibilities and from increased life satisfaction and increased social monitoring due to filling more roles; alternatively, more social roles can lead to role overload, leading women to drink more to cope. Research generally supports the former theories (see Cho and Crittenden, 2006; Hajema and Knibbe, 1998; Kuntsche et al., 2009; Staff et al., 2014; Wilsnack and Cheloha, 1987). An aspect of this literature suggests that it is actually the transition to parenting (from not parenting) that is associated with a reduction in drinking (see, for example, Chilcoat and Breslau, 1996). Thus, our moderation analyses that consider whether the relationship varies depending on whether women had previously given birth can also help answer the question of whether responsibilities of parenting infants or whether the *new* social role of parenting leads to reduced drinking.

2. METHODS

2.1 Data source

Data come from the Turnaway Study, a prospective, longitudinal cohort study of 956 women seeking to terminate pregnancies in the U.S. The Turnaway Study seeks to understand how the outcome of an unwanted pregnancy affects women's subsequent physical and mental health and socioeconomic status (Foster et al., 2015; Harris et al., 2014; Roberts et al., 2014a, 2015; Roberts and Foster, 2015; Roberts et al., 2014c; Rocca et al., 2013, 2015). Analyses presenting the main effects of termination vs. birth on subsequent alcohol use, binge drinking, and problem symptoms have been published previously (Roberts et al., 2015). This paper extends previous analyses by focusing on moderators and mediators of the relationships presented previously. The University of California, San Francisco Committee on Human Research granted ethical approval for this study. Written informed consent was obtained from all study participants. Study design details have been published previously (Dobkin et al., 2014; Gould et al., 2012; Upadhyay et al., 2014).

Study participants presented for termination at one of 30 pregnancy termination facilities throughout the U.S. between January, 2008 and December, 2010 and met criteria for one of three study groups: 1) "*Near Limit Termination Group*" – women presenting for termination within two weeks under a facility's gestational age limit for providing termination and receiving a termination; 2) "*Turnaways*" – women presenting for termination up to three weeks over a facility's gestational limit and denied termination; and 3) "*First Trimester Termination Group*" – women under the gestational limit, in their first trimester, and receiving termination. These three groups were recruited in a 2:1:1 ratio. More *Near Limits* were recruited because we expected that fewer women would meet eligibility criteria for *Turnaways* and we wanted to ensure an adequate overall sample. Also, women seeking later terminations are understudied and we wanted to have an adequate sample of *Near Limits* to examine their experiences (e.g., Foster and Kimport, 2013; Roberts et al., 2014b). All participants spoke English or Spanish and did not have a known fetal anomaly or demise.

The overall study design took advantage of a natural quasi-experiment where some women receive a termination just before the gestational limit for providing terminations at a given facility and some are denied termination because they present just beyond the gestational limit at that same facility. Gestational limits for pregnancy termination vary across facilities due to both state-level restrictions and facility factors. Facilities could participate if they had the latest gestational limit within 150 miles. Facilities were identified using the National Abortion Federation directory and contacts within the pregnancy termination research community. All but two facilities approached agreed to participate. One of the facilities that declined to participate was replaced with a facility with an identical catchment area, identical gestational limit, and similar patient volume. Gestational limits at participating facilities ranged from 10 weeks through the end of the second trimester.

2.2 Participation

The sample includes 956 participants: 452 *Near Limits*, 231 *Turnaways*, and 273 *First Trimesters*. These participants represent 84.5% of those who consented to participate in the

five-year telephone interview study (n=1,132); those who consented represent 37.5% of women who were approached about the study and were eligible. There were no statistically significant differences in the proportion of eligible *Near Limits* and *Turnaways* who participated. More details are available in a paper describing study methods (Dobkin et al., 2014). Of the 956 participants, 76 from one facility were removed from analyses because more than 90% of *Turnaways* at that facility (a facility with a 10-week gestational limit) terminated their pregnancies elsewhere after study enrollment. Also, two *Near Limit* and one *First Trimester* participant later reported that they had not terminated their pregnancies and thus were excluded from analyses. Thus, the final sample is 413 *Near Limit Termination*, 210 *Turnaways* (50 of whom terminated the pregnancy or had a miscarriage subsequent to being turned away and whom we then analyzed separately from the *Turnaways* who gave birth – see Section 2.5), and 254 *First Trimester Termination* group. Analyses in this paper focus primarily on the *Near Limits* and the 160 *Turnaways* who had a birth, whom we refer to as *Turnaway Births*. We focus on this comparison because this is the comparison that takes advantage of the quasi-experimental design. As reported previously, the study design was successful, with *Near Limit* and *Turnaway Birth* groups similar on key baseline characteristics, including any alcohol use, binge alcohol use, and alcohol-related problem symptoms prior to pregnancy recognition (Roberts et al., 2015).

2.3 Data collection

Data collection is ongoing, with participants interviewed by telephone every six months for five years. Baseline interviews were scheduled for eight days after women sought the termination. Analyses for this paper include data collected at baseline, 6-month, 12-month, 18-month, 24-month, and 30-month interviews. Baseline interviews were completed in December, 2010 and 30-month interviews in July, 2013.

2.4 Participant retention

Of participants who completed a baseline interview, 92% were retained at 6 months, 86% at 12 months, 81% at 18 months, 77% at 24 months, and 72% at 30 months. There were no differences in loss-to-follow-up among study groups or by pre-pregnancy recognition binge alcohol use. Of baseline characteristics in Table 1, only any alcohol use prior to pregnancy recognition, tobacco use 1 week after termination seeking, baseline employment, and baseline education were associated with loss to follow-up – with fewer abstainers from alcohol, more smokers, fewer of those employed, and fewer of those who had some college or more education retained at follow-up.

2.5 Measures

2.5.1—Outcomes included past-month binge alcohol use (dichotomous, more than 5 drinks at a time). The binge alcohol question was “In the past month, were there occasions when you had more than 5 drinks?” At baseline, participants were asked both about binge alcohol use in the past month and in the month prior to pregnancy recognition. Analyses focused on binge drinking because binge drinking is associated with adverse health and social consequences (Cherptel et al., 2003; Flowers et al., 2008; Howard et al., 2008; Paljarvi et al., 2009) and was relatively common among participants (Roberts et al., 2014d). While our

previously published main effects analyses (Roberts et al., 2015) did examine any alcohol use, we do not focus on any alcohol use in this paper because alcohol use *per se* is not considered an unhealthy or problematic behavior outside of pregnancy (NIAAA, 2005). Our previous main effects analyses also considered possible problem symptoms, but did not find statistically significant differences between study groups (Roberts et al., 2015). Also, the proportion reporting a problem symptom in our sample is too low to yield an adequate sample for moderation analyses.

2.5.2—*The main independent variable was study group: Near Limits* were the reference group and *Turnaway Births* (Turnaways with a live birth including 15 who placed their baby for adoption) were the main focus in our analyses.

2.5.3—*For moderation analyses, age was categorical (15–19, 20–24, 25–34, 35–46), with participants <=19 referred to as teens; race was categorical (White, Black, Hispanic/Latina, Other); parity was dichotomous (nulliparous vs. parous); and child abuse was disaggregated into physical abuse, neglect, and sexual abuse, each dichotomous in response to yes/no questions that started with, “In childhood, were you ever...” and asked separately about “physically abused,” “sexually abused,” and “seriously neglected.” We also examined other factors that might moderate the association, including relationship status (single, married, cohabiting, divorced/separated), education (less than high school, high school or GED, some college, college graduate), employment (either full-or part-time versus not employed), pre-pregnancy recognition drug use (both illicit and prescription drug misuse), current tobacco use, recent physical violence, recent psychological violence, history of depression/anxiety (previous depression or anxiety diagnosis), difficulty deciding whether to terminate (somewhat and very difficult vs. neither easy nor difficult, somewhat easy, and very easy in response to a question that asked “How difficult was it for you to decide whether to have an abortion?”), and pregnancy intentions using the London Measure of Unplanned Pregnancy (scores 0–3 indicate unplanned pregnancy, scores 10–12 indicate planned or highly planned pregnancy; Barrett et al., 2004). Gestational age is the gestation in weeks at which women presented for pregnancy termination (it was not included in models, as it is a proxy for study group and facility).*

2.5.4—*We considered four potential mediators. First, we considered perceived stress (continuous, 0 – 16 scale, a modified version of the perceived stress scale (Cohen et al., 1983)). The modified scale asked about the degree to which (rather than how often) women felt the stressors and focused on past week instead of past month. The change to past week was made so the baseline measure would reflect the time period after termination seeking and not the time period leading up to termination seeking. The modified scale had a Cronbach’s alpha of .74 (Harris et al., 2014). We also considered emotions about the pregnancy. Women were asked how much they felt six separate emotions (regret, guilt, sadness, anger, relief, and happiness) about the pregnancy: “In the past 7 days, how much have you felt [emotion] about becoming pregnant?” Responses were measured on a scale of 0–4 with 0=“not at all” and 4 = “extremely.” Responses were used to generate two scales: negative emotions about the pregnancy (continuous, 0 – 16 scale [higher numbers indicating more negative emotions], based on how much women had felt regret, guilt, sadness, and*

anger) and *positive emotions* about the pregnancy (continuous, 0 – 8 scale [higher numbers indicating more positive emotions], based on questions asking how much women had felt relief and happiness). The final mediator we considered was *number of social roles* (continuous scale of 0 – 3, with higher numbers indicating more roles: married, raising children, employed). Covariates for mediation analyses included age in years; race; parity; relationship status; employed; and child abuse/neglect (dichotomous variable of any physical abuse, neglect, and/or sexual abuse).

2.5.5—The First Trimester Group was included in the overall study because their experience represents the most typical experience of women terminating a pregnancy in the U.S., where 90% of terminations occur in the first trimester (Pazol et al., 2013). Previously published analyses have compared experiences of *Near Limits* and *First Trimesters* subsequent to the termination. Relevant for the analyses presented in this paper, our previous analyses have not found differences either before or subsequent to the termination between *Near Limits* and *First Trimesters* in binge drinking or problem alcohol use, although they did find that more First Trimesters drank any alcohol prior to pregnancy recognition and that that this pre-existing difference remained subsequent to the termination (Roberts et al., 2015). We also found no differences between these groups in emotions about the pregnancy subsequent to the termination (Rocca et al., 2015).

2.6 Moderation Analysis

Moderation analyses were conducted using two- and three-way interaction terms to examine whether the relationship between termination and binge drinking varied across subgroups. We first estimated main effects of baseline characteristics on binge drinking with a model including only *Near Limits* and *Turnaway Births* and a main effect of months, but excluding interaction terms and dummies for study group. We estimated these models with conceptually grouped sets of variables, i.e., demographics, violence, mental health, substance use, and intentions/decision for this pregnancy. Statistically significant baseline characteristics were retained in subsequent models and were then included in models with two-way interactions between characteristic and months among *Near Limits* and *Turnaway Births*; dummies for study group were again not included. Baseline characteristics associated with change over time were then examined in three-way interactions of baseline characteristic * study group * months. Three-way interaction models included all study groups to maximize the size of the sample used for estimation. These models were estimated using mixed effects longitudinal logistic regression and used all available data from all study groups for the six interviews. While all groups were included in the three-way interaction models for purposes of better random effects estimates, model output for *Turnaway No Births* and *First Trimesters* are not presented in Table 2, although we do note what the model output indicated in a footnote in the table. The rationale for not presenting the model output for these groups is that the model building process we used did not seek to identify potential moderators of the Near Limit vs. First Trimester relationship or the Turnaway No Births vs. Near Limit relationship. Graphs of the population average predicted probability based on model output were used to visualize model output when three-way interaction terms were statistically significant.

2.7 Mediation Analysis

Mediation analyses were conducted to assess whether stress, feelings about the pregnancy, or number of social roles explained the relationship between termination and subsequent binge alcohol use. Outcomes for mediation analyses were measured at 6 and 30 months after seeking termination, as 6 months represents the early to mid-postpartum period for *Turnaways* who gave birth, and 30 months represents a time at which to assess whether any initial differences have been sustained beyond the postpartum period. Mediators were measured at eight days and 24 months after seeking termination, i.e., they were lagged 6 months to ensure they occurred prior to the outcomes. The main independent variable of study group assignment was measured at termination seeking.

To identify mediators to include in a multiple mediator model, we followed recommendations from Baron and Kenny (1986) and first estimated a series of regressions to better understand which potential mediators were candidates for the multiple mediator model. These regressions involved estimating effects of the independent variable (*Near Limit* vs. *Turnaway Births*) on the mediator, mediator effects on the dependent variable (binge drinking), and effects of the independent variable on the dependent variable while controlling for the mediator. Mediation analyses included only *Near Limits* and *Turnaway Births* because there were no differences in binge alcohol use subsequent to termination between the *Near Limits* and *First Trimesters* (Roberts et al., 2015); the lack of a main effect indicates that a mediation analysis was not warranted because there were no significant main effects differences to be mediated.

Multiple mediator analysis looks at the product of coefficients rather than the difference in coefficients, has more statistical power, and results in fewer issues of multiple testing. To conduct multiple mediator analyses, we used the Preacher and Hayes “indirect” macro (Preacher and Hayes, 2008). The macro generates estimates of both specific and total indirect effects; specific indirect effects are the indirect effect attributable to a particular mediator while controlling for other potential mediators, while the total indirect effect is the indirect effect attributable to the whole group of potential mediators. The macro repeats the estimation procedure 1,000 times to produce 95% bootstrapped confidence intervals for both specific and total indirect effects. If the 95% interval does not contain zero, we infer a significant indirect effect. This is equivalent to attributing effects to a particular mediator (specific indirect effect) or group of mediators (total indirect effect), at the $P < 0.05$ significance level. Effects of 8-day mediators on 6-month outcomes and effects of 24-month mediators on 30-month outcomes were estimated separately.

3. RESULTS

3.1 Sample description

Most participants were between 20 and 34, with an average of 24.9 [See Table 1]. About one-third was White, one-third Black, and one in five Hispanic/Latina. A little more than one-third were nulliparous and almost two-thirds were single. About half had education beyond high school and a little more than half were employed. About one-fourth had experienced child abuse or neglect. A little more than 15% had experienced physical

violence and a little less than 15% had experienced psychological violence in the past year. One fourth reported a history of depression/anxiety. The mean gestation at presentation for care was 17 weeks, with expected differences across study groups (19.9 for *Near Limits* and 23.4 for *Turnaway Births*). While pregnancies were unplanned overall (mean of 2.72 [0–3=unplanned], with 77% scoring 0–3, 23% scoring 4–9 [ambivalent], and fewer than 0.5% scoring 10–12 [planned or highly planned]), more than half reported difficulty deciding to terminate. Almost 40% used tobacco at baseline and one in seven used drugs prior to pregnancy recognition. One-fourth reported binge drinking prior to pregnancy recognition. *Near Limits* and *Turnaway Births* were substantially similar at baseline; the only differences at $p<.05$ were in age, parity, and employment.

3.2 Moderation results

Of potential moderators, teen, race, parity, employment, sexual abuse, physical violence, depression/anxiety history, tobacco use, and drug use were associated with binge drinking among *Near Limits* and *Turnaway Births*; relationship status, education, child physical abuse, child neglect, psychological violence, difficulty deciding, and pregnancy intentions were not (See Table 2). In two-way interactions with time, only teen and parity were associated with changes in binge drinking over time (see Table 2).

In three-way interactions with study group and time, only parity modified the relationship between receiving versus being denied a termination and subsequent binge drinking (see Table 3 and Figure 1). Binge drinking prior to pregnancy recognition among parous *Near Limits* and *Turnaway Births* and among nulliparous *Near Limits* and *Turnaway Births* did not differ. One week after termination-seeking, there were differences between parous *Near Limits* and *Turnaway Births* (*Turnaway Births* still pregnant, *Near Limits* not), with *Turnaway Births* having lower binge alcohol use. Over 30 months, parous *Near Limits* maintained their level of binge drinking, while parous *Turnaway Births* increased binge drinking, but the two groups did not converge again in binge alcohol use over the 30 months. Among nulliparous women, however, the relationship differed, with the reduction in binge drinking among *Turnaway Births* less sustained over time. Like parous *Near Limits*, nulliparous *Near Limits* maintained their level of binge drinking over time. Like parous *Turnaway Births*, nulliparous *Turnaway Births* increased binge drinking over time; however, this increase continued throughout the study period, with binge drinking among nulliparous *Near Limits* and *Turnaway Births* converging by 30 months. Binge drinking did not surpass the pre-pregnancy recognition level in any group.

3.3 Mediation results

Regression models indicated that positive emotions and negative emotions were potential mediators, whereas stress and number of social roles were not. We then conducted multiple mediation analyses with both positive and negative emotions included in one model.

Multiple mediation analyses showed that both positive emotions and the set of positive and negative emotions at one week mediated the effects of *Turnaway Births* on binge alcohol use at 6 months at $P<.05$. The statistical significance of the set of emotions is due to positive and not negative emotions. *Turnaway Births* had more positive emotions at 8 days

(coefficient of .5156, $P<.001$), which was related to less binge drinking at 6 months (coefficient of $-.1812$, $P<.05$) [not shown in table]. Table 4 shows that the confidence intervals for positive emotions and for the set of emotions do not cross 0, indicating that they are statistically significant mediators. The negative sign (in Table 4) for the indirect effect reflects that the path from positive emotions to binge drinking was negative whereas the path from *Turnaway Births* to positive emotions was positive. Mediation effects did not persist over time: the indirect effects of 24-month positive and negative emotions on 30-month binge drinking were not statistically significant at a $P<0.05$ level.

4. DISCUSSION

We found that the relationship between termination and binge drinking varies by whether women presenting for termination care had had a previous birth and that positive emotions partially explain the short-term pregnancy termination binge drinking relationship. We first examine our findings in relation to the pregnancy-parenting pathway and then in relation to the drinking to cope pathway.

Regarding pregnancy-parenting, we found that among women with previous live births, the termination-binge drinking relationship looked similar to the relationship found in our previous analyses and was consistent with other studies (Coleman, 2005; Pedersen, 2007; Roberts et al., 2015; Steinberg and Finer, 2011). We also found that both nulliparous and parous women who terminated the pregnancy maintained their level of binge drinking over time. In contrast, among women denied termination, only women who had had a previous live birth sustained the reduction in binge drinking over time; nulliparous women did not sustain the reduction in binge drinking. These findings suggest that previous research findings related to sustained reduction in risky behaviors associated with the initial transition to parenting may not apply to women who did not want to continue the pregnancy.

Social roles did not act as a significant mediator, somewhat lessening support for the parenting pathway. The lack of findings for social roles may be partly explained by the fact that most participants were already parents; thus, having the baby did not add this role. Further, few had a marital role, and this did not change much over the study period (Mauldon et al., 2015). It is also possible, as found in a recent multi-country study (Kuntsche et al., 2009), that more roles are not clearly associated with less drinking in the U.S.

Regarding drinking to cope, moderation analyses did not identify any subgroup in which women who terminated a pregnancy increased binge drinking over time. Further, stress did not mediate the termination – binge drinking relationship, again not supporting the drinking to cope hypothesis. We did find that emotions about the pregnancy mediated the termination – binge drinking relationship in the short, but not longer, term. This mediation was almost entirely due to the short-term higher level of positive emotions about the pregnancy among those denied the termination. It was not due to negative emotions; this, again, conflicts with the drinking to cope hypothesis.

The finding of positive emotions as a mediator is robust, as it survived both the regression and multiple mediation analyses. Previous analyses indicate that the short-term difference in

positive emotions about the pregnancy between those who received versus those denied a termination is due primarily to more happiness about the pregnancy among those denied termination (Rocca et al., 2013). Our finding is thus consistent with previous literature that has found associations between happiness about a pregnancy and health behaviors during pregnancy, including alcohol use (Blake et al., 2007).

There are number of limitations. First, our alcohol measures are self-report and thus binge alcohol use may have been under-reported, especially by women who were pregnant at the interview. Second, our binge drinking measure was more than 5 drinks rather than the more commonly used 5 or more or 4 or more drinks for women (NIAAA, 2004; Wechsler et al., 1995), a limitation of the dataset. Third, 37.5% of eligible participants consented to participate. As we noted previously, non-participation was unrelated to our primary exposure (receiving versus being denied termination) and sensitivity analyses for our main effects analyses found no substantive differences when the sample was restricted to sites with higher participation (Roberts et al., 2015). We note that prospective cohort studies that are lengthy and offer no direct benefit often have low participation rates (Ejiogu et al., 2011; Rothman et al., 2008) and that published participation rates for prospective cohort studies may suffer from reporting bias, in that studies with lower participation fail to report participation rates (Galea and Tracy, 2007). While we cannot be sure because prospective cohort studies with lower participation may be less likely to report participation rates, a 37.5% participation rate for a study asking women seeking a stigmatized health service to complete bi-annual interviews over five years may be within the range of other large-scale prospective studies. Also, there may be a relationship between any pre-pregnancy recognition alcohol use, tobacco use, education, and employment and completion of follow-up interviews. The maximum likelihood methods we used to fit the regression models for moderation analyses provide consistent estimation of parameters of interest in settings where data are missing at random (Little and Rubin, 2002), although we cannot know for sure to what extent this is the case here. Also, most women in the *Near Limit* group received terminations later in gestation than most US women (Pazol et al., 2013). However, our previously published analyses of alcohol, tobacco, drug use, stress, mental health, and emotions found that *Near Limits* are substantially similar to *First Trimesters* in their experiences subsequent to the termination (Foster et al., 2015; Harris et al., 2014; Roberts et al., 2015; Roberts and Foster, 2015; Roberts et al., 2014c; Rocca et al., 2015). We also note that about 10% of *Turnaway Births* placed their babies for adoption. Previous sensitivity analyses that restricted *Turnaway Births* to those who did not place their baby for adoption did not find any substantive difference in subsequent alcohol use from the models that included them in the *Turnaway Births* (Roberts et al., 2015).

Higher levels of binge drinking over time among those who terminate unwanted pregnancies do not appear to be due to stress or to negative emotions. Only parous women – and not nulliparous women – denied terminations experienced sustained reductions in binge drinking over time. Initial transitions to parenting for women who do not want to continue the pregnancy may not result in sustained reductions in binge drinking.

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References

- Alvik A, Haldorsen T, Lindemann R. Alcohol consumption, smoking and breastfeeding in the first six months after delivery. *Acta Paediatr*. 2006; 95:686–693. [PubMed: 16754549]
- Baron RM, Kenny DA. The moderator-mediator variable distinction in social psychological research: conceptual, strategic, and statistical considerations. *J Pers Soc Psychol*. 1986; 51:1173–1182. [PubMed: 3806354]
- Barrett G, Smith SC, Wellings K. Conceptualisation, development, and evaluation of a measure of unplanned pregnancy. *J Epidemiol Community Health*. 2004; 58:426–433. [PubMed: 15082745]
- Blake SM, Kiely M, Gard CC, El-Mohandes AA, El-Khorazaty MN. Pregnancy intentions and happiness among pregnant black women at high risk for adverse infant health outcomes. *Perspect Sex Reprod Health*. 2007; 39:194–205. [PubMed: 18093036]
- Carmichael SL, Ahluwalia IB. Correlates of postpartum smoking relapse. Results from the Pregnancy Risk Assessment Monitoring System (PRAMS). *Am J Prev Med*. 2000; 19:193–196. [PubMed: 11020597]
- Chambers CD, Hughes S, Meltzer SB, Wahlgren D, Kassem N, Larson S, Riley EP, Hovell MF. Alcohol consumption among low-income pregnant Latinas. *Alcohol Clin Exp Res*. 2005; 29:2022–2028. [PubMed: 16340460]
- Cherpitel CJ, Bond J, Ye Y, Borges G, Macdonald S, Giesbrecht N. A cross-national meta-analysis of alcohol and injury: data from the Emergency Room Collaborative Alcohol Analysis Project (ERCAAP). *Addiction*. 2003; 98:1277–1286. [PubMed: 12930215]
- Chilcoat HD, Breslau N. Alcohol disorders in young adulthood: effects of transitions into adult roles. *J Health Soc Behav*. 1996; 37:339–349. [PubMed: 8997889]
- Cho YI, Crittenden KS. The impact of adult roles on drinking among women in the United States. *Subst Use Misuse*. 2006; 41:17–34. [PubMed: 16393733]
- Cohen S, Kamarck T, Mermelstein R. A global measure of perceived stress. *J Health Soc Behav*. 1983; 24:385–396. [PubMed: 6668417]
- Coleman PK. Induced abortion and increased risk of substance abuse: a review of the evidence. *Curr Womens Health Rev*. 2005; 1:21–34.
- Coleman PK, Reardon DC, Cogle JR. Substance use among pregnant women in the context of previous reproductive loss and desire for current pregnancy. *Br J Health Psychol*. 2005; 10:255–268. [PubMed: 15969853]
- Coleman PK, Reardon DC, Rue VM, Cogle J. A history of induced abortion in relation to substance use during subsequent pregnancies carried to term. *Am J Obstet Gynecol*. 2002; 187:1673–1678. [PubMed: 12501082]
- Dobkin L, Gould H, Barar R, Ferrari M, Weiss E, DGF. Implementing a prospective study of women seeking abortion in the United States: understanding and overcoming barriers to recruitment. *Women Health Iss*. 2014; 24:e115–e123.
- Ejiogu N, Norbeck JH, Mason MA, Cromwell BC, Zonderman AB, Evans MK. Recruitment and retention strategies for minority or poor clinical research participants: lessons from the Healthy Aging in Neighborhoods of Diversity across the Life Span study. *Gerontologist*. 2011; 51(Suppl 1):S33–45. [PubMed: 21565817]

- Ethen MK, Ramadhani TA, Scheuerle AE, Canfield MA, Wyszynski DF, Druschel CM, Romitti PA. Alcohol consumption by women before and during pregnancy. *Matern Child Health J.* 2009; 13:274–285. [PubMed: 18317893]
- Flowers NT, Naimi TS, Brewer RD, Elder RW, Shults RA, Jiles R. Patterns of alcohol consumption and alcohol-impaired driving in the United States. *Alcohol Clin Exp Res.* 2008; 32:639–644. [PubMed: 18341648]
- Foster DG, Kimport K. Who seeks abortions at or after 20 weeks? *Perspect Sex Reprod Health.* 2013; 45:210–218. [PubMed: 24188634]
- Foster, DG.; Roberts, SCM.; Mauldon, J. Socioeconomic Consequences Of Abortion Compared To Unwanted Birth. American Public Health Association Annual Meeting And Expo; San Francisco, CA. 2012.
- Foster DG, Steinberg J, Roberts SCM, Neuhaus J, Biggs MA. A comparison of depression and anxiety symptom trajectories between women who had an abortion and women denied one. *Psychol Med.* 2015; 45:2073–2082.
- Galea S, Tracy M. Participation rates in epidemiologic studies. *Ann Epidemiol.* 2007; 17:643–653. [PubMed: 17553702]
- Gilchrist LD, Hussey JM, Gillmore MR, Lohr MJ, Morrison DM. Drug use among adolescent mothers: prepregnancy to 18 months postpartum. *J Adolesc Health.* 1996; 19:337–344. [PubMed: 8934294]
- Gomez-Scott J, Cooney TM. Young women's education and behavioral risk trajectories: clarifying their association with unintended-pregnancy resolution. *Cult Health Sex.* 2014; 16:648–665. [PubMed: 24735279]
- Gould H, Perrucci A, Barar R, Sinkford D, Foster D. Patient education and emotional support practices in abortion care facilities in the United States. *Women Health Iss.* 2012; 22:e359–e364.
- Hajema KJ, Knibbe RA. Changes in social roles as predictors of changes in drinking behaviour. *Addiction.* 1998; 93:1717–1727. [PubMed: 9926534]
- Harris LF, Roberts SC, Biggs MA, Rocca CH, Foster DG. Perceived stress and emotional social support among women who are denied or receive abortions in the United States: a prospective cohort study. *BMC Womens Health.* 2014; 14:76. [PubMed: 24946971]
- Hasin DS, Keyes KM, Hatzenbuehler ML, Aharonovich EA, Alderson D. Alcohol consumption and posttraumatic stress after exposure to terrorism: effects of proximity, loss, and psychiatric history. *Am J Public Health.* 2007; 97:2268–2275. [PubMed: 17971553]
- Howard DE, Griffin MA, Boekeloo BO. Prevalence and psychosocial correlates of alcohol-related sexual assault among university students. *Adolescence.* 2008; 43:733–750. [PubMed: 19149143]
- Kuntsche S, Knibbe RA, Gmel G. Social roles and alcohol consumption: a study of 10 industrialised countries. *Soc Sci Med.* 2009; 68:1263–1270. [PubMed: 19232807]
- Little, RJA.; Rubin, DB. *Statistical Analysis with Missing Data.* 2. John Wiley & Sons; Hoboken, NJ: 2002.
- Major B, Appelbaum M, Beckman L, Dutton MA, Russo NF, West C. Abortion and mental health: evaluating the evidence. *Am Psychol.* 2009; 64:863–890. [PubMed: 19968372]
- Mauldon J, Foster DG, Roberts SCM. Effect of abortion vs. carrying to term on a woman's relationship with the man involved in the pregnancy. *Perspect Sex Reprod Health.* 2015; 47:11–8. [PubMed: 25199435]
- May PA, Brooke L, Gossage JP, Croxford J, Adnams C, Jones KL, Robinson L, Viljoen D. Epidemiology of fetal alcohol syndrome in a South African community in the Western Cape Province. *Am J Public Health.* 2000; 90:1905–1912. [PubMed: 11111264]
- NIAAA. NIAAA Newsletter. NIH; Bethesda: 2004 Winter. Binge Drinking Defined.
- NIAAA. Helping Patients Who Drink Too Much: A Clinician's Guide. Bethesda: 2005. NIH publication No. 07–3769 <http://pubs.niaaa.nih.gov/publications/Practitioner/CliniciansGuide2005/guide.pdf> [Accessed May 19, 2015]
- Paljarvi T, Koskenvuo M, Poikolainen K, Kauhanen J, Sillanmaki L, Makela P. Binge drinking and depressive symptoms: a 5-year population-based cohort study. *Addiction.* 2009; 104:1168–1178. [PubMed: 19438420]

- Pazol K, Creanga AA, Burley KD, Hayes B, Jamieson DJ. Abortion surveillance - United States, 2010. *MMWR*. 2013; 62:1–44. [PubMed: 24280963]
- Pedersen W. Childbirth, abortion and subsequent substance use in young women: a population-based longitudinal study. *Addiction*. 2007; 102:1971–1978. [PubMed: 18031432]
- Preacher KJ, Hayes AF. Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behav Res Methods*. 2008; 40:879–891. [PubMed: 18697684]
- Roberts SCM, Biggs MA, Chibber KS, Gould H, Rocca CH, Foster DG. Risk of violence from the man involved in the pregnancy after receiving or being denied an abortion. *BMC Med*. 2014a; 12:144. [PubMed: 25262880]
- Roberts SCM, Delucchi K, Wilsnack SC, Foster DG. Receiving versus being denied a pregnancy termination and subsequent alcohol use: a longitudinal study. *Alcohol Alcohol*. 2015; 50:477–484. [PubMed: 25787011]
- Roberts SCM, Foster DG. Receiving versus being denied an abortion and subsequent tobacco use. *Matern Child Health J*. 2015; 19:438–446. [PubMed: 24880251]
- Roberts SCM, Gould H, Kimport K, Weitz TA, Foster DG. Out-of-pocket costs and insurance coverage for abortion in the United States. *Women Health Iss*. 2014b; 24:e211–218.
- Roberts SCM, Rocca CH, Foster DG. Receiving versus being denied an abortion and subsequent drug use. *Drug Alcohol Depend*. 2014c; 134:63–70. [PubMed: 24183616]
- Roberts SCM, Wilsnack SC, Foster DG, Delucchi KL. Alcohol use before and during unwanted pregnancy. *Alcohol Clin Exp Res*. 2014d; 38:2844–2852. [PubMed: 25336245]
- Rocca C, Kimport K, Gould H, Foster D. Women's emotional responses to unintended pregnancy, abortion and being denied an abortion in the United States. *Perspect Sex Reprod Health*. 2013; 45:122–131. [PubMed: 24020773]
- Rocca CH, Kimport K, Roberts SCM, Gould H, Neuhaus J, Foster DG. Decision rightness and emotional responses to pregnancy termination in the United States: a longitudinal study. *PLoS One*. 2015; 10:e0128832. [PubMed: 26154386]
- Rothman, K.; Greenland, S.; Lash, TL. *Modern Epidemiology*. Lippincott, Williams, & Wilkins; Philadelphia, PA: 2008.
- Staff J, Greene KM, Maggs JL, Schoon I. Family transitions and changes in drinking from adolescence through mid-life. *Addiction*. 2014; 109:227–236. [PubMed: 24571025]
- Steinberg JR, Finer LB. Examining the association of abortion history and current mental health: a reanalysis of the National Comorbidity Survey using a common-risk-factors model. *Soc Sci Med*. 2011; 72:72–82. [PubMed: 21122964]
- Tough S, Tofflemire K, Clarke M, Newburn-Cook C. Do women change their drinking behaviors while trying to conceive? An opportunity for preconception counseling. *Clin Med Res*. 2006; 4:97–105. [PubMed: 16809401]
- Upadhyay UD, Weitz TA, Jones RK, Barar RE, Foster DG. Denial of abortion because of provider gestational age limits in the United States. *Am J Public Health*. 2014; 104:1687–1694. [PubMed: 23948000]
- Wechsler H, Dowdall GW, Davenport A, Rimm EB. A gender-specific measure of binge drinking among college students. *Am J Public Health*. 1995; 85:982–985. [PubMed: 7604925]
- Wilsnack R, Cheloha R. Women's roles and problem drinking across the lifespan. *Soc Probl*. 1987; 34:231–248.

Highlights

- We examined moderators and mediators of the termination-binge drinking relationship.
- Only parity moderated the relationship.
- Binge drinking remained steady among all women who had terminations.
- Parous, not nulliparous, women denied terminations maintained drinking reductions.
- Neither stress, negative emotions, nor social roles mediated the relationship.

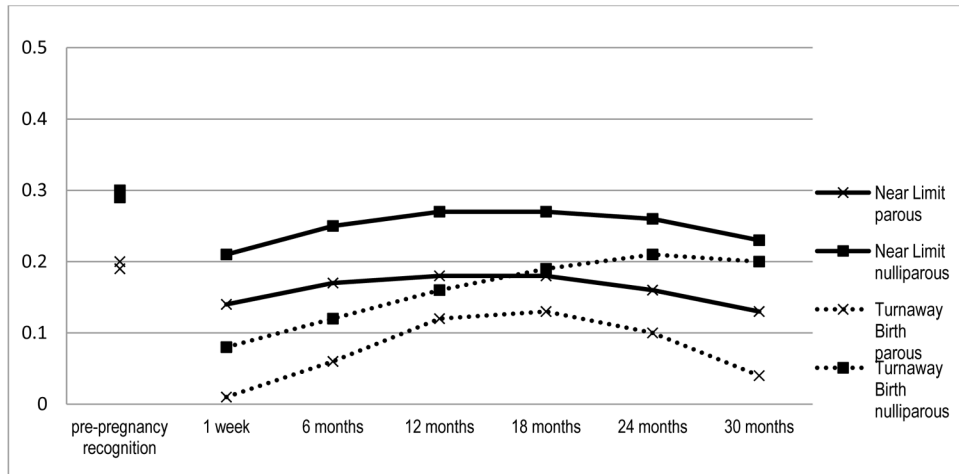


Figure 1. Near Limit Group v. Turnaway Births binge drinking by baseline parity
 Note: Pre-pregnancy-recognition refers to the proportion reporting binge drinking prior to pregnancy recognition; this time point was not included in the longitudinal model and is shown here for reference purposes only.

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Table 1

Sample description (n=877)

	Total n=413	Near Limits n=160	T-Births n=160	T-No Births n=50	First Trimesters n=254
Age (mean)	24.9	24.9	23.4**	24.5	25.9*
Age categories			**		*
15-19	19%	17%	30%	22%	14%
20-24	36%	39%	34%	41%	30%
25-34	38%	36%	31%	29%	47%
35-46	8%	8%	4%	8%	9%
Race					*
White	33%	32%	25%	43%	39%
Black	32%	32%	34%	29%	32%
Hispanic/Latina	22%	21%	29%	12%	21%
Other	13%	15%	13%	16%	8%
Nulliparous	37%	33%	47%**	41%	35%
Relationship status					
Single	63%	64%	72%	61%	57%
Married	9%	8%	10%	6%	11%
Cohabiting	17%	17%	12%	16%	21%
Divorced/separated	10%	11%	6%	16%	11%
Education					
Less than high school	19%	18%	25%	18%	16%
High school or GED	33%	34%	34%	27%	31%
Some college	40%	40%	35%	47%	42%
College graduate	8%	7%	6%	8%	11%
Employed	54%	54%	40%**	49%	63%*
Childhood physical abuse	12%	12%	13%	6%	13%
Childhood neglect	7%	7%	9%	6%	7%
Childhood sexual abuse	15%	15%	15%	4%	17%
Any child abuse	23%	23%	22%	10%	25%

	Total	Near Limits n=413	T-Births n=160	T-No Births n=50	First Trimesters n=254
Recent physical violence	17%	19%	13%	10%	19%
Recent psychological violence	12%	12%	11%	8%	14%
History of depression/anxiety	25%	23%	21%	29%	30%
Gestational age (mean)	17.0	19.9	23.4 ^{***}	19.2 ^{***}	7.8 ^{***}
Difficulty deciding	55%	58%	66%	41%*	46% ^{**}
Pregnancy intentions (mean)	2.72	2.74	2.96	2.27	2.62
Pre-pregnancy recognition drug use	14%	13%	14%	8%	18%
Tobacco use	37%	37%	43%	28%	43%
Pre-pregnancy recognition any alcohol use	55%	53%	48%	56%	64% ^{**}
Pre-pregnancy recognition binge alcohol use	24%	23%	24%	22%	25%
Variables considered as mediators – values at 1 week					
Perceived stress (mean)	4.88	4.79	5.63*	5.84	4.39
Negative emotions (mean)	5.86	5.85	5.57	7.18	5.77
Positive emotions (mean)	1.12	0.97	1.97 ^{***}	0.46	0.97
Social roles (mean)	1.23	1.26	1.01 ^{***}	1.12	1.34

* p<.05,

** p<.01,

*** p<.001 compared to Near Limits

Table 2

Associations between potential moderators and binge drinking, change in binge drinking, and differential change over time in binge drinking among *Near Limits vs. Turnaway Births*

	Associated with:		
	Binge drinking	Change over time in binge drinking	Differential change over time in binge drinking
Age (teen)	X	X	
Race/ethnicity	X		
Parity	X	X	X
Relationship status			
Education			
Employment	X		
Childhood physical abuse			
Childhood neglect			
Childhood sexual abuse	X		
Recent physical violence	X		
Recent psychological violence			
History of depression/anxiety	X		
Pre-pregnancy recognition drug use	X		
Tobacco use	X		
Difficulty deciding			
Pregnancy intentions			

X=associated with the outcome (p< .05)

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Table 3
 Three way interactions between baseline characteristics, study group, and time (n=877)

	Parity				Teen			
	OR	P	95% CI	OR	P	95% CI	OR	95% CI
Months	1.06	0.117	0.99	1.14	1.07	0.029	1.01	1.13
Months ²	1.00	0.005	0.99	1.00	1.00	0.001	0.99	1.00
Turnaway birth	0.05	0.002	0.01	0.32	0.09	<0.001	0.03	0.30
Turnaway birth*Months	1.39	0.006	1.10	1.76	1.20	0.019	1.03	1.39
Turnaway birth*Months ²	0.99	0.009	0.98	1.00	1.00	0.096	0.99	1.00
Nulliparous	2.46	0.033	1.08	5.61				
Nulliparous*Turnaway birth	4.35	0.203	0.45	41.91				
Nulliparous*Turnaway birth*Months	0.76	0.061	0.57	1.01				
Nulliparous*Turnaway birth*Months ²	1.01	0.039	1.00	1.02				
Nulliparous*Months	1.01	0.902	0.90	1.12				
Nulliparous*Months ²	1.00	0.757	1.00	1.00				
Teen					0.24	0.034	0.07	0.90
Teen*Turnaway birth					5.38	0.167	0.49	58.55
Teen*Turnaway birth*Months					0.90	0.475	0.66	1.21
Teen*Turnaway birth*Months ²					1.00	0.834	0.99	1.01
Teen*Months					1.00	0.953	0.85	1.18
Teen*Months ²					1.00	0.398	1.00	1.01

Models also control for age, race, employment, sexual abuse, physical violence, depression/anxiety history, pre-pregnancy drug use, and tobacco use. The First Trimester and Turnaway No Birth groups and interactions with these groups are also included in the models. We note that neither parity nor teen modified the *First Trimester vs. Near Limit* comparison.

Table 4

Parameter estimates and 95% bootstrapped confidence intervals for indirect effects of Turnaway Births vs. Near Limits on binge drinking via multiple mediators^a

Mediator	Any binge drinking	
	6 months	30 months
Positive emotions, 8 days	-0.093 (-0.220, -0.012)	
Negative Emotions, 8 days	-0.001 (-0.037, 0.037)	
TOTAL _{Positive + Negative Emotions}	-0.094 (-0.232, -0.003)	
Positive emotions, 24 months		0.171 (-0.184, 0.535)
Negative Emotions, 24 months		-0.025 (-0.092, 0.034)
TOTAL _{Positive + Negative Emotions}		0.146 (-0.222, 0.510)

^aModels control for age, race, parity, relationship status, employment, and child abuse/neglect.

Statistically significant indirect effects are **bolded**

n.s. = not statistically significant

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