



# Emotion regulation difficulties and social control correlates of smoking among pregnant women trying to quit

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## HIGHLIGHTS

- Cessation correlates are examined in low-income pregnant smokers trying to quit
- Emotion regulation difficulties predict greater smoking urges, withdrawal symptoms
- Negative social control predicts fewer smoking days, greater abstinence self-efficacy
- Positive social control buffered effects of negative affect smoking on dependence

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## ABSTRACT

Approximately 15% of US women currently smoke during pregnancy. An important step toward providing effective smoking cessation interventions during pregnancy is to identify individuals who are more likely to encounter difficulty quitting. Pregnant smokers frequently report smoking in response to intrapersonal factors (e.g., negative emotions), but successful cessation attempts can also be influenced by interpersonal factors (i.e., influence from close others). This study examined the association between emotion regulation difficulties, positive and negative social control (e.g., encouragement, criticism), and smoking cessation-related variables (i.e., smoking quantity, withdrawal symptoms) among pregnant smokers. Data were drawn from the pretreatment wave of a smoking cessation trial enrolling low-income pregnant women who self-reported smoking in response to negative affect ( $N = 73$ ). Greater emotion regulation difficulties were related to greater smoking urges ( $b = 0.295$ ,  $p = .042$ ) and withdrawal symptoms ( $b = 0.085$ ,  $p = .003$ ). Additionally, more negative social control from close others was related to fewer smoking days ( $b = -0.614$ ,  $p = .042$ ) and higher smoking abstinence self-efficacy ( $b = 0.017$ ,  $p = .002$ ). More positive social control from close others interacted with negative affect smoking ( $b = -0.052$ ,  $p = .043$ ); the association between negative affect smoking and nicotine dependence ( $b = 0.812$ ,  $p < .001$ ) only occurred at low levels of positive social control. Findings suggest that emotion regulation difficulties may contribute to smoking during pregnancy by exacerbating women's negative experiences related to smoking cessation attempts. Negative social control was related to lower smoking frequency and greater confidence in quitting smoking, suggesting that it may assist pregnant smokers' cessation efforts. Positive social control buffered women from the effects of negative affect smoking on nicotine dependence.

*Trial registration:* [ClinicalTrials.gov](https://clinicaltrials.gov/ct2/show/study/NCT01163864), NCT01163864

## 1. Introduction

Smoking during pregnancy is associated with a host of prenatal

health problems for women (e.g., miscarriage, placenta previa, preeclampsia) (Cnattingius, 2004; Hand, Ellis, Carr, Abatemarco, & Ledgerwood, 2017), and is a leading cause of poor perinatal outcomes

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for infants (e.g., low birth weight, neurological problems, behavioral problems, SIDS) (Beijers, Burger, Verbeek, Bockting, & Ormel, 2014; Cnattingius, 2004; Goodwin, Cheslack-Postava, Nelson, et al., 2017; Hammoud et al., 2005; Micalizzi & Knopik, 2017; Riaz, Lewis, Coleman, et al., 2016; Tong, England, Rockhill, & D'Angelo, 2017). Despite these well-known negative consequences, approximately 15% of women in the US currently use tobacco during pregnancy (Beijers et al., 2014; Hand et al., 2017; SAMHSA, 2014). In particular, women with less than a high school diploma are sixteen times more likely to smoke during pregnancy, and those who live below the poverty line are three times more likely to smoke during pregnancy (Kurti, Redner, Lopez, et al., 2017). Although rates of smoking during pregnancy have significantly declined since the 1980s (Riaz et al., 2016), there has been little decrease during the past decade (Goodwin et al., 2017). Therefore, there is a critical need to identify variables that promote or impede successful smoking cessation among pregnant women.

One such variable, negative affect,<sup>2</sup> has been identified as a key factor influencing smoking among women, and escape and avoidance of negative affect is theorized as a primary motive for smoking (Bradizza, Stasiewicz, Zhuo, et al., 2017; Brandon, 1994) and other substance use disorders (Baker, Piper, McCarthy, Majeskie, & Fiore, 2004; Stasiewicz, Bradizza, & Slosman, 2018; Stasiewicz & Maisto, 1993). In explaining the relationship between negative affect and smoking, there has been increasing interest in conceptualizing cigarette smoking as an emotion regulation strategy and in examining alternative emotion regulation strategies for targeting smoking-related problems (Fucito, Julian, & Toll, 2010; Szasz, Szentagotai, & Hofmann, 2012). The construct of emotion regulation generally refers to the cognitive and behavioral strategies that people use to keep emotions within tolerable levels. Thompson defines emotion regulation as the “extrinsic or intrinsic processes responsible for monitoring, evaluating, and modifying emotional reactions especially their intensive and temporal features, to accomplish one's goals” (pp. 27–28) (Thompson, 1994). Similarly, *emotion regulation difficulties* refer to the self-report of problems with appropriately or effectively regulating emotional responses (Gratz & Roemer, 2004).

Theories of emotion regulation identify both intrapersonal (e.g., cognitive reappraisal, expressive suppression) and interpersonal (e.g., social support, negative social control) emotion regulation strategies (Campos, Walle, Dahl, & Main, 2011; Gross, 1998; Hofmann, 2014; Rimé, 2009). The preponderance of emotion regulation research emphasizes intrapersonal processes with many fewer investigations of interpersonal emotion regulation processes (Zaki & Williams, 2013). However, recent research on affective processes has seen a shift from a solely intrapersonal perspective to a greater focus on interpersonal or social processes (Niven, Totterdell, & Holman, 2009). Below we discuss the role of both intrapersonal and interpersonal risk factors for smoking during pregnancy.

### 1.1. Intrapersonal factors related to smoking

There are a number of known intrapersonal risk factors for continued smoking during pregnancy including mental health conditions (e.g., depression, anxiety, externalizing problems) (Eiden, Leonard, Colder, et al., 2011; Miguez, Pereira, & Figueiredo, 2017; Smedberg, Lupattelli, Mardby, Overland, & Nordeng, 2015), personality variables

(e.g., low agreeableness, low conscientiousness) (Maxson, Edwards, Ingram, & Miranda, 2012), and perceived stress (Maxson et al., 2012; Powers, McDermott, Dloxton, & Chojena, 2013). Studies indicate that the relationship between affective (e.g. negative emotions, craving) and smoking-related variables appears to be particularly strong for women. In laboratory studies, women experience greater craving (Perkins, Karelitz, Giedgowd, & Conklin, 2013; Saladin et al., 2012) and demonstrate greater tobacco and nicotine intake (Perkins, Giedgowd, Karelitz, Conklin, & Lerman, 2012; Weinberger & McKee, 2011) than men in response to both in vivo smoking cues and negative affect or stress inductions. In addition, women report greater relief from negative affect following smoking as compared to men (Eissenberg, Adams, Riggins, & Likness, 1999; Xu, Azizian, Monterosso, et al., 2008). Among pregnant smokers, emotions such as hostility and anger have been associated with persistent smoking during pregnancy, over and above depression and stress (Eiden et al., 2011). In a recent study examining predictors of abstinence following a smoking cessation intervention, only dependence levels predicted successful abstinence in pregnant smokers, whereas cognitive-motivational variables such as smoking-cessation self-efficacy did not (Emery, Sutton, & Naughton, 2017). Thus, given (a) the significance of negative emotion in theories of addiction (Baker et al., 2004; Stasiewicz & Maisto, 1993), (b) the stable associations between negative affect and nicotine dependence, withdrawal, and smoking lapses, particularly among women (Eissenberg et al., 1999; Perkins et al., 2012; Perkins et al., 2013; Rogers, Bakhshaie, Viana, et al., 2017; Saladin et al., 2012; Weinberger & McKee, 2011; Xu et al., 2008), and (c) the strong associations between negative affect and nicotine use among pregnant women (Howard et al., 2013), it is important to examine intrapersonal factors such as emotion regulation difficulties among pregnant smokers attempting to quit (Emery et al., 2017).

### 1.2. Interpersonal factors related to smoking

Interpersonal factors can also play an important role in motivating smoking behavior and in successful cessation (Butler, Hollenstein, Shoham, & Rohrbach, 2014; Robles, Slatcher, Trombello, & McGinn, 2014; Stadler, Snyder, Horn, Shrout, & Bolger, 2012). For example, a close other is often among the first to perceive and attempt to influence an individual's negative health-related behavior; this process of trying to influence health-related behavior of another person is referred to as *social control* (Lewis & Rook, 1999; Umberson, 1987). In general, social control tactics can be categorized into positive (e.g., encouragement, persuasion, positive reinforcement) and negative (e.g., disapproval, pressuring, and criticism) behaviors (Lewis & Butterfield, 2005). For example, partners, relatives, or close friends may try to influence a pregnant woman's smoking behavior by encouraging her to quit smoking (positive social control) or by criticizing her for putting the health of the fetus at risk (negative social control).

Multiple models of social control (e.g., dual-effects model, domain specific model, mediational model, contextual model) have been proposed to explain the relations between providers' social control behavior and the recipient's health-related behavior (Craddock, vanDellen, Novak, & Ranby, 2015; Okun, Huff, August, & Rook, 2007). A common theme across models is the idea that social control attempts may elicit both positive and negative emotional (e.g., positive affect, negative affect) and behavioral responses (e.g., change behavior in desired direction, ignore attempts/change behavior in opposite direction) on the part of the recipient. A growing body of research has found support for these models across a wide range of health behaviors (Okun et al., 2007). Importantly, there is a degree of overlap between social control and interpersonal emotion regulation. Interpersonal emotion regulation involves the role of interpersonal interactions (i.e., social control) on the modulation of emotional experiences. This includes sharing an emotional state with others (Rimé, 2009), attenuating negative affect while others are present (Coan, 2011), and attempting to change other's

<sup>2</sup> Gross uses the term *affect* as a higher order category for positive and negative internal states, including specific emotions (e.g. anger, sadness), emotion episodes (e.g., disagreement with a friend), and moods (e.g. euphoria, depression) (Gross, 1998). As a member of the affect family, *emotions* (a) unfold over a relatively short period of time, (b) have a shorter duration (versus moods), and (c) give rise to behavioral response tendencies (e.g. shouting during a disagreement). Though affect and emotion have distinct meanings, these terms have often been used interchangeably in the literature. In this paper, for consistency we have opted most often to use the broader term *affect*.

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