



Continued smoking and continued alcohol consumption during early pregnancy distinctively associated with personality



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HIGHLIGHTS

- Continued alcohol consumption is associated with two personality traits.
- Depressive and anxiety symptoms can explain part of the association with alcohol consumption.
- Continued smoking is not associated with personality traits.

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ABSTRACT

Pregnancy is a unique period to quit smoking and alcohol consumption and although motivated, not all women succeed at this. We investigated the associations of personality with continued smoking and continued alcohol consumption during early pregnancy. In addition, we studied whether antenatal anxiety and depressive symptoms can explain these associations. Two antenatal measurements from the population-based Pregnancy Anxiety and Depression cohort study were used. Pregnant women in their first trimester were recruited via midwifery practices and hospitals. We analyzed a sample of women who continued ($n = 101$) or quit smoking ($n = 254$), and a sample of women who continued ($n = 110$) or quit alcohol consumption ($n = 1230$). Measures included questions about smoking, alcohol consumption, the NEO-Five Factor Inventory (personality), the State Trait Anxiety Inventory, and the Edinburgh Postnatal Depression Scale. We found associations between continued alcohol consumption and higher levels of openness to experience, and lower levels of conscientiousness ($p < 0.05$). The association between conscientiousness and continued alcohol consumption was partly explained by both anxiety and depressive symptoms. No associations between personality and continued smoking emerged. This study contributes to the limited literature on personality differences between women who continue and quit smoking and alcohol consumption during early pregnancy. General population studies have not confirmed the association between openness to experience and alcohol consumption which implies that pregnancy is indeed a unique period. Increased insight in how personality influences continued smoking and alcohol consumption during pregnancy can help health professionals to improve lifestyle interventions targeted at pregnant women.

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1. Introduction

Smoking and alcohol consumption during pregnancy hold several risks for both mother and child. Smoking during pregnancy increases the risk of adverse pregnancy outcomes such as reduced birth weight, lower Apgar scores, preterm delivery (Hammoud et al., 2005), placental abruption (Castles, Adams, Melvin, Kelsch, & Boulton, 1999), changes in brain development (Booij et al., 2012) and a 150% increase in overall

perinatal mortality (Andres & Day, 2000). Prenatal alcohol consumption has been associated with reduced birth weight (Bada et al., 2005), preterm delivery (Sokol et al., 2007), spontaneous abortion (Andersen, Andersen, Olsen, Gronbaek, & Strandberg-Larsen, 2012) and the fetal alcohol syndrome (Jones, Smith, Ulleland, & Streissguth, 1973). However, studies investigating the effects of small to moderate amounts of alcohol show a lack in consensus regarding the negative effects (Kelly et al., 2012). Nevertheless, pregnant women are typically advised to abstain completely from alcohol consumption throughout their pregnancy (Health Council of the Netherlands, 2005).

Pregnancy is considered a unique window of opportunity to quit smoking and alcohol consumption. Indeed, women appear to be both intrinsically and extrinsically motivated to change their health behavior

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(Curry, Grothaus, McBride, Lando, & Pirie, 2001; Dunn, Pirie, & Hellerstedt, 2003; Higgins, Clough, Frank, & Wallerstedt, 1995). Notwithstanding these motivations, many women do not try or do not succeed in quitting smoking or alcohol consumption when pregnant. In western countries it is estimated that between 5% and 21% of all women smoke during pregnancy (Allen, Dietz, Tong, England, & Prince, 2008; Euro-Peristat Project, 2008). The prevalence rate of alcohol consumption shows a wider range and is estimated to vary between 6% and 50% in western countries (Alvik, Heyerdahl, Haldorsen, & Lindemann, 2006; Blondel & Kermarrec, 2011; Centers for Disease Control & Prevention, 2004; Cheng, Kettinger, Uduhiri, & Hurt, 2011; Health Council of the Netherlands, 2005; Nilsen, Holmqvist, Hultgren, Bendtsen, & Cedergren, 2008). Quitting rates during pregnancy are between 23% and 47% for smoking (Schneider, Huy, Schütz, & Diehl, 2010) and vary between 27% and 80% for alcohol consumption (Krans, Davis, & Schwarz, 2013; Ockene et al., 2002; Palma et al., 2007).

Risk factors associated with smoking and alcohol consumption during pregnancy include the level of education, being multiparae, being single, and experiencing anxiety or depressive symptoms (Powers, McDermott, Loxton, & Chojenta, 2013; Schneider et al., 2010; Skagerström, Chang, & Nilsen, 2011). General population studies have shown that personality traits predict both health behavior and risky health behavior (e.g. excessive drug and alcohol consumption) (Bogg & Roberts, 2004; Hampson, Goldberg, Vogt, & Dubanoski, 2006). In pregnancy, continued smoking and alcohol consumption can be considered as a form of risky health behavior and therefore personality traits are likely predictors of these behaviors. The well-known Five Factor Model explains personality as consisting of five domains or traits, each accompanied by six facets, that describe individual differences between people (Table 1) (Costa & McCrae, 1992). Neuroticism is characterized by a tendency to experience negative affects. Extraversion is characterized by being social, energetic, and adventurous. Openness to experience relates to curiosity, intellect and creativity. Conscientiousness is related to responsibility, carefulness, and conforming to societal norms. Agreeableness refers to avoiding conflict, being sensitive to social cues, and being considerate (Costa & McCrae, 1992).

As far as we know, personality has been related to continued smoking and alcohol consumption during pregnancy in only two studies. Maxson and colleagues found an association between lower levels of agreeableness and continued smoking, compared to smoking cessation, using the NEO-Five Factor Inventory (Costa & McCrae, 1992; Maxson, Edwards, Ingram, & Miranda, 2012). Another study, using the Big Five Inventory (John & Srivastava, 1999), did not find an association between personality and continued smoking, but found that higher levels of extraversion and lower levels of conscientiousness increased the risk for continued alcohol consumption (Ystrom, Vollrath, & Nordeng, 2011). However, the latter study included non-smokers and non-drinkers as reference groups which provide little information if one is particularly interested in how continued users differ from quitters during pregnancy. To our knowledge, no study has investigated personality associated with continued alcohol consumption compared to discontinued consumption during pregnancy. Furthermore, the association of personality with the amount of smoking and alcohol

consumption among continued users during pregnancy has not been investigated to date.

Smoking and alcohol consumption are, particularly in women, considered to be a strategy to regulate or cope with feelings of negative affect (Abbey, Smith, & Scott, 1993; Locke & Newcomb, 2001; Zuckerman, Ball, & Black, 1990). Therefore, we propose that anxiety and depressive symptoms may explain part of the association of personality with continued smoking and alcohol consumption during pregnancy.

The present study investigated the relationships of personality traits with continued smoking and continued alcohol consumption during early pregnancy. Based on the characteristics of the traits and previous research, we expected to find an association of continued smoking and alcohol consumption with higher levels of neuroticism and extraversion and with lower levels of conscientiousness, agreeableness, and openness to experience. Furthermore, we assumed that some proportion of the associations would be explained by anxiety or depressive symptoms. Finally, we explored the associations between personality and the amount of smoking and alcohol consumption among continued users.

2. Methods

2.1. Setting and participants

Data from the ongoing ‘Pregnancy, Anxiety and Depression’ (PAD) study was used. This population-based prospective cohort study investigates psychological, medical and social factors during pregnancy and the postnatal period. Participants in the PAD study are enrolled at primary midwifery practices ($n = 102$) and obstetric and gynecology departments of hospitals ($n = 9$) throughout the Netherlands. Women who provide written informed consent enter the study before 16 weeks of gestation and complete online questionnaires during and after pregnancy. For the present study we used data from the first two assessments at 14 and 19 weeks of gestation, collected between December 2011 and April 2013. Out of the 3,102 women who agreed to participate, 2,033 (66%) completed the online questionnaires. The PAD study was approved by the medical ethical review board of the University Medical Center Groningen.

2.2. Measures

2.2.1. Smoking status

Smoking status was recorded at the second assessment in three categories; “not smoking before pregnancy”, “quit smoking during pregnancy”, and “continued smoking during pregnancy”. “Continued smoking” was defined as a positive response to the question ‘Are you currently smoking cigarettes?’ (yes/no) and ‘Did you smoke before finding out about your current pregnancy?’. “Quit smoking” was defined as a positive response to ‘Did you smoke before finding out about your current pregnancy?’ (yes/no) and a negative response to ‘Are you currently smoking cigarettes?’. “Not smoking before pregnancy” was defined as a negative response to ‘Did you smoke before finding out about your current pregnancy?’ (yes/no). The mean amount of cigarettes smoked per day by continued smokers was assessed in five different categories: 1–5, 6–10, 11–15, 16–20 and 21 or more.

Table 1
Five personality traits and their facets.

Neuroticism	Extraversion	Openness to experience	Conscientiousness	Agreeableness
Anxiety	Warmth	Fantasy	Competence	Trust
Anger	Gregariousness	Esthetics	Order	Straightforwardness
Depression	Assertiveness	Feelings	Dutifulness	Altruism
Self-consciousness	Activity	Action	Achievement striving	Compliance
Impulsiveness	Excitement-seeking	Ideas	Self-discipline	Modesty
Vulnerability	Positive emotions	Values	Deliberation	Tender-mindedness

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