A Biopsychosocial Analysis of Smoking

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Abstract

Smoking behavior still poses a significant health risk. Although smoking is on recess in Western societies with higher incomes, contradictory effects in poorer parts of the world lead to overall increasing numbers of smokers. This article examines the reasons for smoking and its possible remedies from a biopsychosocial point of view.

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To examine the etiology of smoking behavior (SB), health personnel need to take biological, psychological and social factors into account. At the beginning of smokers' careers, psychosocial aspects predominate. During the later stages physiological addiction and related psychological factors sustain SB. This analysis thus starts with investigating the social axis.

Contributing Factors to Smoking

Social Factors

Smoking is usually started upon social reasoning. Social ideals that display SB have been identified as a primary driver. In the second half of the 20th century, smoking was attributed manly features, so more men smoked. Today, primarily women smoke to be cool (Laureate, 2014). SB becomes a ritual between partners or friends. Parents and older siblings who smoke serve as role models for younger members. Secondhand smoke exposure at home "mediates the association between parental smoking and students smoking," posing a substantial risk towards SB in children (Wang, Ho, & Lam, 2011, p. 827).

In group culture, feelings of belonging encourage SB. Advertising promotes ideals for subcultures and products. Movie smoking has been established as a precursor to SB; however, its predictive effect on blacks was reported to be lower than on whites and Hispanics, suggesting cultural effects (Soneji, Lewis, Tanski, & Sargent, 2012, p. 2201). Well-known thinkers, for example, Sartre or Piaget are remembered smoking pipes, giving smoking an exculpating intellectual flair. Cigars are still used to display entrepreneurship. Tobacco rhetoric may be seen as postmodern pseudo-communication, a neo-sophism where facts recede behind winning sales (Olivier, 2008, pp. 48-51).

Tobacco appears as an important economic factor. Meritocracies tolerate self-exploitation, promote risk-taking behavior, and fail to discharge SB as a valid coping strategy. Group culture overemphasizes ritual and ignores consequences. In situations of uncertainty, people revert to their peer group to stabilize alternatives of action (Weick, 1979, p. 6).

Interviewing an elderly chain-smoker in Maryland, U.S.A., in the late 20th century, I was given the conclusion, "This state has been founded on tobacco, and now they tell us we cannot smoke?"

Biological Factors

Nicotine stimulates reward circuits, particularly in the midbrain. The habenulo-interpeduncular (MHb-IPN) pathway has been proposed as a "critical crossroad that influences the brain response to nicotine," for its enrichment in nicotinic acetylcholine receptor (Antolin-Fontes, Ables, & Ibanez-Tallon, 2014, p. 1). It takes part in several reward-related circuits, designating the MHb-IPN as a convergent track for cholinergic, serotoninergic and dopaminergic signals (pp. 2, 7). Nicotine tightens blood vessels and increases blood pressure, initially increasing alertness. Antenatal nicotine exposure has been linked to heightened vascular hypertensive responsivity and oxidative stress (Xiao, Huang, Yang, & Zhang, 2011, p. 1407). Alterations in nerve tissue density in the anterior cingulate cortex and nucleus accumbens, caused by antenatal nicotine, have been reported. Together with childhood nicotine exposure from passive smoking, they contribute to the later etiology of SB (Mychasiuk, Muhammad, Carroll, & Kolb, 2013, p. 2491).

With enduring nicotine addiction, withdrawal symptoms take the lead in maintaining SB (Jarvis, 2004, p. 27). Nicotine withdrawal produces increased salivary cortisol levels (Cohen, al'Absi, & Collins, 2004, p. 1673). Nicotine initially shortens simple reaction times and enhances sustained attention. Mild stimulation of lung tissue may exhibit placating effects on nervous individuals by mediating mental activity, but they are usually attributed to withdrawal symptoms once tolerance has been formed. Thus, tasks with high demand for sustained attention forward persistent SB. A family anamnesis is indicated to identify relatives with nicotine or other dependencies, as genetic components have been identified in nicotinic acetylcholine receptor subunits that relate to general addictive behavior (Antolin-Fontes, Ables, & Ibanez-Tallon, 2014, p. 2).

Psychological Factors

The sensual experience of tobacco smoke, taste, and the lit cigarette have to be considered. Nicotine replacement may not be as satisfying as the smoking experience (Perkins, Conklin, & Levine, 2008, "Preface"). Smoking can be emotionally pleasing in the short term while, on the contrary, its negative consequences unfold on the long run. Lack of knowledge about the health risks of SB is a major problem, particularly in regions with low education. Even in higher income societies, young people may underestimate risks of dependency and not fully comprehend its negative long-term consequences. Although knowledge about the dangers of SB should lead to cessation, people attend to false knowledge to alleviate dissonances. Festinger (1962) suggests smokers may find it too difficult to withstand the pressures of not smoking. Non-scientific facts and opinions are sought that are consonant with SB (p. 5-6). Recurring thoughts about smoking support SB. According to Hagger et al. (2013), smoker's resources for self-control are exhausted by smoking-related stimuli (p. 394). Smokers may alleviate other dissonances by their SB. Sustained SB can result from a failure to observe one's cognitive habits, limiting available coping strategies. Smoking may be linked to ego states that trigger SB (Emmerson, 2006, p. 23).

As nicotine is involved in the brain's reward circuits, a history of other addictions and substance abuse has to be considered. Because impulsivity has been related to smoking initiation, patients with impaired impulse control need to be given particular attention. Their sensation seeking produces "heightened expectancies for reinforcement from smoking" rather than a difficulty delaying rewards (Doran et al., 2013, p. 714). Cigarettes are known as coping strategy for prior trauma. However, it is not clear whether SB aggravates or relieves trauma (Perkins, Conklin, & Levine, 2008, ch. 7).

Factors and Strategies of Smoking Cessation

Biological Approaches

Among multiple substances, nicotine has been linked to physical addiction. For this reason, nicotine replacement therapy is effective in promoting non-smoking behavior (NSB). Available forms are nicotine patches, lozenge, chewing gum, e-cigarettes, and other oral inhalers. L-theanine has been proposed as a counteragent to the biological effects of nicotine. It "inhibited nicotine-induced tyrosine hydroxylase expression and dopamine production in the midbrain", reducing nicotine-reactive cells. (Di, Yan, Zhao, Chang, & Zhao, 2012, p. 1064) Melatonin has been shown to exhibit beneficial effects on nicotine-induced vasculopathy and may complement smoking cessation therapy (Rodella et al., 2010, p. 126). A recent study comparing different pharmacological approaches to smoking cessation showed bupropion, nicotine lozenge, nicotine patch, and combinations effective to achieve initial abstinence, with nicotine patch and a combination of bupropion and lozenge positively influencing the lapse-relapse transition. Although smoking motivation is gender specific, bupropion is equally effective for men and women (Japuntich, Piper, Leventhal, Bolt, & Baker, 2014, p. 58). E-cigarettes have been proposed as an aid to smoking cessation to reduce overall toxic effects. There exists initial evidence for their effectivity, but further research is required. (Rahman, Hann, Wilson, & Worrall-Carter, 2014; Brown, Beard, Kot, Michie, & West, 2014, p. 1351)

Exercise reduces cravings, especially in the presence of other stressors, but showed no "effect on ad libitum smoking" (Fong, De Jesus, Bray, & Prapavessis, 2014, pp. 1516-1521). Physical activation significantly reduced snacking and attentional bias to both smoking and snacking environmental cues (Oh, & Taylor, 2014, p. 349). A combined approach targeted at overall health improvement, including NSB and moderate to vigorous exercise, may be beneficial. However, dieting during quitting is discouraged. Comorbid alcoholism should be treated, as dose-dependent effects of alcohol consumption are known to increase the desire to

smoke and decrease smoking resistance. Nicotine reverses blood vessel dilation caused by alcohol, creating combined effects (Kahler et al., 2014, p. 4649).

Psychological Approaches

Many people who easily quit in Western societies likely have already done so, and those who continue to smoke find quitting difficult (Perkins, Conklin, & Levine, 2008, "Preface," para. 1). The most promising effects result from a combination of bupropion, nicotine replacement and cognitive behavioral therapy (CBT). These treatments even have proven to be effectively applied by primary care physicians with considerable abstinence rates on follow-up (Wittchen, Hoch, Klitsche, & Mühlig, 2010, p. 28). Education about the effects of smoking is an important starting point on the way to NSB. Knowledge transfer has shown to be applicable in peer-education among college students (Finn, Cardinal, & Bent, 2014, p. 293-294).

For successful therapy, smoking habits will have to be retrained. People need to relearn to say *no* to cigarettes. Cognition is targeted to reshape dissonances that ideally are minimized by NSB. NSB is a lifelong process, during which patients encounter many cues and opportunities to relapse to SB. Strategies have to be applied to tolerate the effects of NSB in the long run. Some people may benefit from group therapeutic effects. If other dissonances are present, education on the ineffectiveness of SB as a coping strategy may be helpful. In case of pregnancies, cognitive and behavioral methods usually are the sole therapies available (Perkins et al., ch. 2-3).

In CBT, detrimental thoughts are targeted and replaced with more positive attitudes toward oneself. Similarly, behavior that fosters SB is identified and healthier alternatives are considered. The CBT approach to NSB includes asking for smoking habits to break reluctance, advising to quit exploiting motivational effects of authorities, assessing willingness to determine commitment, assisting with interventional techniques, and arranging follow-up. Eight or more sessions with an overall time of at least 90 minutes have proven

most effective. Routines of SB are usually easily identified, and locations that are connected with SB should be prevented. Coping strategies include reminders on the positive consequences of NSB, an active lifestyle including tactile experience, readily available healthy snacks, and relaxation techniques. With severe resistance to quitting, stepwise reduction may be appropriate (ibid.). Symptoms of nicotine withdrawal like stress, fatigue, poor sleep, coughing, constipation, and negative mood have to be addressed. The attitude towards weight gain may be altered. As a third wave behavioral approach, acceptance and commitment therapy (ACT) is effective for smoking cessation, most notably in its initial stages. ACT mainly addresses the tolerance of the adverse effects of non-smoking and develops an equanimous attitude toward one's affective states. ACT thus contributes to positive long-term outcomes, particularly with comorbid anxiety (Lanza, Garcia, Lamelas, & Gonzalez-Menendez, 2014, p. 644).

Firmly identifying with being a nonsmoker may increase the dissonance that is felt when smoking. Eliminating the presence of smoking stimuli may be superior to stigmatization of smoking. Both guilt and nicotine withdrawal have been linked with increased salivary cortisol levels, emphasizing the need to consider stress responses and anxiety related factors in the initial stages of smoking cessation (Cohen, al'Absi, & Collins, 2004, p. 1673). To further reduce the anxious pressures of preventive behavior, long term goals that are not related to smoking but whose achievement requires NSB should be found, for example, to make the lungs (or body) as healthy as possible. Goal-achievement depends on functioning promotional strategies. Their malfunction has been linked to depression. (Higgins, 1997, p. 1228). Substantial association of smoking with depression suggests the need for treatment of comorbid depression for favorable outcomes (Luger, Suls, & Vander Weg, 2014, p. 1418). Simple steps, for example, setting definitive quit dates enable promotional behavior. Hypnotherapy may explore internal pressures that lead to smoking or reduce the resistance to non-smoking behavior. However, there is no evidence that hypnosis is effective for smoking

cessation above placebo. Text messages or pictures as daily reminders help patients focus on their ideals. (Perkins et al., ch. 4-5, 8)

Social Approaches

Extensive therapy is often found inconvenient by smokers due to the necessary changes in their social behavior. Self-help attempts as e-mail counseling or the intermittent delivery of self-help booklets are valid alternatives (Unrod et al., 2014, p. 284). E-mail intervention was effective both for adherence and reduction of relapses or number of smoked cigarettes (Polosa, Russo, Di Maria, Arcidiacono, & Picillo, 2008). Being away from one's usual environment may facilitate the initial stages of quitting. Couples can set a joint quit date during vacation to exploit both benefits (Perkins et al., ch. 3).

Dedobbeleer, Beland, Contandriopoulos, & Adrian (2004) investigated policing effects on male and female groups. Increasing prices, no-smoking laws, and restricting youth access all reduced the number of cigarettes smoked by men, but not by women. For women, smoking is seen as a coping strategy for low income and stress. Although economic and legal pressures not to smoke are efficient on men, economic well-being may decrease the perceived need for cigarettes in women. Notably, women have reported pressures to smoking cessation by friends and family. Advanced age and larger households correlate with a decreased number of cigarettes smoked per day. Aggravated menstrual symptoms and less partner support may add to the difficulties of women to quit smoking. Thus, restricting advertisement, prohibiting smoking in public buildings, and discouraging public display of SB all successfully reduce smoking. (p. 1-6)

Conclusion

CBT, together with initial pharmacological approaches, is considered the gold standard for smoking cessation. Successful maintenance of NSB requires learning to withstand the

temptation on a situation-to-situation basis, which includes regulating emotional experience. Cognitive and mindful techniques appear to be most appropriate to sustain NSB.

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