

The relationship between smoking, years of education, and cognitive functioning in mid- and late-life: a co-twin control study

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Smoking and its influence on health is well known but the relation of smoking on cognitive functioning is less understood, with inconsistent findings as to impacts on cognitive functioning in late adulthood. This paper will explore these relations to determine if smoking does impact cognitive performance, and if educational level moderates these effects. To address these questions, the current study will use data collected and harmonized by the international IGEMS (Interplay of Genes and Environment across Multiple Studies; Mage = 68.4 years) consortium. Measures included pack years, years of education, and cognitive ability assessments in twins from three countries (Sweden, Denmark, and the USA): digits backwards, digits forward, symbol digit, block design, and synonyms. Negative associations were found between pack years and most cognitive tasks, with significant negative effects for symbol digit, the digit span tasks, and block design, although magnitudes differed by sex for symbol digit. Only the Symbol Digit task showed evidence for an interaction between smoking and years of education at the individual level but these effects were reversed across sex, with males showing a positive interaction. To examine potential causal relationships between pack years and cognitive performance, a co-twin control (CTC) design was used, adjusting for age, study, and cognitive impairment. Pack years was found to negatively impact symbol digit and block design within the CTC approach with no significant differences across sex in comparing within-pair twin effects among discordant twins. Effect sizes were larger for the dizygotic than monozygotic twins, but these effects were not significantly different across zygosity. Overall, smoking exposure shows supportive evidence of an environmental stressor that negatively impacts the more fluid associated cognitive tasks.