

## Smokers could be more prone to schizophrenia, study finds

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Smoking alters the impact of a schizophrenia risk gene. Scientists from the universities of Zurich and Cologne demonstrate that healthy people who carry this risk gene and smoke process acoustic stimuli in a similarly deficient way as patients with schizophrenia. Furthermore, the impact is all the stronger the more the person smokes.

Schizophrenia has long been known to be hereditary. However, as a melting pot of disorders with different [genetic causes](#) is concealed behind manifestations of [schizophrenia](#), research has still not been able to identify the main gene responsible to this day.

In order to study the [genetic background](#) of schizophrenia, the frequency of particular risk genes between healthy and ill people has mostly been compared until now. Pharmacopsychologist Professor Boris Quednow from University Hospital of Psychiatry, Zurich, and Professor Georg Winterer's workgroup at the University of Cologne have now adopted a novel approach. Using [electroencephalography](#) (EEG), the scientists studied the processing of simple acoustic stimuli (a sequence of similar clicks). When processing a particular stimulus, healthy people suppress the processing of other stimuli that are irrelevant to the task at hand. Patients with schizophrenia exhibit deficits in this kind of stimulus filtering and thus their brains are probably inundated with too much information. As psychiatrically healthy people also filter stimuli with varying degrees of efficiency, individual stimulus processing can be associated with particular genes.

In a large-scale study involving over 1,800 healthy participants from the general population, Boris Quednow and Georg Winterer examined how far acoustic stimulus filtering is connected with a known risk gene for schizophrenia: the so-called "transcription factor 4" gene (TCF4). TCF4 is a protein that plays a key role in [early brain development](#). As patients with schizophrenia often smoke, the scientists also studied the smoking habits of the [test subjects](#).

The data collected shows that psychiatrically healthy carriers of the TCF4 gene also filter stimuli less effectively – like people who suffer from schizophrenia. It turned out that primarily smokers who carry the risk gene display a less effective filtering of acoustic impressions. This effect was all the more pronounced the more the people smoked. Non-smoking carriers of the risk gene, however, did not process stimuli much worse. "Smoking alters the impact of the TCF4 gene on acoustic stimulus filtering," says Boris Quednow, explaining this kind of gene-environment interaction. "Therefore, smoking might also increase the impact of particular genes on the risk of schizophrenia." The results could also be significant for predicting schizophrenic disorders and for new treatment approaches, says Quednow and concludes: "Smoking should also be considered as an important cofactor for the risk of schizophrenia in future studies." A combination of genetic (e.g. TCF4), electrophysiological ([stimulus](#) filtering) and demographic (smoking) factors could help diagnose the disorder more rapidly or also define new, genetically more uniform patient subgroups.

**More information:** Boris B. Quednow et al. Schizophrenia risk polymorphisms in the TCF4 gene interact with smoking in the modulation of auditory sensory gating. In: PNAS, March 26, 2012. [DOI: 10.1073/pnas.1118051109](https://doi.org/10.1073/pnas.1118051109)

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