

# Indoor Air Quality and Cognitive Performance

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This paper studies the causal impact of indoor air quality on the cognitive performance of individuals using data from official chess tournaments. We use a chess engine to evaluate the quality of moves made by individual players and merge them with measures of air quality (fine particulates and CO<sub>2</sub>) inside the tournament venue. The results show that poor indoor air quality hampers cognitive performance significantly, in particular when decisions are taken under time pressure. For instance, we find that an increase of 10  $\mu\text{g}/\text{m}^3$  in the indoor concentration of fine particulates (PM<sub>2.5</sub>) increases a player's probability of making an erroneous move by 26.3% if the move is taken under time pressure. For CO<sub>2</sub>, the effect is also statistical significant but smaller. Exploiting temporal as well as spatial variation in outdoor pollution, we provide evidence suggesting an immediate effect of fine particulates on cognition. Our results have important implications for the growing share of high-skilled workers executing non-routine cognitive tasks.