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We apologise for the delay in our response, but regrettably, Dr. Rogeberg did not communicate his challenge to us, nor did PNAS make us aware of his challenge to our paper.

Dr. Rogeberg's ideas are interesting, but his challenge is based on simulations. We used actual data on 1,037 people to carry out the analyses he suggested. His ideas are not supported by our data.

Dr. Rogeberg's claim is that cannabis use is more common in children from low-SES families. He also claims that the IQ's of low-SES children are temporarily boosted by schooling, but that when they leave school and become adults their IQ's go back down to their former low baseline. If, as Dr. Rogeberg suggests, many cannabis users were former low-SES children, he says this coincidence would create the false impression that cannabis use was responsible for their IQ drop in adulthood.

Only a small portion (23%) of the adolescent cannabis users in the Dunedin Study were from lower SES families (whose breadwinner had low-skill occupations such as food packer), making it unlikely that low SES can explain why adolescent-onset cannabis users show IQ decline. Nevertheless, to address his claim, we restricted our analysis to individuals in middle-class families (whose primary breadwinner had occupations such as building inspector, plumber, or aircraft mechanic), and we excluded low-SES families as well as high-SES families (whose breadwinners had professional occupations such as dentist). By restricting our analysis to only include children from middle-class homes, our findings of IQ decline in adolescent-onset cannabis users remain unaltered, thereby suggesting that the decline in IQ cannot be attributed to socio-economic factors alone.

Our longitudinal data also show that the IQ scores of children from low-SES families are the same from the time they begin schooling to adolescence. These data do not support the claim that the IQ's of children from low-SES families are temporarily boosted by schooling, only to fall again once they reach adolescence.

In a critical test in our analysis, we controlled for SES and found that independent of whether children were from low, middle or high-SES families, their IQ remained unchanged from adolescence to adulthood. Therefore, SES does not influence IQ decline from adolescence to adulthood.

Finally, we reported IQ decline across many different kinds of mental functions, including executive function, memory, processing speed, perceptual reasoning and verbal comprehension. Some of these sections of the IQ test are known to be more susceptible to alteration by education or social environment. If the decline in IQ were, as Dr. Rogeberg suggests, due to SES factors, we would expect to see a greater decline in these sections of the IQ test. However, we found no evidence to suggest that cannabis use disproportionately affects these sections of the IQ test, further excluding the possibility that the drop in IQ is due to SES alone.

Moreover, we note that our results suggesting that adolescent-onset but not adult-onset cannabis users show IQ decline is consistent with findings in rats, and rats have no schooling or SES.

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