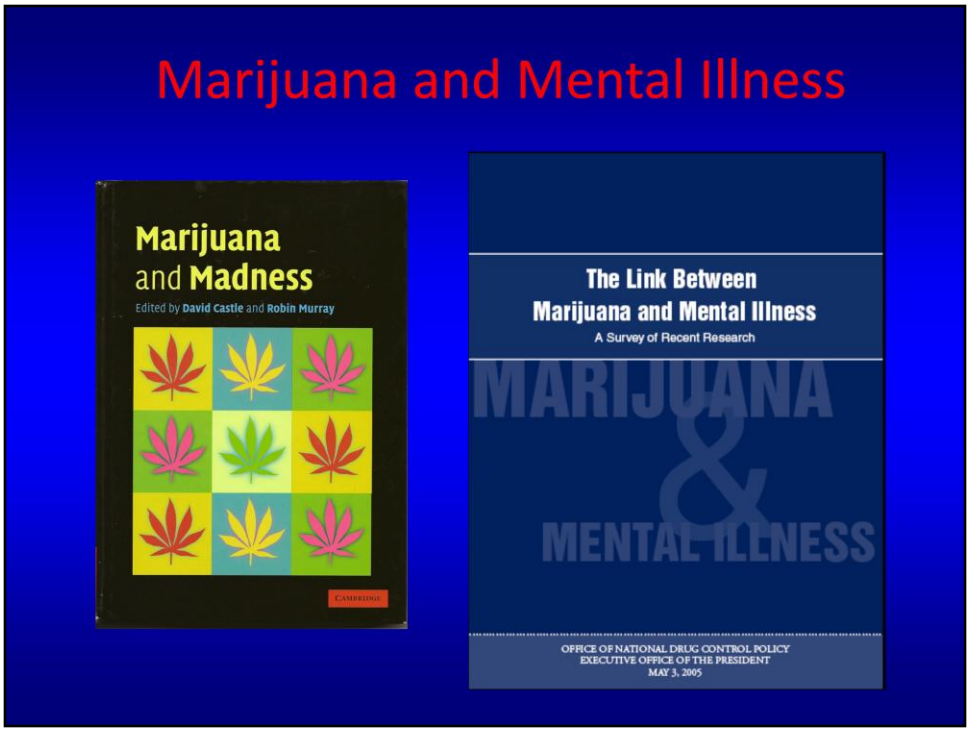

Besides the evidence showing that marijuana affects memory and cognitive performance, there is a growing body of evidence suggesting that marijuana may increase risk for mental illness. The two reports shown on this slide summarize the results of over three decades of research studies showing this link between marijuana and later mental illness.

Regular marijuana use during adolescence found to increase risk 2 to 5 times of developing psychosis, schizophrenia, anxiety, and depression in adulthood.

Source: Malone DT et al. Adolescent cannabis use and psychosis: epidemiology and neurodevelopmental models. Brit J Pharmacol. 2010;160:511-522

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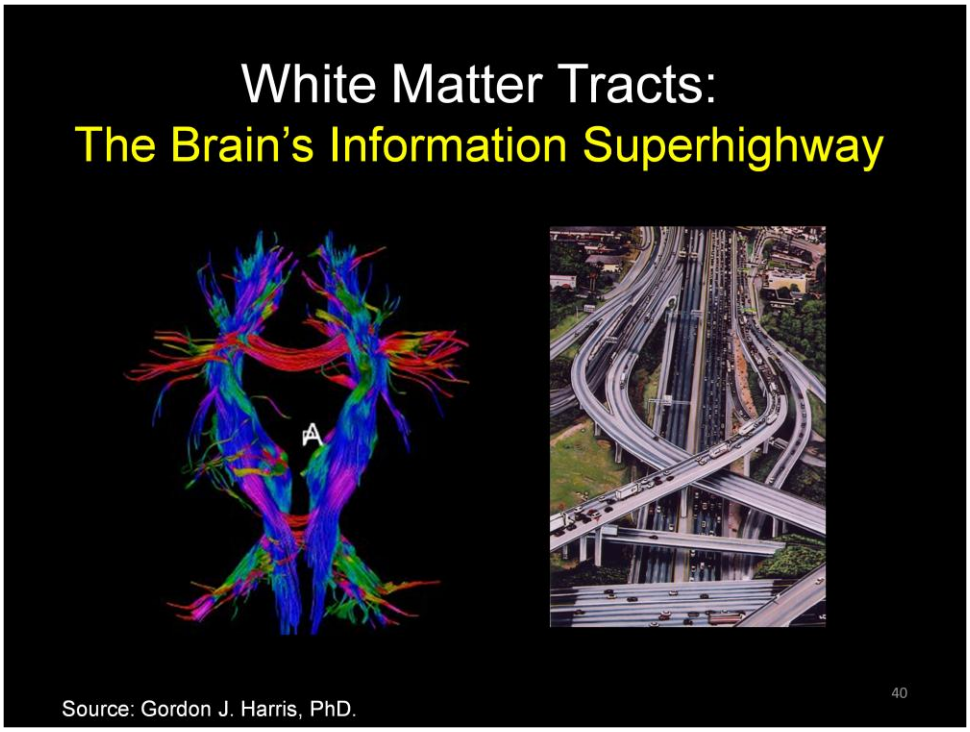
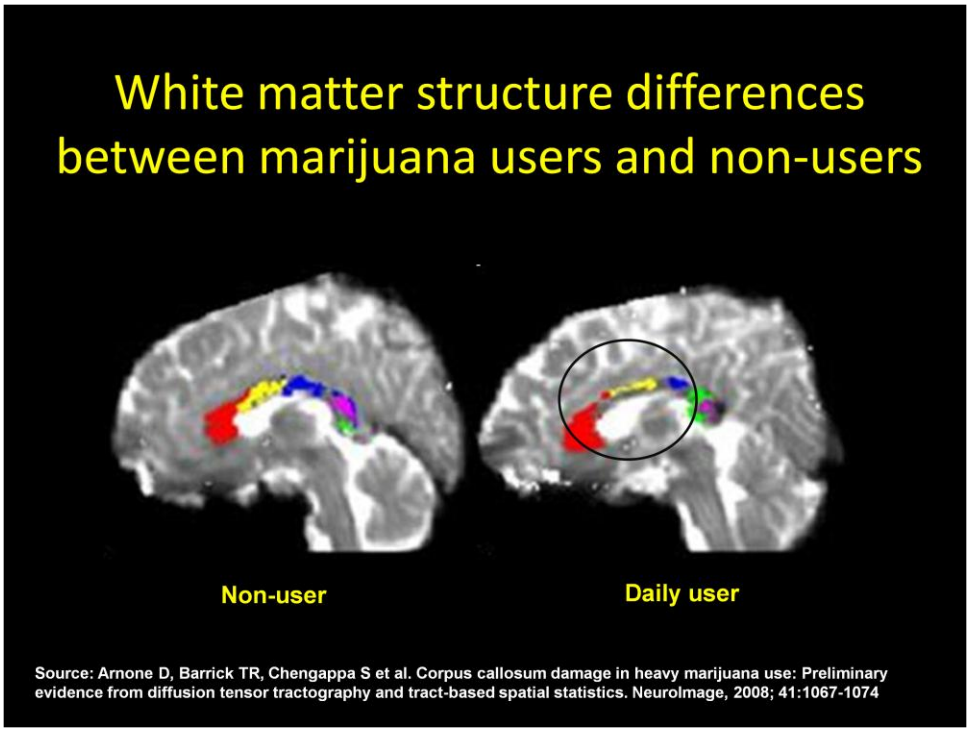
Several of these studies followed individuals from childhood (ages 6 or younger), before marijuana use began, all the way into their late 20's. So, they were able to determine whether symptoms of mental illness were present BEFORE marijuana use initiation, and perhaps contributed to individuals becoming marijuana users.

Even after controlling for the confounding effect of mental illness symptoms preceding marijuana use, these studies showed an increased risk of developing schizophrenia or mood disorders (depression, anxiety) in adulthood if individuals regularly smoked marijuana during adolescence. The risk was particularly heightened if there was any family history of mental illness (i.e., "genetics provided the loaded gun and marijuana pulled the trigger"). Also, mental illness, among those at risk, tended to show up earlier with marijuana use.

Why would marijuana use increase the risk for mental disorders?



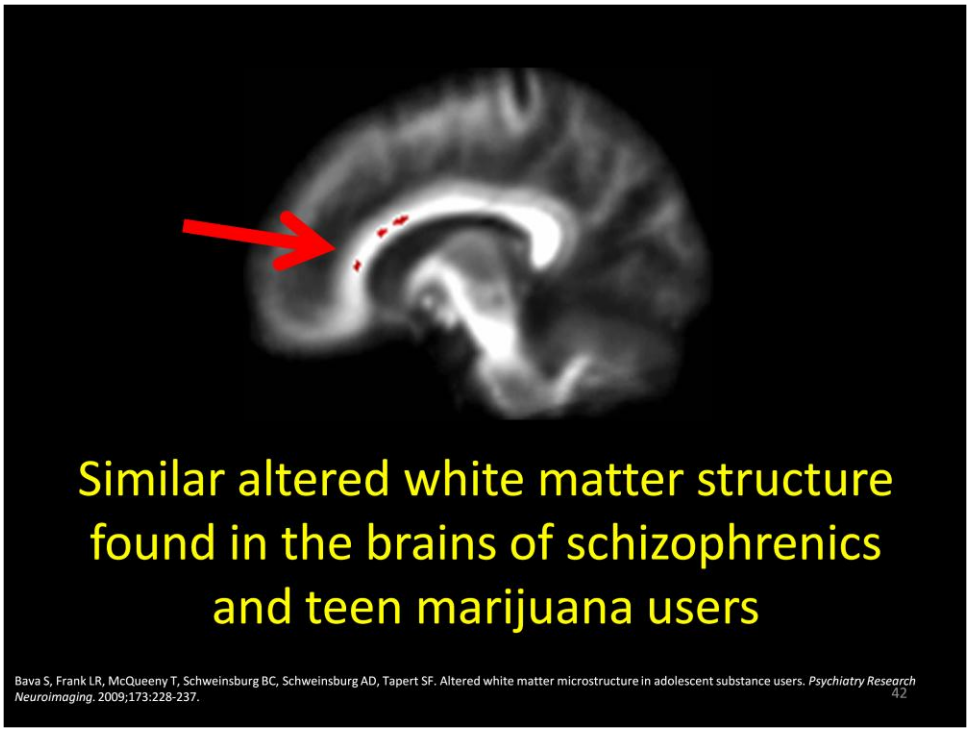
Remember those white matter tracts and how myelination happens throughout adolescence? There are clues emerging from recent brain imaging studies that suggest that alterations in white matter development among regular marijuana users may be one contributing factor to the increased risk for mental illness.



This slide shows the results of one such study. These are MRI scans of the corpus callosum, the bundle of fibers connecting the two brain hemispheres, allowing the two hemispheres to communicate and work in a coordinated way. Young adult males who smoked marijuana daily (and started at an average age of 15 yrs) were scanned along with age-matched non-users. All had low levels of alcohol use.

The different regions of the corpus callosum fibers are shown in bright colors on these two scans. The circled area on the scan of the daily user (right) shows thinner corpus callosum fibers than the scan of the non-user (left), indicating that there are white matter integrity issues for the daily user.

Poorer communication across different parts of the brain that need to work together for proper cognitive function may be one cause of cognitive disorders such as schizophrenia.



And indeed, imaging studies are finding that there are similar white matter problems in the brains of people with schizophrenia and of regular marijuana users who started using in adolescence. For example, this image is from another study which found white matter alterations in the fibers linking the prefrontal regions of the two hemispheres.