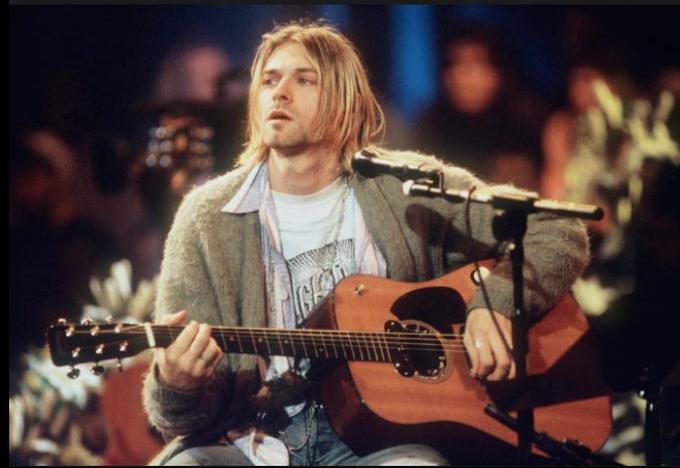




# **EFECTOS DE LAS DROGAS EN EL CEREBRO DE NIÑOS Y ADOLESCENTES**

**DR. PATRICIO GUERRA  
NEURÓLOGO INFANTIL Y ADOLESCENTES  
MAGÍSTER NEUROCIENCIAS**

**CHARLA COLEGIO GERMANIA AGOSTO 2018**



## En Chile son asesinadas dos personas al día: tráfico de drogas es la principal motivación

Identifican a hombre asesinado a tiros esta madrugada en edificio de Santiago Centro

La Brigada de Homicidios de la PDI está a cargo de la investigación y maneja, por ahora, la hipótesis del tráfico de drogas, ya que luego del brutal homicidio, los atacantes se llevaron una mochila.

VALPARAÍSO

### Valparaíso: Investigan supuesto homicidio tras quitada de drogas en el sector de Placilla

Un supuesto homicidio investiga Carabineros en el sector de Placilla. Al parecer tras lo que sería una quitada de drogas, un ex reo habría recibido una herida de bala mortal, según habría contado un testigo que se mantiene prófugo. (16-05-16)

TVU Noticias

Investigan homicidios en Concepción y Talcahuano que tendrían relación con drogas

Por: TVU | 12 de Agosto 2017

### Mujer muere baleada por ajuste de cuentas en la comuna de Paine

Según señaló Carabineros, "según investigación y primeras diligencias, se trataría de un problema de drogas".

DROGA:



-TODA SUSTANCIA CON POTENCIAL PARA PREVENIR O CURAR UNA ENFERMEDAD (OMS)



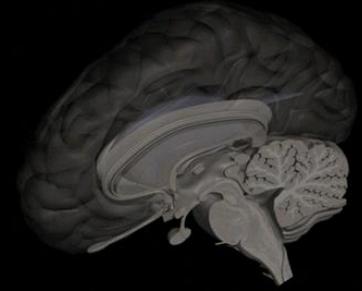
-SUSTANCIA QUE CAUSA ALTERACIÓN DE LA REALIDAD Y ADICCIÓN (HABLA COMÚN)



-*ADDICTUS*: AQUEL QUE HABIENDO CONTRAÍDO UNA DEUDA, Y NO HABIÉNDOLA PAGADO, SE CONVIERTE EN ESCLAVO DE SU ACREEDOR (ANTIGUA ROMA)



## FENÓMENOS COMUNES ASOCIADOS A LAS DROGAS:



-PRODUCEN UN EFECTO PLACENTERO EN RELACIÓN A SU USO

-CIERTO GRADO DE ALTERACIÓN DE PERCEPCIÓN DE LA REALIDAD

-CIERTO GRADO DE MALESTAR AL NO USARLA

-ACTIVAN O DESACTIVAN CIRCUITOS O ÁREAS DEL CEREBRO

-PUEDEN GENERAR ADICCIÓN

## PROBLEMÁTICAS COMUNES ASOCIADAS A LAS DROGAS:



- DAÑO FÍSICO DE LA DROGA AL QUE LAS USA
- DAÑO CEREBRAL (MENTAL) AL QUE LAS USA
- DAÑO A LOS QUE RODEAN AL CONSUMIDOR : EMOCIONAL-FÍSICO
- RELACIÓN CON “GRUPOS DE RIESGO”
- ”DEJAR DE HACER COSAS...”
- ”DEPENDER DE...”
- ”HACER COSAS PARA OBTENER...”
- GENERAR ACTIVIDADES ILÍCITAS RELACIONADAS A LA DROGA

# DROGAS:



-LEGALES:

TABACO

DISMINUYE ANSIEDAD  
SENSACIÓN DE PLACER

ALCOHOL

EUFORIA  
DESINHIBICIÓN

-ILEGALES:

MARIHUANA

RELAJACIÓN-ALTERACIONES  
PERCEPTIVAS

COCAÍNA

EUFORIA

SINTÉTICAS

EUFORIA-EMPATÍA

TODAS ACTÚAN EN EL CEREBRO MODIFICANDO SU FUNCIONAMIENTO

## CONSUMO (MOTIVOS):



-EXPERIMENTAR ALGO NUEVO

-PRESIÓN SOCIAL

-ESCAPAR DE LA REALIDAD

-BUSCAR DIRIGIDAMENTE SUS EFECTOS:

“OLVIDAR”

DISMINUIR LA ANSIEDAD

PERDER EL MIEDO



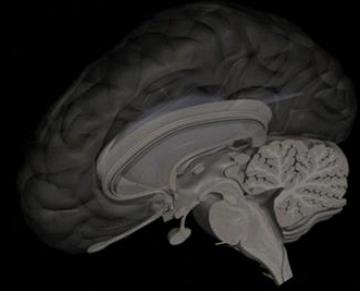
## ADICCIÓN (ADDICTUS) DEFINICIONES:

-SE DEFINE COMO LA DEPENDENCIA FÍSICA O PSICOLÓGICA DE UNA DETERMINADA SUSTANCIA QUÍMICA, CUYA SUPRESIÓN CAUSA SÍNTOMAS DE PRIVACIÓN AL INDIVIDUO

-DEPENDENCIA DE UNA SUSTANCIA, O UNA ACTIVIDAD, HASTA EL PUNTO QUE DETENERLA RESULTA MUY DIFÍCIL Y CAUSA ALTERACIONES PSÍQUICAS Y MENTALES GRAVES

-¿COMO DETECTARLOS?, ¿CÓMO DARSE CUENTA?

## ADICCIÓN (ADDICTUS):



-LOS SENTIMIENTOS DE MALESTAR QUE LOS ADICTOS EXPERIMENTAN DURANTE LOS PERÍODOS DE ABSTINENCIA SON UN FACTOR CLAVE EN LA MANTENCIÓN DE LA ADICCIÓN, YA QUE MANTIENEN LA BÚSQUEDA Y EL CONSUMO DE DROGAS

-LA ADICCIÓN SE CONSIDERA EL PROBLEMA PSIQUIÁTRICO DE MAYOR PREVALENCIA ACTUALMENTE  
(OMS: 4% DE LA POBLACIÓN MUNDIAL ADICCIÓN A DROGAS ILEGALES)

-EL CAER EN LA ADICCIÓN ES EL RESULTADO DE LA SUMA DE FACTORES BIOLÓGICOS (GENÉTICOS), AMBIENTALES, FAMILIARES Y SOCIALES

GOODWIN (DINAMARCA) 1974



110 NIÑOS DADOS EN ADOPCIÓN

55 VARONES HIJOS DE PADRES ALCOHÓLICOS

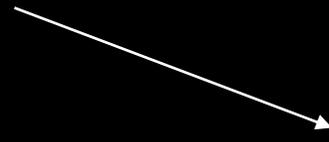
55 VARONES PADRES NO ALCOHÓLICOS



ADOPCIÓN ANTES DEL MES DE VIDA-NUNCA CONTACTO CON PADRES.



25-29 AÑOS DE EDAD



20% ALCOHOLISMO

5% ALCOHOLISMO

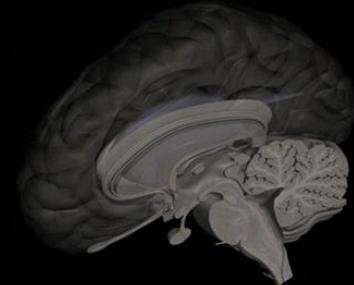
## ADICCIÓN (ADDICTUS):



-PREDISPOSICIÓN A LA ADICCIÓN:      40% FACTORES AMBIENTALES  
60% FACTORES GENÉTICOS  
(GEN DRD2: 27%)

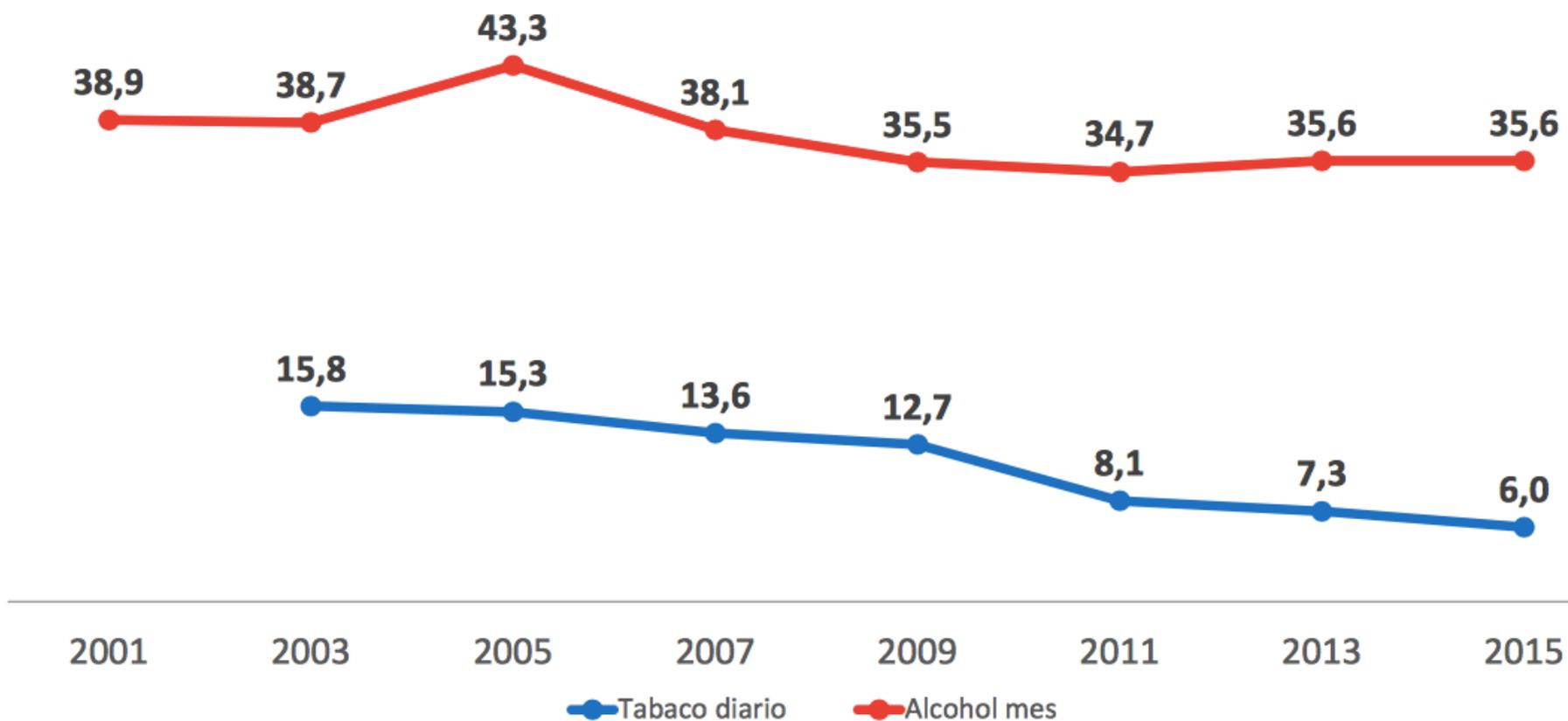
-PESE A ESTO, NO SE DEBE CAER EN EL “*DETERMINISMO*”:

LOS GENES Y EL ENTORNO SOCIAL PUEDEN *FACILITAR*, DE ALGUNA MANERA, CIERTAS ADICCIONES, PERO *NO DESTINAN* A LAS PERSONAS A PERMANECER TODA SU VIDA EN ESTE ESTADO



## Evolución prevalencias consumo de tabaco y alcohol.

Total país, 2001-2015



# TABACO

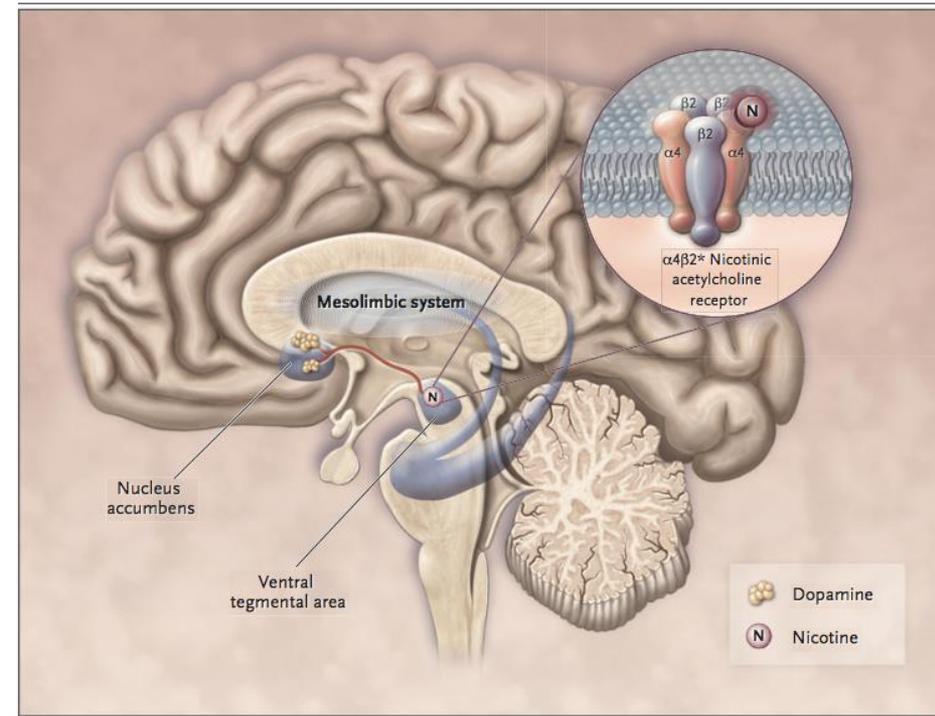
-ADICCIÓN AL TABACO: NICOTINA

-FUMADORES: 50% MORIRÁ EN FORMA PREMATURA

-SOLO 3% ADICTOS AL TABACO PUEDE DEJARLO EN FORMA VOLUNTARIA (FUERZA DE VOLUNTAD)



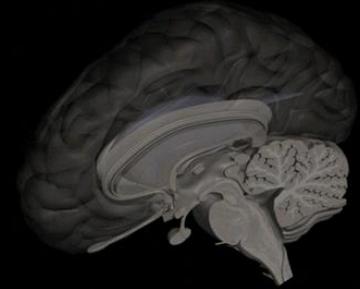
MECHANISMS OF DISEASE  
N ENGL J MED 362;24 NEJM.ORG JUNE 17, 2010



**Figure 2.** Role of the Mesolimbic Dopamine System in Nicotine Activity.

Nicotine activates  $\alpha_4\beta_2^*$  receptors in the ventral tegmental area, resulting in dopamine release in the shell of the nucleus accumbens.

# ALCOHOL



-CONSUMO SOCIAL v/s ALCOHOLISMO v/s BEBEDOR PROBLEMA

-IMPORTANTE HERRAMIENTA DE “SOCIABILIZACIÓN” Y DE “MULETA” PARA SUPERAR DÉFICITS DE DESARROLLO EMOCIONAL, EN FORMA PARTICULAR EN LA ADOLESCENCIA

-AUMENTO DE CONSUMO EN HOMBRES Y ESPECIALMENTE EN LAS MUJERES

-AUMENTO DE CONSUMO EXAGERADO EN FIESTAS LLEGANDO A INTOXICACIÓN (“TRANCAZO”): EFECTOS DAÑINOS A LARGO PLAZO EN EL CEREBRO

## Moderate alcohol consumption as risk factor for adverse brain outcomes and cognitive decline: longitudinal cohort study

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Additional material is published online only. To view please visit the journal online.

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<http://dx.doi.org/10.1136/bmj.j2353>

Accepted: 11 May 2017

### ABSTRACT

#### OBJECTIVES

To investigate whether moderate alcohol consumption has a favourable or adverse association or no association with brain structure and function.

#### DESIGN

Observational cohort study with weekly alcohol intake and cognitive performance measured repeatedly over 30 years (1985-2015). Multimodal magnetic resonance imaging (MRI) was performed at study endpoint (2012-15).

#### SETTING

Community dwelling adults enrolled in the Whitehall II cohort based in the UK (the Whitehall II imaging substudy).

#### PARTICIPANTS

550 men and women with mean age 43.0 (SD 5.4) at study baseline, none were "alcohol dependent" according to the CAGE screening questionnaire, and all safe to undergo MRI of the brain at follow-up. Twenty three were excluded because of incomplete or poor quality imaging data or gross structural abnormality (such as a brain cyst) or incomplete alcohol use, sociodemographic, health, or cognitive data.

#### MAIN OUTCOME MEASURES

Structural brain measures included hippocampal atrophy, grey matter density, and white matter microstructure. Functional measures included cognitive decline over the study and cross sectional cognitive performance at the time of scanning.

### WHAT IS ALREADY KNOWN ON THIS TOPIC

Heavy drinking is associated with Korsakoff's syndrome, dementia, and widespread brain atrophy

While smaller amounts of alcohol have been linked to protection against cognitive impairment, few studies have examined the effects of moderate alcohol on the brain

Previous studies have methodological limitations especially regarding the lack of prospective alcohol data, have been conflicting, and have failed to provide a convincing neural correlate

### WHAT THIS STUDY ADDS

Compared with abstinence, moderate alcohol intake is associated with increased risk of adverse brain outcomes and steeper cognitive decline in lexical fluency  
The hippocampus is particularly vulnerable, which has not been previously linked negatively with moderate alcohol use

No protective effect was found for small amounts of alcohol over abstinence, and previous reports claiming a protective effect of light drinking might have been subject to confounding by associations between increased alcohol and higher social class or IQ

### RESULTS

Higher alcohol consumption over the 30 year follow-up was associated with increased odds of hippocampal atrophy in a dose dependent fashion. While those consuming over 30 units a week were at the highest risk compared with abstainers (odds ratio 5.8, 95% confidence interval 1.8 to 18.6;  $P < 0.001$ ), even those drinking moderately (14-21 units/week) had three times the odds of right sided hippocampal atrophy (3.4, 1.4 to 8.1;  $P = 0.007$ ). There was no protective effect of light drinking (1-7 units/week) over abstinence. Higher alcohol use was also associated with differences in corpus callosum microstructure and faster decline in lexical fluency. No association was found with cross sectional cognitive performance or longitudinal changes in semantic fluency or word recall.

### CONCLUSIONS

Alcohol consumption, even at moderate levels, is associated with adverse brain outcomes including hippocampal atrophy. These results support the recent reduction in alcohol guidance in the UK and question the current limits recommended in the US.

### Introduction

Alcohol use is widespread and increasing across the developed world.<sup>1-3</sup> It has historically been viewed as harmless in moderation,<sup>4</sup> defined variably from 9-18 units (72-144 g) a week.<sup>5,6</sup> Recent evidence of associations with risk of cancer<sup>7</sup> has prompted revision of UK government alcohol guidance, though US Federal Dietary guidelines (2015-20) allow up to 24.5 units a week for men.<sup>8</sup> Even light drinking (midpoint <12.5g daily/8 units a week) has been associated with increased risk of oropharyngeal, oesophageal, and breast cancer.<sup>7,9</sup> While chronic dependent drinking is associated with Korsakoff syndrome and alcoholic dementia,<sup>10</sup> the long term effects of non-dependent alcohol consumption on the brain are poorly understood. Robust evidence of adverse associations would have vital implications for public health.

Some authors have suggested an inverted U shaped relation between alcohol use and brain outcomes, similar to that seen with cardiovascular disease. Light-to-moderate drinking has been associated with a lower risk of dementia<sup>11,12</sup> and a reduced incidence of myocardial infarction<sup>13</sup> and stroke.<sup>14</sup> Brain imaging studies, however, have thus far failed to provide a convincing neural correlate that could underpin any protective effect. Results of research into the effects of moderate alcohol on the brain are inconsistent.<sup>15</sup> Moderate alcohol consumption in older people has been

### Fractional anisotropy



### Radial diffusivity



### Mean diffusivity



### Axial diffusivity

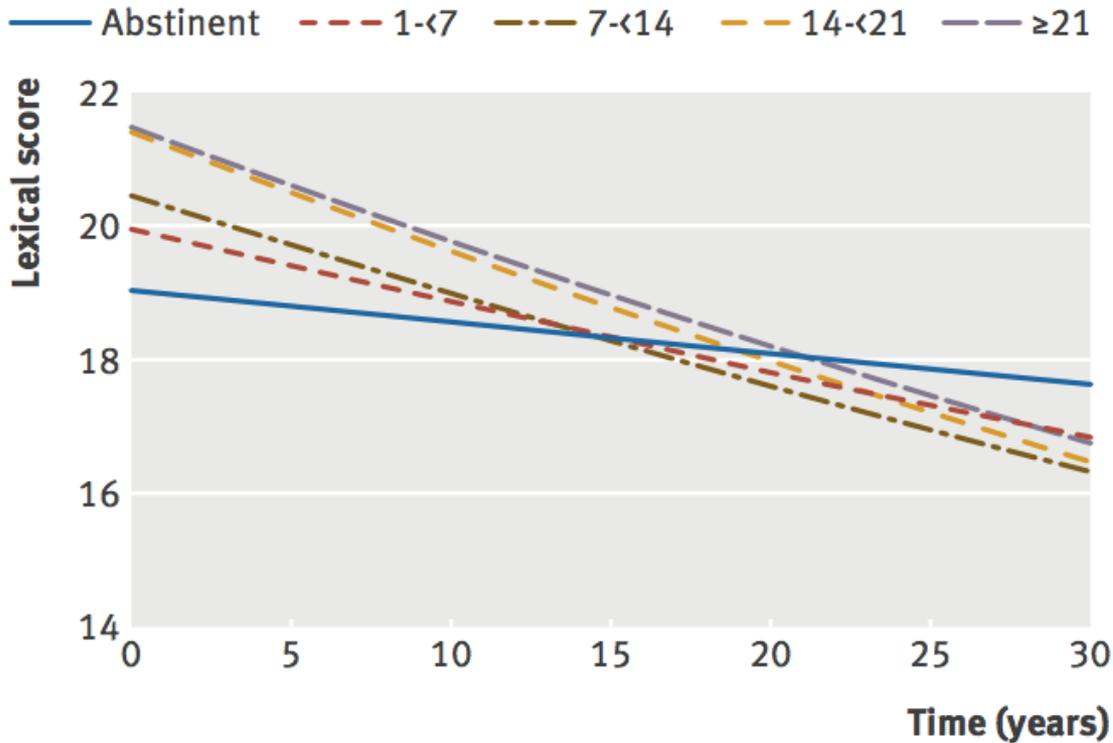


P values 0.01 0.05



Fig 5 | Tract based spatial statistics results (corrected for threshold-free cluster enhancement, TFCE) showing negative correlation between average alcohol across study (all phases) and fractional anisotropy, and positive correlations with radial diffusivity, mean diffusivity, and axial diffusivity in 511 participants. Adjusted for age, sex, education, premorbid IQ, social class, physical exercise, club attendance, social activity, Framingham stroke risk score, psychotropic drugs, and history of major depressive disorder

## Weekly alcohol consumption (units)

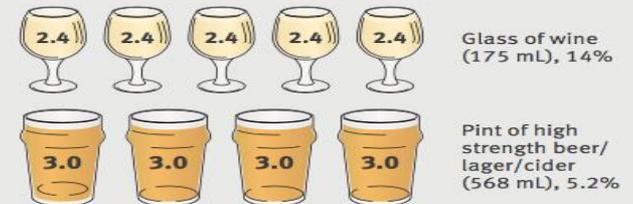


**Fig 6 | Predicted longitudinal change in cognitive test scores (lexical and semantic fluency, word recall “memory”) for man of mean age (70) and premorbid IQ (118), median education (15 years), social class I and Framingham stroke risk score (10%) according to average alcohol consumption (weekly units). Predictions made on basis of mixed effects models with cognitive testing performed at phases 3, 5, 7, 9, and 11 and time of scan**



### How much alcohol is there in a standard drink?

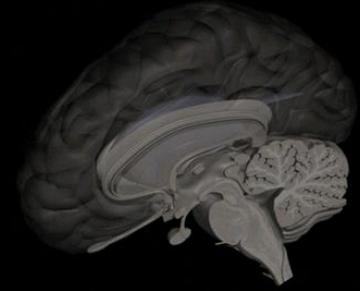
1 unit contains 10 mL or 8 g of alcohol  
 14 units (UK guidance per week for men and women) is equivalent to 4 pints of high strength beer or 5 large glasses of 14% wine (see below)  
 24.5 units (US guidance for men) is equivalent to 7 pints of beer or 9 glasses of wine



**Fig 1 | UK 2016 guidelines on alcohol consumption (see [www.alcoholconcern.org.uk/help-and-advice/help-and-advice-with-your-drinking/unit-calculator/](http://www.alcoholconcern.org.uk/help-and-advice/help-and-advice-with-your-drinking/unit-calculator/)) (redrawn from Alcohol Concern, 2016)**

doi: 10.1136/bmj.j2353 | *BMJ* 2017;357:j2353 | [thebmj](http://www.bmj.com)

# MARIHUANA



- CANNABIS, FAMILIA DE PLANTAS ORIGINARIAS DEL HIMALAYA CON PROPIEDADES PSICOACTIVAS
- PLANTA (CÁÑAMO) SE USA PARA FABRICAR CUERDAS Y COMO ALIMENTO PARA EL GANADO
- USADA CON FINES MEDICINALES DESDE EL 4000 A.C.
- MARIHUANA O CANNABIS SE USA COMO TÉRMINO PARA DENOMINAR A LAS FLORES FEMENINAS DE LA PLANTA (“COGOLLOS”)
- HABITUALMENTE SE LE FUMA O INHALA EN PIPAS



## MARIHUANA

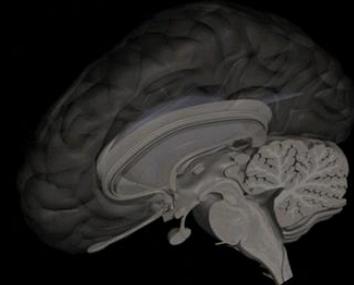
-SE DENOMINA CANNABINOIDES A LOS PRINCIPIOS QUÍMICOS QUE SE ENCUENTRAN EN LA PLANTA (400 COMPONENTES)

-LOS CANNABINOIDES ACTÚAN EN RECEPTORES CELULARES Y MODULAN LA LIBERACIÓN DE NEUROTRANSMISORES EN EL CEREBRO

-LOS PRINCIPALES CANNABINOIDES SON:

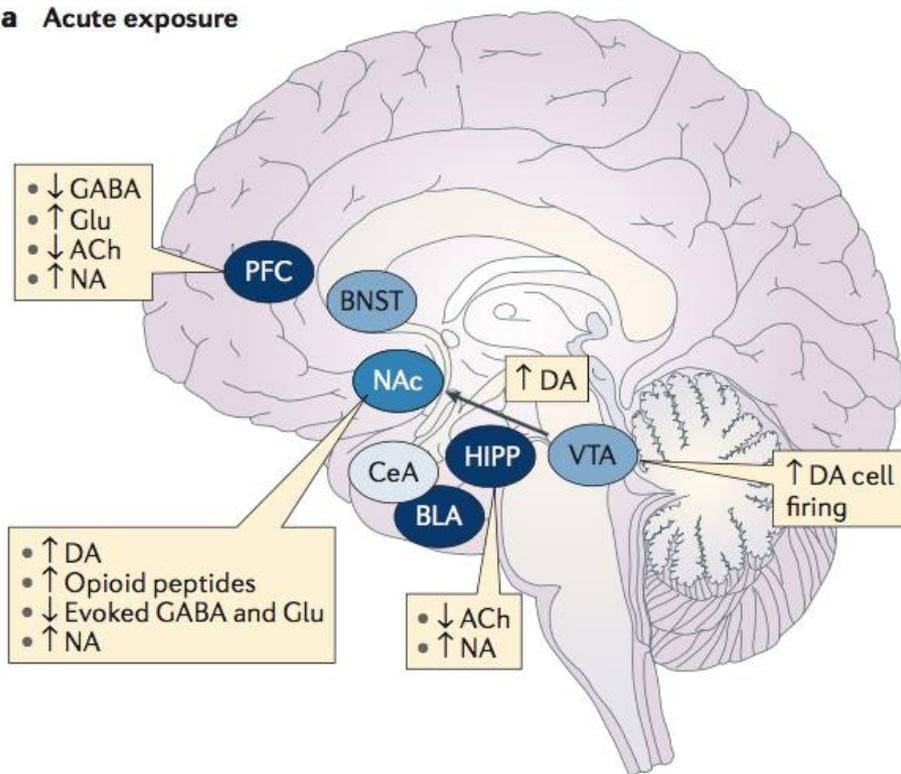
THC (TETRAHIDROCANNABINOL)  
CANNABIDIOL  
CANNABINOL

# SITIOS DE ACCIÓN Y NEUROTRANSMISORES AFECTADOS POR EL USO DE MARIHUANA

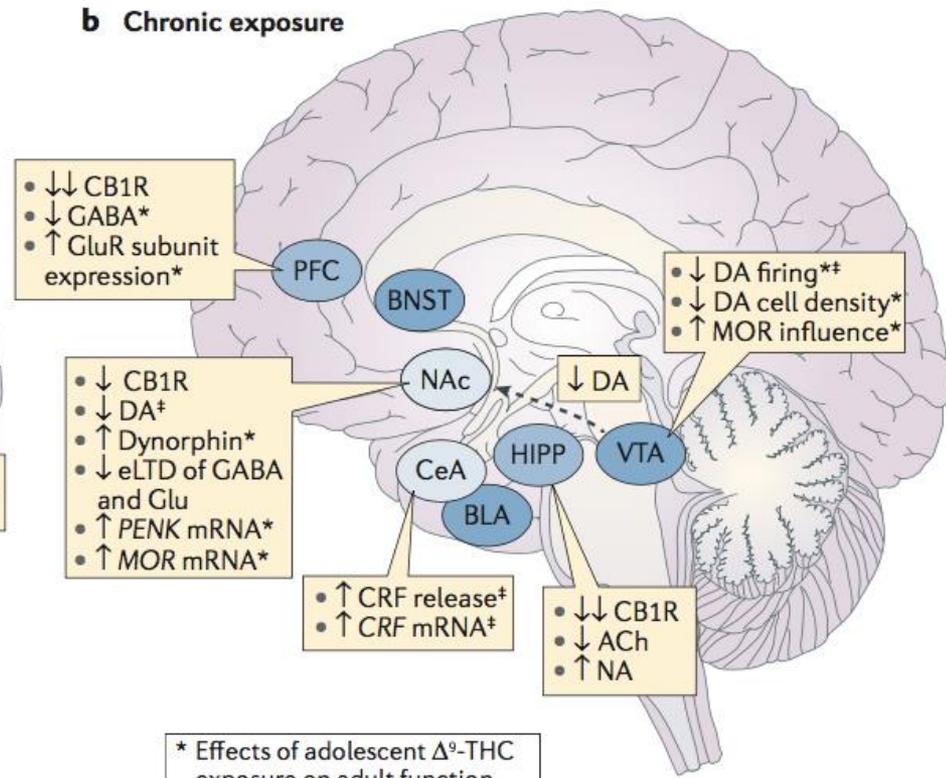


## REVIEWS

### a Acute exposure



### b Chronic exposure



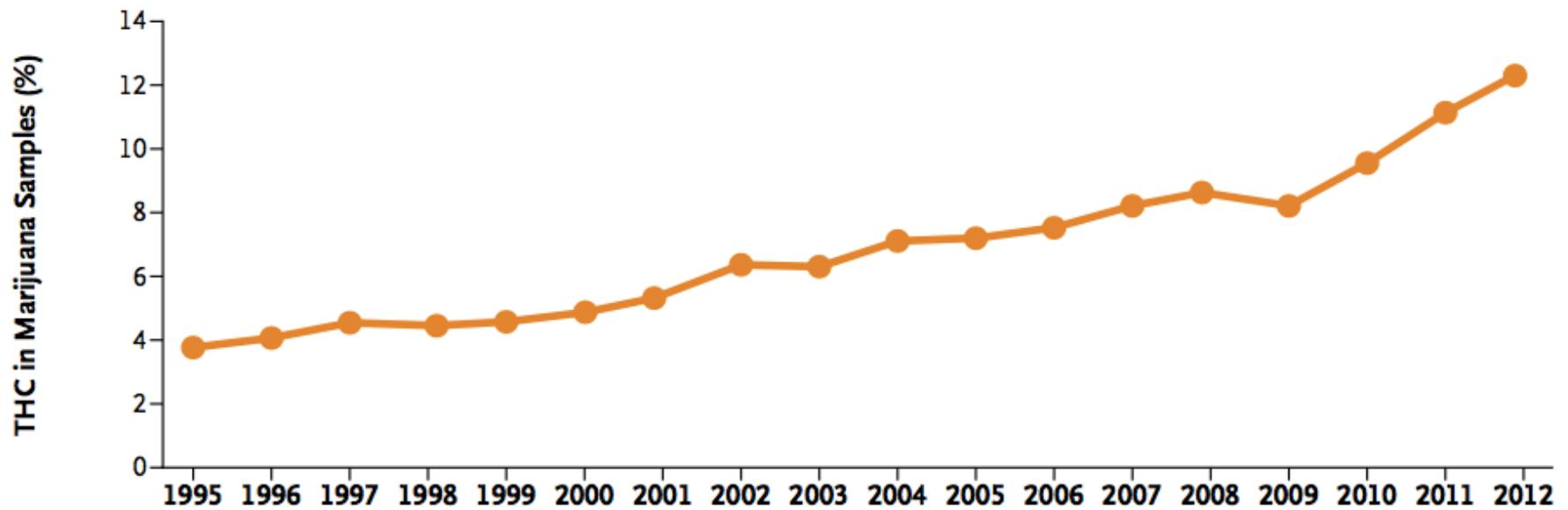
\* Effects of adolescent  $\Delta^9$ -THC exposure on adult function  
 ‡ Effects during withdrawal





## ADVERSE HEALTH EFFECTS OF MARIJUANA USE

### A Potency of THC



N ENGL J MED 370;23 NEJM.ORG JUNE 5, 2014

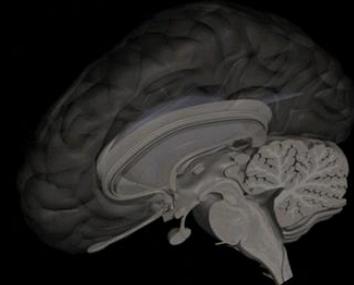
The New England Journal of Medicine



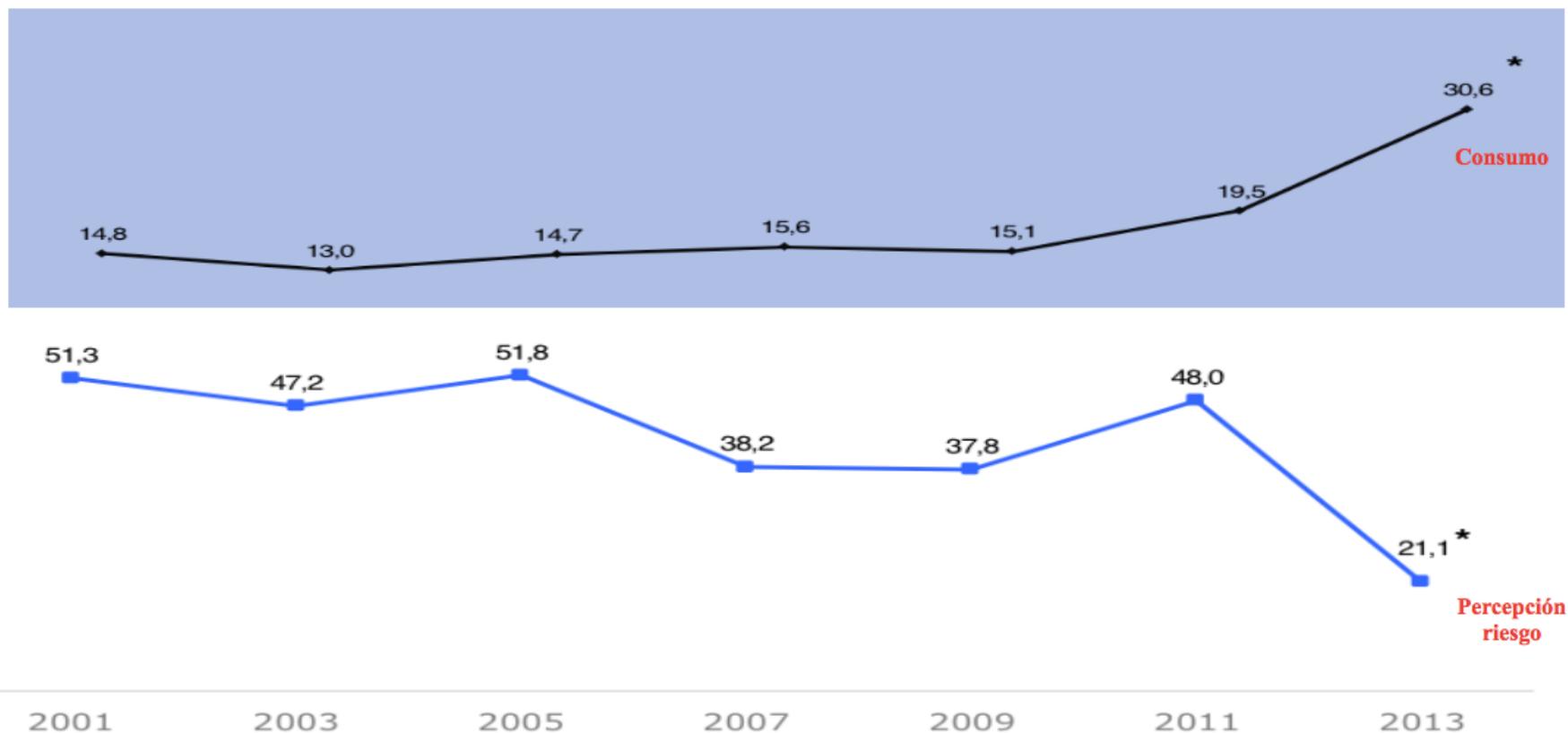
Tabla 1: Edad de inicio de uso de drogas, población entre los 12 y 49 años de edad

	Tabaco	Alcohol	Marihuana	Cocaína	Pasta Base
Estados Unidos (2013)	17.8	17.3	18	20.4	
Chile (2014)	16.3	17.2	18.2	21.4	20.6

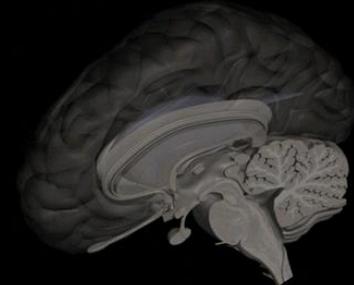
*Fuente: Décimo Primer Estudio Nacional de Drogas en Población General de Chile (SENDA, 2014); Results from the 2013 National Survey on Drug Use and Health: Summary of National Findings.*



## Evolución de la percepción de riesgo de consumir marihuana frecuentemente. Chile, 2001-2013.

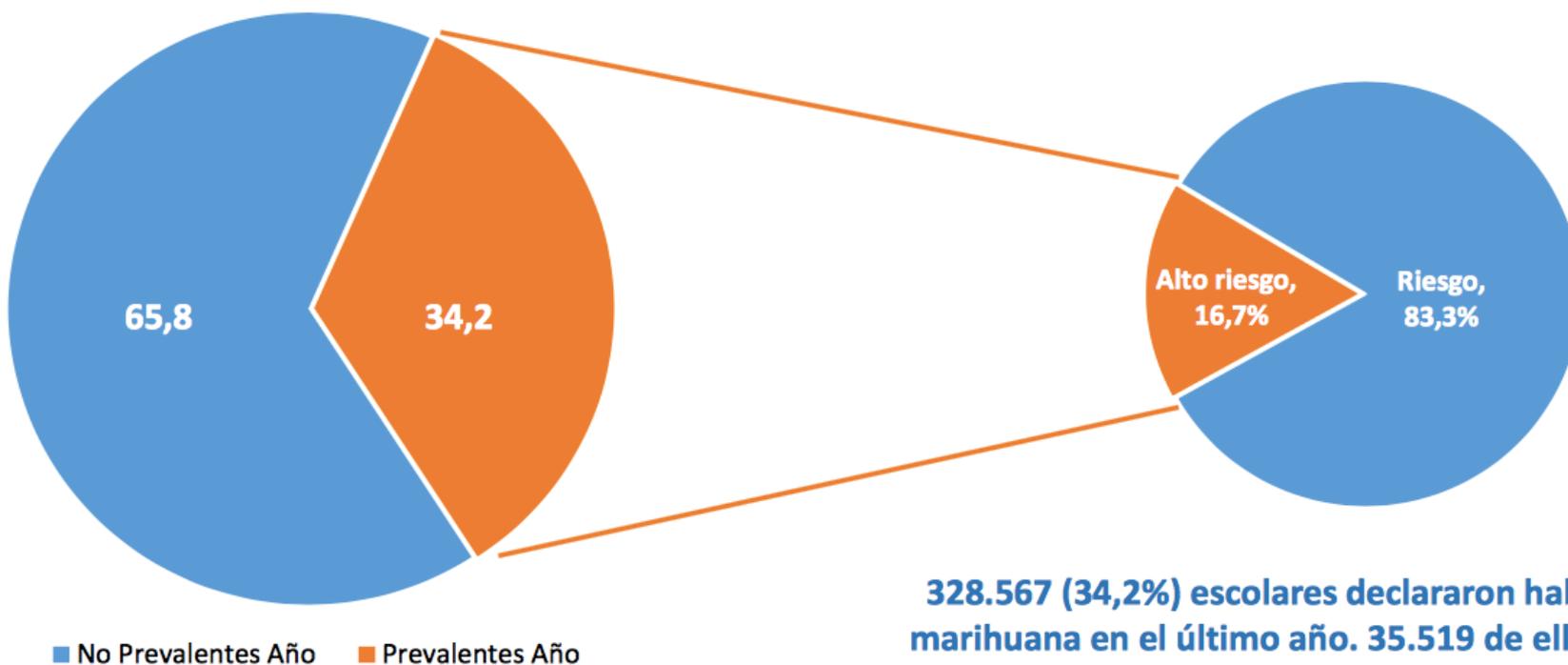


\* Variación significativa al 5%

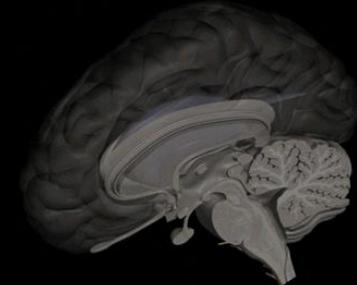


## Distribución de consumo y consumo de alto riesgo de marihuana en último año.

Total país, 2015

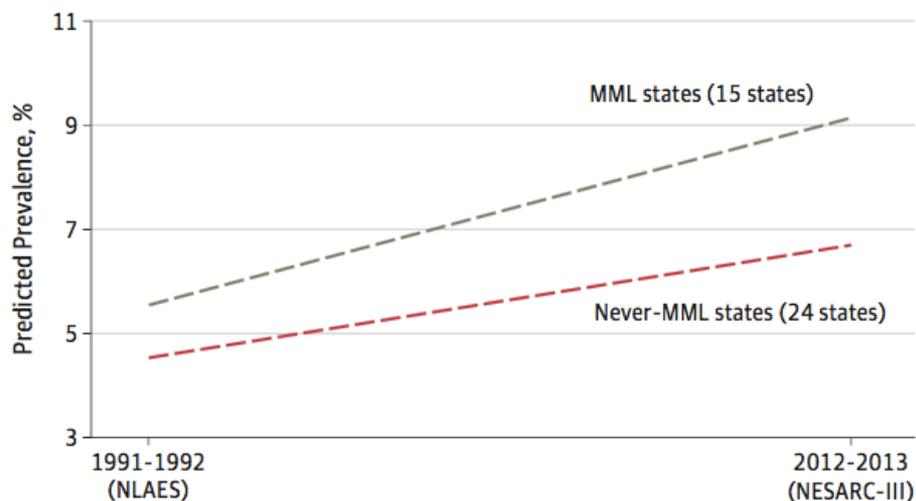


**328.567 (34,2%)** escolares declararon haber consumido marihuana en el último año. **35.519** de ellos (1 de cada 5) presentaron consumo de alto nivel de riesgo a esta droga.



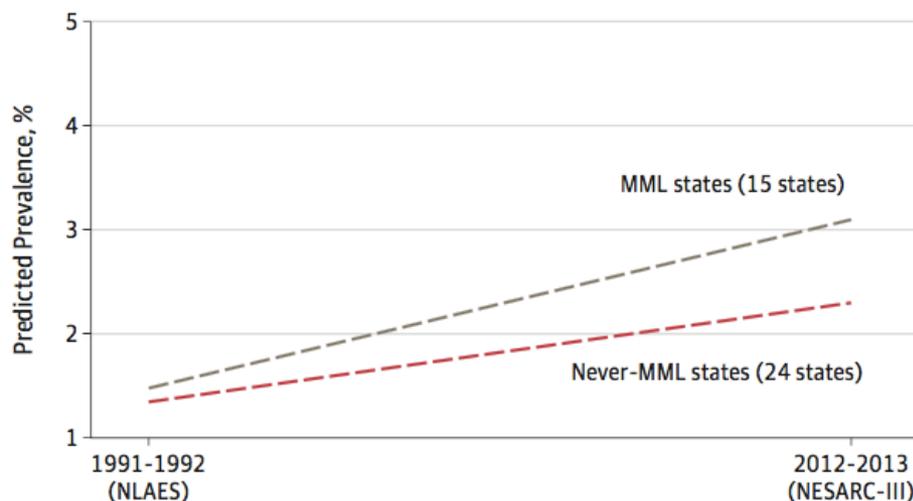
**Figure 1. Medical Marijuana Laws (MML) and Marijuana Use in the Past 12 Months**

**A** 1991-1992 to 2012-2013 (overall period)



**Figure 2. Medical Marijuana Laws (MML) and DSM-IV Cannabis Use Disorder in the Past 12 Months**

**A** 1991-1992 to 2012-2013 (overall period)



JAMA Psychiatry | Original Investigation

## US Adult Illicit Cannabis Use, Cannabis Use Disorder, and Medical Marijuana Laws 1991-1992 to 2012-2013

Deborah S. Hasin, PhD; Aaron L. Sarvet, MPH; Magdalena Cerdá, DrPH; Katherine M. Keyes, PhD; Malka Stohl, MS; Sandro Galea, MD, DrPH; Melanie M. Wall, PhD

## MARIHUANA: EFECTOS A CORTO PLAZO DE SU USO



- EUFORIA, RELAJACIÓN, A VECES ANSIEDAD: “LA PÁLIDA”, AUMENTO DEL APETITO, ENROJECIMIENTO DE LAS CONJUNTIVAS
- FALLA EN LA COORDINACIÓN MOTORA, INTERFIERE CON LA CAPACIDAD DE CONDUCIR VEHÍCULOS, AUMENTA AL DOBLE EL RIESGO DE UN ACCIDENTE EN AUTOMOVIL
- ALTERACIÓN DEL JUICIO, AUMENTO DE CONDUCTAS SEXUALES DE RIESGO, CON POSIBILIDAD DE ADQUIRIR ENFERMEDADES DE TRANSMISIÓN SEXUAL
- DETERIORO DE MEMORIA A CORTO PLAZO, DIFICULTAD PARA APRENDER Y RETENER LA INFORMACIÓN

MARIHUANA:



EFFECTOS A LARGO PLAZO O EN USO INTENSIVO EN ADOLESCENTES

-ADICCIÓN

-DESARROLLO CEREBRAL ALTERADO

-PEOR DESEMPEÑO ESCOLAR (Y ABANDONO DE ESTUDIOS)

-MENOR COEFICIENTE INTELECTUAL

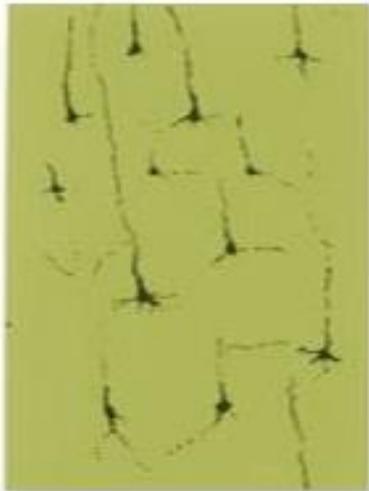
-MENOR NIVEL DE AUTOSATISFACCIÓN DE SU VIDA Y LOGROS

-MAYOR RIESGO DE ESQUIZOFRENIA





## Desarrollo neuronal hasta los 3 años



Neuronas  
al nacer



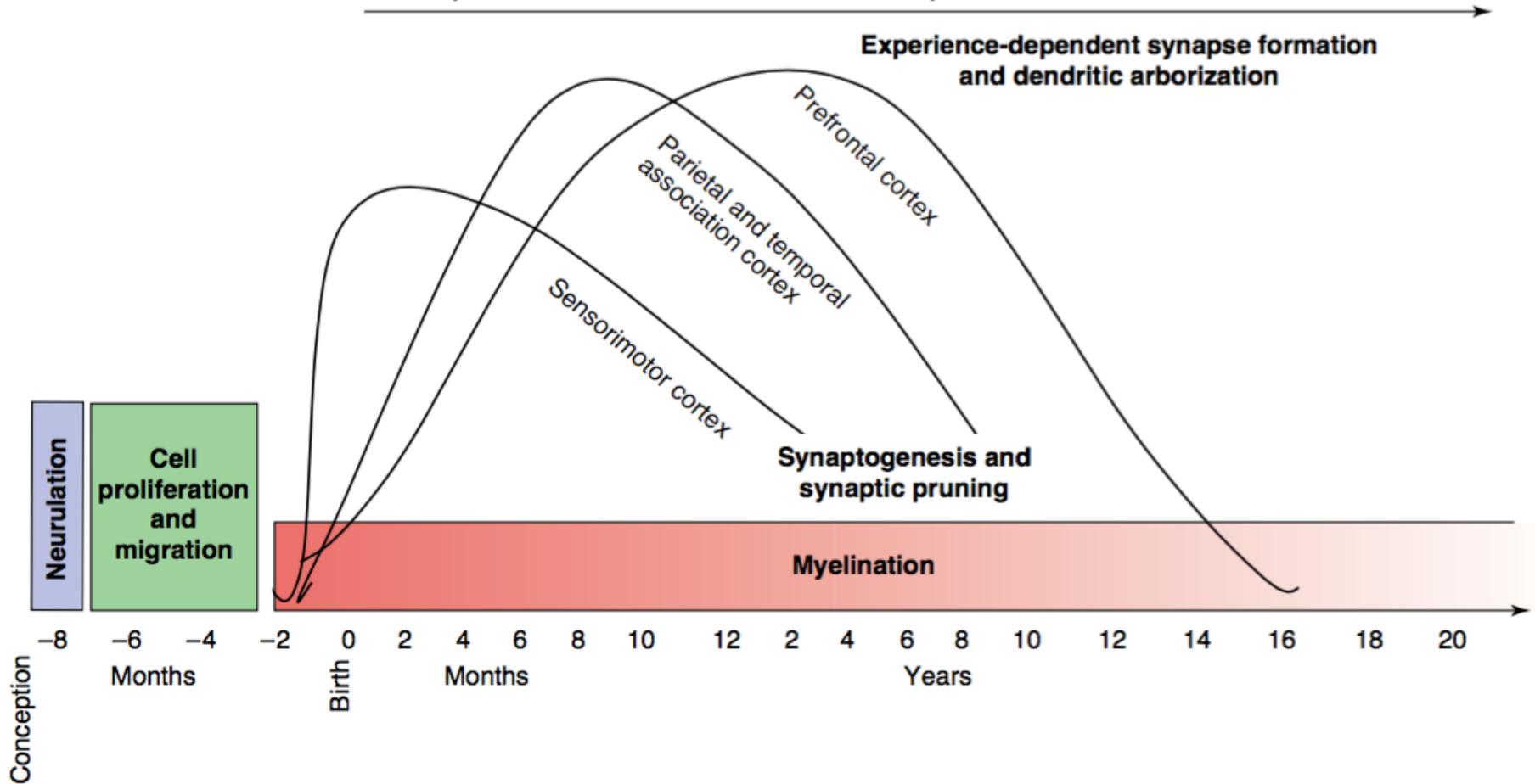
Neuronas  
a los 3 meses



Neuronas  
a los 3 años



## Developmental course of human brain development



# Evidence for the Risks and Consequences of Adolescent Cannabis Exposure



Amir Levine, MD, Kelly Clemenza, BA, Moira Rynn, MD, Jeffrey Lieberman, MD

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**Objective:** This review of the scientific literature examines the potential adult sequelae of exposure to cannabis and related synthetic cannabinoids in adolescence. We examine the four neuropsychiatric outcomes that are likely most vulnerable to alteration by early cannabinoid use, as identified within both the clinical and preclinical research: cognition, emotional functioning, risk for psychosis, and addiction.

**Method:** A literature search was conducted through PubMed, PsychInfo, and Google Scholar with no publication date restrictions. The search terms used were “adolescent” and “adult,” and either “cannabis,” “marijuana,” “delta-9-tetra-hydrocannabinol,” or “cannabinoid,” which was then crossed with one or more of the following terms: “deficit,” “impairment,” “alteration,” “long-term,” “persistent,” “development,” “maturation,” and “pubescent.”

**Results:** The majority of the clinical and preclinical data point to a strong correlation between adolescent cannabinoid exposure and persistent, adverse neuropsychiatric outcomes in adulthood. Although the literature supports the hypothesis that adolescent cannabis use is connected to impaired cognition and mental health in adults, it does not conclusively demonstrate that cannabis consumption alone is sufficient to cause these

deficits in humans. The animal literature, however, clearly indicates that adolescent-onset exposure to cannabinoids can catalyze molecular processes that lead to persistent functional deficits in adulthood, deficits that are not found to follow adult-onset exposure and that model some of the adverse outcomes reported in humans among adult populations of early-onset cannabis users.

**Conclusion:** Based on the data in the current literature, a strong association is found between early, frequent, and heavy adolescent cannabis exposure and poor cognitive and psychiatric outcomes in adulthood, yet definite conclusions cannot yet be made as to whether cannabis use alone has a negative impact on the human adolescent brain. Future research will require animal models and longitudinal studies to be carefully designed with a focus on integrating assessments of molecular, structural, and behavioral outcomes in order to elucidate the full range of potential adverse and long-term consequences of cannabinoid exposure in adolescence.

**Key words:** adolescent cannabis use, executive function, affect, psychosis, cross-sensitization

*J Am Acad Child Adolesc Psychiatry* 2017;56(3):214–225.

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## ADOLESCENTES QUE CONSUMEN CANNABIS:



-MAYOR RIESGO DE ENFERMEDADES PSIQUIÁTRICAS

-MAYOR RIESGO DIFICULTADES DE APRENDIZAJE

-MAYOR RIESGO DE SUICIDIO Y ADICCIÓN VIDA ADULTA

-A MENOR EDAD DE INICIO DE CONSUMO, MAYOR RIESGO

-A MAYOR FRECUENCIA DE CONSUMO, MAYOR RIESGO

## MARIHUANA DAÑA LA MEMORIA VERBAL EN ADULTEZ:

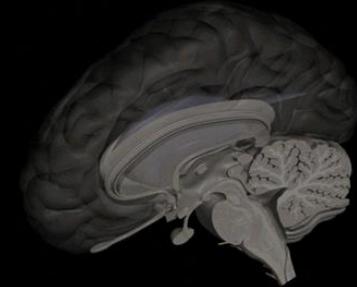
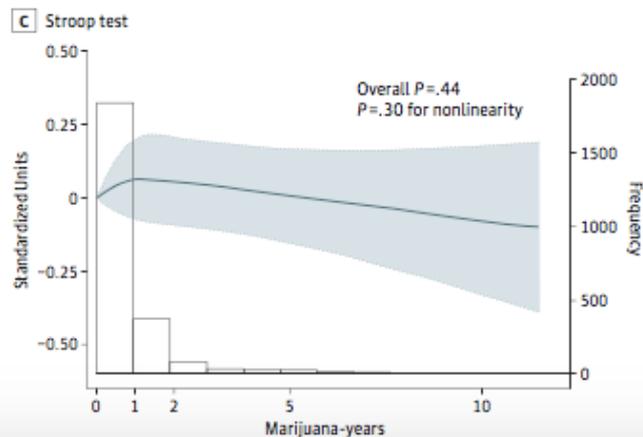
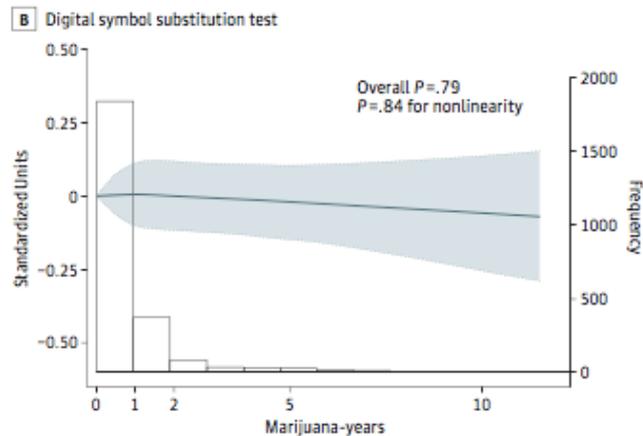
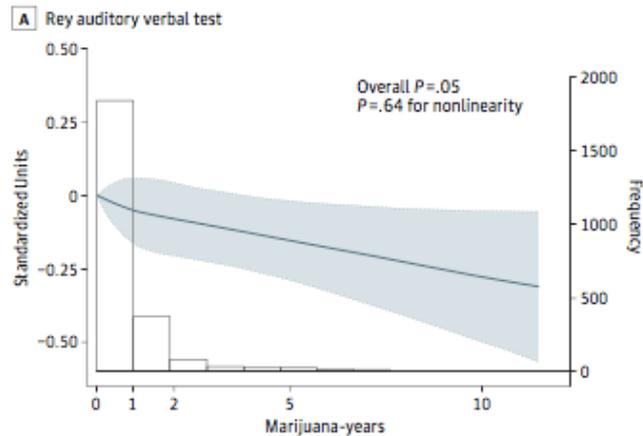


-EFECTO A LARGO PLAZO EN EL CEREBRO ADULTO

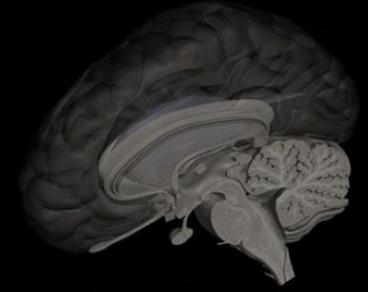
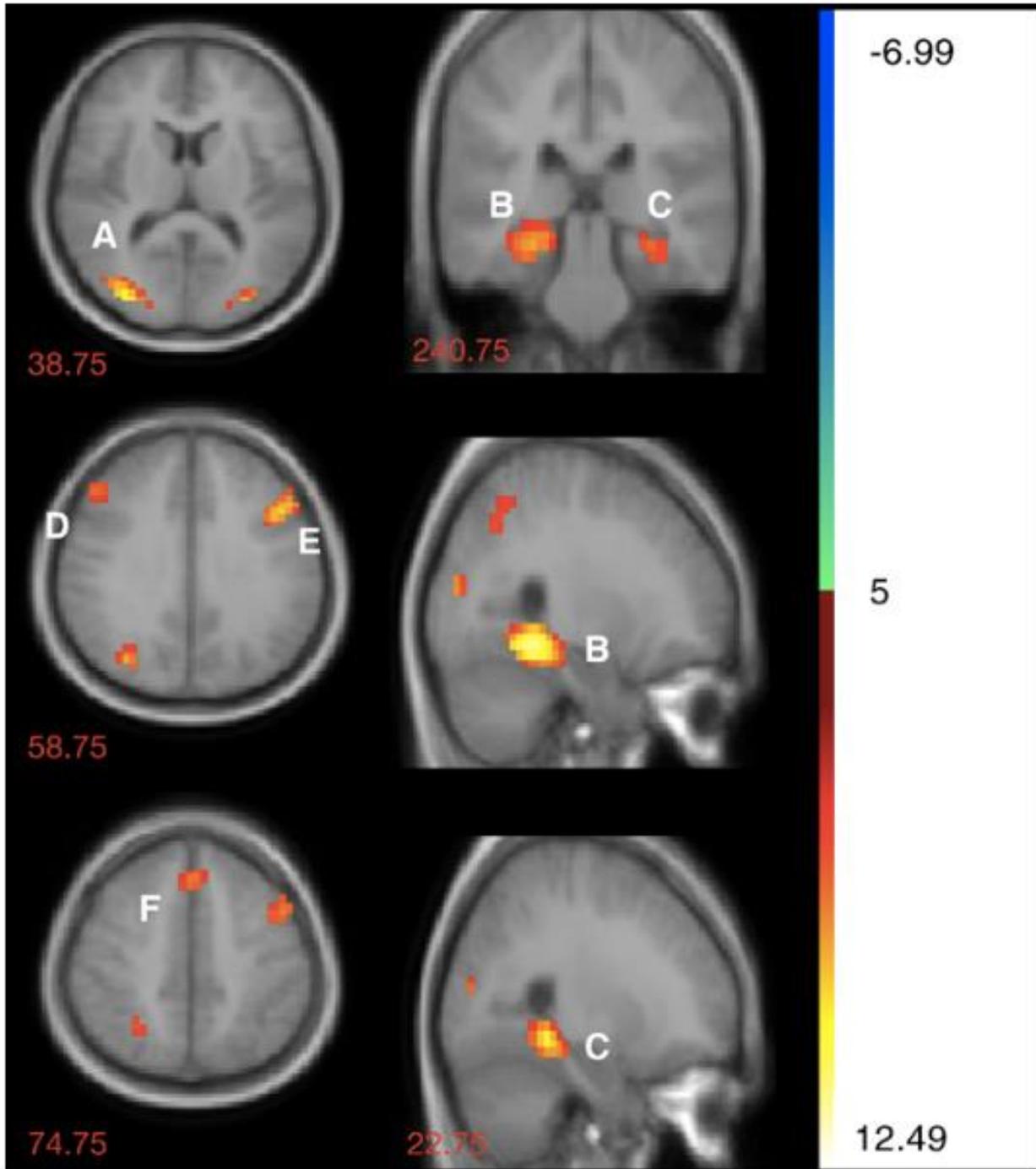
-EN UNA LISTA DE 15 PALABRAS, UNA DE CADA DOS PERSONAS OLVIDARÁ 1 PALABRA POR CADA 5 AÑOS DE CONSUMO (EN RELACIÓN A UN GRUPO CONTROL SIN CONSUMO)

-EL COMPROMISO COGNITIVO DE LA MARIHUANA PERSISTE MÁS ALLÁ DEL TIEMPO DE CONSUMO (HASTA 15 AÑOS)

Figure. Associations Between Lifetime Exposure to Marijuana and Cognitive Function



## EFFECTOS A LARGO PLAZO EN LA FUNCIÓN INTELECTUAL DE ADULTOS EXPUESTOS AL USO “RECREATIVO” DE LA MARIHUANA



# IMÁGENES DE RMN CEREBRAL FUNCIONAL CON DIFERENTES TÉCNICAS QUE PERMITEN EVALUAR LA FUNCIÓN DEL CEREBRO

## MARIHUANA: ALTERACIÓN DEL FUNCIONAMIENTO DEL HIPOCAMPO

European Neuropsychopharmacology (2007) 17, 289-297



www.elsevier.com/locate/euroneuro



Effects of frequent cannabis use on hippocampal activity during an associative memory task

Gerry Jager <sup>a,\*</sup>, Hendrika H. Van Hell <sup>a</sup>, Maartje M.L. De Win <sup>b</sup>, Rene S. Kahn <sup>a</sup>, Wim Van Den Brink <sup>c</sup>, Jan M. Van Ree <sup>d</sup>, Nick F. Ramsey <sup>a</sup>

## MARIHUANA :



-RIESGO DE ADICCIÓN: 9% DE LOS QUE LA CONSUMEN

-SI LA FUMAN DIARIAMENTE: 1 DE CADA 2 (4) LLEGARÁ A SER ADICTO

-EN UNA LISTA DE 15 PALABRAS, UNA DE CADA DOS PERSONAS OLVIDARÁ 1 PALABRA POR CADA 5 AÑOS DE CONSUMO (EN RELACIÓN A UN GRUPO CONTROL SIN CONSUMO)

## CONCLUSIONES



HAY UNA REALIDAD: EL CONSUMO DE DROGAS VA EN AUMENTO

HAY UNA SEGUNDA REALIDAD: LAS DROGAS CAUSAN DAÑO AL CEREBRO

HAY UNA ESPERANZA:

DAR A CONOCER LA VERDAD DE LAS CONSECUENCIAS DE LAS DROGAS  
PARA FRENAR ESTO Y CAMBIAR LA REALIDAD ACTUAL

