

# La psychose et la ville

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Un webinaire présenté par les axes Éthique et Santé mentale des  
populations du RRSPQ en collaboration avec le réseau Qualaxia

25 septembre 2019



Réseau de recherche  
en santé des populations  
du Québec **RRSPQ**

Fonds de recherche  
Santé  
Québec 

  
réseau **qualaxia** network  
vivre en bonne santé mentale



## Psychosis

### Positive symptoms

- Delusions
- Hallucinations
- Thought disorder

### Negative symptoms

- Blunted affect
- Poverty of thought, speech
- Avolition

Chronic vs. brief

Schizophrenia



## Psychosis

- Lifetime prevalence: about one person in 100
- Of symptoms: 5.3 in 100
- Annual incidence: about one person in 250
- Psychotic symptoms vs. disorder
- Continuum hypothesis
- Median prevalence: about 5%



## Psychosis

- Genetic factors important
- About 40% monozygotic concordance rate
- The psychotic brain
- Aside: the dopamine hypothesis



## Psychosis

Some risk factors:

- Problems during pregnancy
- Winter birth
- Older father
- Drugs of abuse (esp. cannabis and methamphetamine)



## Social risk factors

- Childhood adversity (e.g. death of a parent, abuse, bullying)



- Immigration
- Urban environment

## Immigration

- First and second generation
- First: roughly double the risk
- Second: effect of skin colour – up to five times the risk



## MENTAL DISORDERS IN URBAN AREAS

AN ECOLOGICAL STUDY  
OF SCHIZOPHRENIA AND OTHER  
PSYCHOSES

By  
ROBERT E. L. FARIS  
AND  
H. WARREN DUNHAM

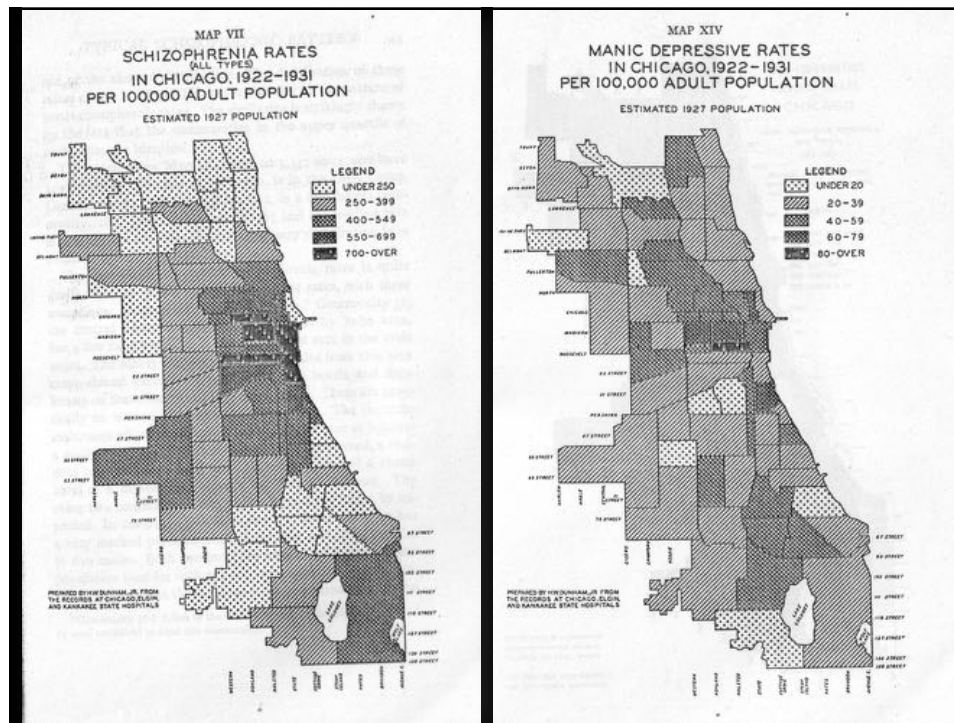
*With a new preface by the authors*



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NEW YORK  
1909

## Cities

- Faris and Dunham (1939)
- Higher rates of schizophrenia in inner-city neighborhoods
- Characterized by social disorganization and social isolation
- No parallel differences in the rates of bipolar disorder
- Subsequent research: the city effect is really a population (and population density) effect
- Meta-analysis in 2012: near-linear effect



Reference	Exposure factor	Outcome	Effect size	95% CI [Lower level; upper level]
Peen et al. (2010) (6)	Urban vs. rural	Any disorder <sup>2</sup>	1.38 (OR)	[1.17; 1.64]
	Urban vs. rural	Mood disorder <sup>2</sup>	1.39 (OR)	[1.23; 1.58]
	Urban vs. rural	Anxiety disorder <sup>2</sup>	1.21 (OR)	[1.02; 1.42]
	Urban vs. rural	Substance use disorder <sup>2</sup>	1.31 (OR)	[0.97; 1.78]
Vassos et al. (2012) (15)	Continuous urbanicity index	Schizophrenia	2.38 (OR)	[2.01; 2.81]
Pedersen & Mortensen (2001) (14)	Per 15 years lived in capital city vs. rural area	Schizophrenia <sup>3</sup>	2.75 (RR)	[2.31; 3.28]
	Per 15 years lived in capital suburb vs. rural area	Schizophrenia <sup>3</sup>	1.69 (RR)	[1.43; 1.99]
	Per 15 years lived in provincial city vs. rural area	Schizophrenia <sup>3</sup>	1.71 (RR)	[1.41; 2.06]
	Per 15 years lived in provincial town vs. rural area	Schizophrenia <sup>3</sup>	1.32 (RR)	[1.13; 1.54]
Mortensen et al. (1999) (23)	Place of birth: Capital vs. rural area	Schizophrenia <sup>3</sup>	2.40 (RR)	[2.13; 2.70]
	Place of birth: Capital suburb vs. rural area	Schizophrenia <sup>3</sup>	1.62 (RR)	[1.37; 1.90]
	Place of birth: Provincial city vs. rural area	Schizophrenia <sup>3</sup>	1.57 (RR)	[1.36; 1.81]
	Place of birth: Provincial town vs. rural area	Schizophrenia <sup>3</sup>	1.24 (RR)	[1.10; 1.41]
Cantor-Graae & Selten (2005) (e10)	First generation migrants vs. natives	Schizophrenia	2.7 (RR)	[2.3; 3.2]
	Second generation migrants vs. natives	Schizophrenia	4.5 (RR)	[1.5; 13.1]
	First and second generation migrants vs. natives	Schizophrenia	2.9 (RR)	[2.5; 3.49]
Vieling et al. (2008) (34)	Immigrant vs. Dutch in urban area of low ethnic density	Psychotic disorder <sup>3</sup>	2.36 (IRR)	[1.89; 2.95]

<sup>1</sup>Selective summary results of studies using meta analyses (6, 15, e10) or large population sizes (>1.75 million) (14, 23).  
<sup>2</sup>Provincial cities had more than 100 000 inhabitants and provincial towns more than 10 000 inhabitants (14, 23).  
 We also included one study that looked at psychotic disorders among immigrants in The Hague, Netherlands (34), to cover inner urban differences in mental health.  
<sup>3</sup>Unadjusted, <sup>4</sup>adjusted.  
 CI, confidence interval; IRR=incidence rate ratio; OR=Odds ratio; RR=Risk ratio.

(Gruebner et al., 2017)

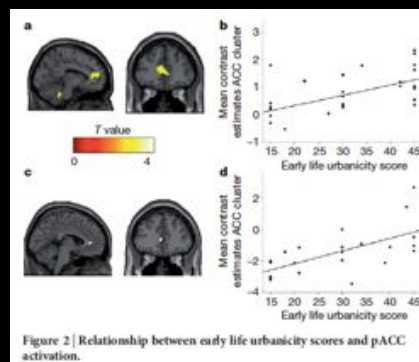
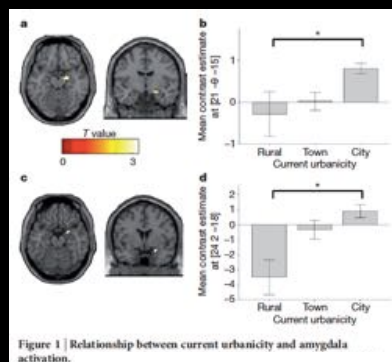


A Low-income countries			B Middle-income countries		
Country	No. of Respondents	OR (95% CI)	Country	No. of Respondents	OR (95% CI)
Bangladesh	5942	0.95 (0.63-1.42)	Bosnia and Herzegovina	1031	1.70 (0.54-5.38)
Burkina Faso	4948	1.40 (0.98-2.00)	Brazil	5000	1.08 (0.83-1.40)
Chad	4870	1.37 (0.87-2.16)	Croatia	993	0.73 (0.38-1.39)
Ethiopia	5089	1.00 (0.64-1.57)	Czech Republic	949	0.48 (0.24-0.97)
Ghana	4165	0.74 (0.49-1.12)	Dominican Republic	5027	0.95 (0.64-1.42)
Kenya	4640	0.60 (0.34-1.04)	Ecuador	5675	1.11 (0.67-1.85)
Laos	4988	1.59 (1.09-2.33)	Estonia	1020	2.11 (1.20-3.72)
Malawi	5551	0.80 (0.48-1.32)	Georgia	2950	0.76 (0.24-2.42)
Mali	4886	1.52 (1.09-2.12)	Hungary	1419	0.63 (0.41-0.97)
Mauritania	3902	1.71 (0.89-3.28)	Kazakhstan	4499	0.42 (0.17-1.03)
Myanmar	6045	0.71 (0.21-2.47)	Latvia	929	0.77 (0.44-1.37)
Nepal	8820	0.76 (0.62-0.92)	Malaysia	6145	0.86 (0.64-1.14)
Pakistan	6501	1.89 (0.98-3.62)	Mauritius	3968	0.68 (0.37-1.26)
Senegal	3461	1.16 (0.81-1.65)	Mexico	38746	1.26 (1.03-1.54)
Vietnam	4174	0.26 (0.07-0.98)	Morocco	5000	1.56 (1.13-2.17)
Zambia	4165	0.79 (0.56-1.11)	Namibia	4379	1.25 (0.91-1.72)
Zimbabwe	4290	0.89 (0.55-1.42)	Paraguay	5288	1.24 (0.96-1.59)
Overall heterogeneity:	86 437	1.03 (0.86-1.23)	Philippines	10083	0.95 (0.68-1.34)
$I^2 = 63.6\%$ , $P < .001$			Slovakia	2535	1.21 (0.45-3.25)
			South Africa	2629	0.43 (0.27-0.70)
			Sri Lanka	6805	1.77 (0.91-3.43)
			Swaziland	3117	0.90 (0.62-1.31)
			Tunisia	5202	0.75 (0.53-1.07)
			Ukraine	2860	0.86 (0.48-1.53)
			Uruguay	2996	1.28 (0.58-2.82)
			Overall heterogeneity:	129245	0.97 (0.84-1.12)
			$I^2 = 59.8\%$ , $P < .001$		

DeVylder et al. (2018)

## Cities and the brain

- Current city living: increased amygdala activity
- Urban upbringing: perigenual anterior cingulate cortex (pACC: regulation of amygdala, negative affect, stress)



Lederbogen et al. (2011)

## Physical causes

Obstetric complications

Maternal influenza and nutrition

Winter birth excess of schizophrenia is stronger in cities

Drug use (some contribution)

## Social drift

Prospective study of 1.89 million Danes: moving to a more urban environment raised the risk of schizophrenia, and movement in the other direction lowered it.

Diagnosis of schizophrenia not associated with increased likelihood of moving to a city

Generational social drift?

## Social causes

- Socioeconomic status increases the risk (?)
- Isolation increases the risk
- Fragmentation: up to 13-fold greater in the most fragmented neighborhoods compared to the least fragmented.
- Cohesion: ethnic density as protective

BRITISH JOURNAL OF PSYCHIATRY (2005), 187, 101–102

## Social defeat: risk factor for schizophrenia?

JEAN-PAUL SELTEN and ELIZABETH CANTOR-GRAAE

Social defeat



HPA axis



Cortisol



Dopamine



Psychosis



Social conflict: the resident-intruder test

### Social Defeat as Actual Encounter

- By social defeat I mean what the ethologists mean: an actual social encounter in which one person physically or symbolically loses to another one . . . [in which] another person . . . [d]emeans them, humiliates them, subordinates them. (Luhmann, 2007:151)

### Social Defeat as Social Disadvantage

- Intersectionality

### Social Defeat as Sensitization

- Anticipation and response to social encounters

### Social Defeat as Aspiration-achievement Discrepancy

- Second-generation immigrants



## Social defeat in cities

### Social Defeat as Actual Encounter

- more encounters in cities?
- more frequent negative encounters (e.g., crime)?
- encounters are more negative?

### Social Defeat as Social Disadvantage

- greater inequality in cities independent of the city?
- rises with population?
- unemployment vs. vulnerable employment: a function of population?

### Social Defeat as Sensitization

- more anticipation? because more encounters?
- will it rise with population?

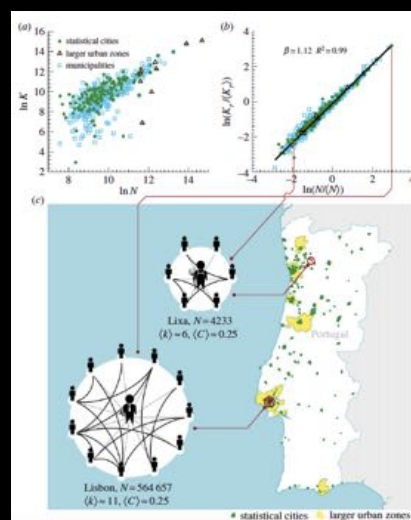
### Social Defeat as Aspiration-achievement Discrepancy

- relevance of socioeconomic structure of different cities?
- rises with population?

## Methodological issues

- The need for (a) determine hypotheses and (b) fine-grained data
- Illustration of (b): voter turnout as a measure of cohesion: for every 1 percent increase in voter numbers, a 5 percent decrease in cases of psychosis (Kirkbride et al., 2007)
- Computational social science: possibilities of big data

Schl pfer et al (2014)



## Implications for theory

Need for inter-disciplinary:

... the main difficulty with the research is that there has been surprisingly little work on the concept of a city. Studies have generally aimed to try to quantify, rather than understand, the association between the urban environment and schizophrenia. (Boydell & McKenzie, 2008:91)

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... the main difficulty with the research is that there has been surprisingly little work on the concept of a city. Studies have generally aimed to try to quantify, rather than understand, the association between the urban environment and schizophrenia. (Boydell & McKenzie, 2008:91)



## Psychiatry Research Neuroimaging

Association of excessive social media use with abnormal white matter integrity of the corpus callosum

Qinzhua He<sup>1</sup>, Ofir Turel<sup>1</sup>, EB<sup>2</sup>, Antoine Bechara<sup>3</sup>

## Implications for theory

This finding may provide better understanding of the mechanisms by which urban living may contribute to psychosis risk in high-income countries, because urban-rural patterns of cannabis use, racial discrimination, and socioeconomic disparities may vary between developing and developed nations. (DeVylder et al., 2018:E1)

## Implications for theory

- Environment as subordinate in explanation: modulator of biology
- Why? A conflation between **illness** (biological) and **theory of illness** (who knows?)

## Implications for theory

### The nature of explanation

Analogy: receptive fields in visual neurons

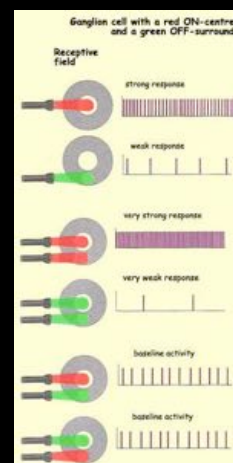
To understand neurons, we have to understand what the neuron is supposed to be doing.

Neural function here is characterized with reference to properties of the environment.

The case of social life

We need a (prior) **theory** of the social environment no less than a neural theory.

**The situated brain:** Real social science and new biological hypotheses



## Delusions

The NSA is listening to my phone conversations.  
 My girlfriend is cheating on me with President Obama.  
 My actions are being controlled by the CEO of Apple.  
 Vladimir Putin is putting thoughts into my head.  
 I can fly.  
 I am the chief disciple of the Buddha.  
 Meryl Streep is madly in love with me.  
 My organs are rotting.  
 I caused the earthquake in Haiti.  
 God has destroyed all human life.  
 The television is sending me messages.  
 There is a stranger living in my bathroom mirror.

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 God has destroyed all human life.  
 The television is sending me messages.  
 There is a stranger living in my bathroom mirror.  
 My penis is being absorbed into my body.  
 Having been bitten by a dog, I'm pregnant with puppies.  
 I'm being buried in sand.

Diagnosis: formal features

An alternative: what are delusions about?

Table 1

Form	English	African	Jamaican	Continental European	English speaking Non-European*	Asian	Middle Eastern	Far Eastern	Caribbean
Persecutory	26	45	37	14	11	22	9	7	31
Reference	16	11	9	8	3	12	6	13	11
Grandiose and religious	11	19	21	8	8	8	6	7	8
Sensual and fantastic	14	6	15	7	3	4	0	27	10

\*North American, White South African, Australian and New Zealanders.

Source: Nijhar and Vaher (1984).

Form	Sydney	Form	Tokyo	Vienna	Tübingen	Form	Seoul	Shanghai	Taipei
Persecutory	26.0	Persecutory	75.9	70.3	72.7	Persecutory	72.3	78.9	74.1
Religious	26.7	Religious	8.0	14.9	18.0	Reference	6.0	54.2	59.0
Grandiose	23.2	Poisoning	8.0	14.9	18.0	Grandiose	46.2	27.5	38.8
Reference	15.6	Jealousy	1.9	1.0	6.0	Control	36.5	23.9	30.0
Somatic	14.4	Being stolen from	4.9	2.0	2.7	Somatic	23.4	14.1	24.5
Mind Control	4.4	Paranoia	0.9	3.0	2.0	Guilt	31.2	4.9	3.8
Guilt	4.4	Misuse/ grandeur/ special ability	19.4	19.8	18.7	Jealousy	17.0	8.5	3.6
Mind reading	4.4	Economia	6.5	5.9	6.7	Poverty	2.1	4.2	5.0
Thought broadcasting	3.3	Discontent	2.8	1.0	0.7	Nihilism	0.7	2.1	3.6
Trumanizing devices*	3.3	Pregnancy	0.9	3.0	0.7				
Thought withdrawal	3.3	Resurrection	0	1.0	0				
Believing that a stranger is in one's room	2.2	Insults	0.3	0	0.7				
Believing that they are someone else	2.2	Hypochondria/ dying	8.6	19.8	9.3				
Believing someone is in love with them	2.2	Guilt/ sin	4.9	20.8	15.3				
Extraterrestrial <sup>†</sup>	2.2	Being dead	0.3	5.9	0.7				
Other delusions <sup>‡</sup>	6.7	Poverty	0	1.0	2.0				
		Death of relations	3.4	1.0	2.7				
		World catastrophe	2.5	2.0	4.7				
		Separation of being	1.5	3.0	1.3				
		Homosexual	0	0	0				
		Others	5.9	10.9	8.0				
		Religious	6.8	19.8	21.3				

Source: Tajima et al. (1989).

\*Trumanizing devices refer to delusions (often involving physical characteristics) derived from movies.

†Extraterrestrial refers to delusions (often involving space travel, alien and unidentified flying objects).

‡Other delusions included persistence of each of the following: delusions, thought insertion, withdrawal, identity, personality, status and mood, and non-grandiose, have different ways of thinking.

Source: Brakouli et al. (2008).

Source: Subtil and Cochrane (2002).

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## Form and content



Table 1

Form	Continental					English speaking				
	English	African	American	European	European*	Asian	Middle Eastern	Far Eastern	Caribbean	
Persecutory	26	45	37	14	11	22	9	7	31	
Reference	16	11	9	8	3	12	6	13	11	
Grandiose and religious	11	19	21	8	8	8	6	7	8	
Sensual and fantastic	14	6	15	7	3	4	0	27	10	

\*North Americans, White South Africans, Australians and New Zealanders.  
Source: Nijhar and Vaher (1984)

Form	Sydney				Form	Seoul			
	Persecutory	Religious	Grandiose	Reference		Persecutory	Reference	Grandiose	Control
Persecutory	30.0	26.7	23.2	15.6	Persecutory	22.3	28.9	29.1	
Religious					Reference	6.0	54.2	59.0	
Grandiose					Grandiose	48.2	27.5	38.8	
Reference					Control	36.5	23.9	20.9	
Sensual	14.4				Sensual	23.8	14.1	24.5	
Mixed Control	4.4				Guilt	31.2	4.9	3.8	
Guilt	4.4				Jealousy	17.0	8.5	3.6	
Mixed reading	4.4				Poverty	2.1	4.2	5.0	
Thought broadening	3.3				Nihilism	0.7	2.1	2.6	

Source: Kim et al. (2001)

Thought withdrawal	3.3	Resurrection	0	1.0	0	Form	Western Turkey	Central Turkey
Believing that a stranger is a close relative	2.2	Insertion	0.3	0	0.7	Persecutory	74.7	83.7
Believing that they are someone else	2.2	Hypochondria/delus	4.6	19.8	8.3	Reference	37.7	26.9
Believing someone is in love with them	2.2	Guilt	4.9	20.8	15.2	Persecion	9.5	26.2
Extraterrestrial?	2.2	Being dead	0.3	5.9	0.7	Religious	80.9	20.9
Other delusions?	6.7	Poverty	0	1.0	2.0	Grandiosio	10.0	19.8
		Death of relatives	2.4	1.0	2.7	Being controlled	6.0	19.8
		World catastrophe	2.5	2.0	4.7	Mixed reading	4.5	17.4
		Separation	1.5	3.0	1.3	Jealousy	3.5	14.0
						Guilt/sin	0.5	13.4

Source: Balakrishnan et al. (2008)

delusional beliefs involving extraterrestrial, alienating, or misperceptions	Belief	6.8	19.8	21.3	Enkennismis	2.5	9.3
Extraterrestrial refers to extraterrestrial beliefs involving space, aliens and unidentified flying objects	Form				Thought broadening	0.5	11.1
Alienating refers to delusional beliefs involving space, aliens and unidentified flying objects	White		British	Pakistani	Thought insertion	1.0	9.3
Misperceptions refers to delusional beliefs involving space, aliens and unidentified flying objects	Persecution	48	60	62	Nihilism	4.0	5.2
Other delusions refers to delusional beliefs involving space, aliens and unidentified flying objects	Control	50	26	13	Thought withdrawal	0.5	5.2
	Reference	48	43	11	Jealousy	0	2.5
	Grandiose	26	19	28	Individuality	0	2.5
	Being controlled	4	23	42	Hypochondria	0	2.5
	Guilt	14	23	42	Paranoia	0	1.3

Source: Balakrishnan et al. (2008)

Stigmatised	14	21	11	catastrophe		
Sensual	14	13	16	Resurrection	0	1.2
Depersonalisation	18	11	2	Others	4.5	0.6
Hypochondriacal	8	17	5			
Misinterpretation	8	6	8			

Source: Geco et al. (2010)

Source: Balakrishnan et al. (2008)

Form	British				Form	Western Turkey			
	Persecutory	Religious	Grandiose	Reference	Persecutory	Reference	Grandiose	Control	
Persecutory	30.0	26.7	23.2	15.6	Persecutory	24.6	83.7		
Religious					Reference	37.7	26.9		
Grandiose					Grandiose	9.5	26.2		
Reference					Religious	80.9	20.9		
Sensual	14.4				Grandiose	10.0	19.8		
Mixed Control	4.4				Being controlled	6.0	19.8		
Guilt	4.4				Mixed reading	4.5	17.4		
Mixed reading	4.4				Jealousy	3.5	14.0		
Thought broadening	3.3				Guilt	0.5	13.4		
Thought withdrawal	3.3				Hypochondria	1.0	12.2		
Believing that a stranger is a close relative	2.2				Erkennismis	2.5	6.3		
Believing that they are someone else	2.2				Thought broadening	0.5	11.1		
Believing someone is in love with them	2.2				Thought insertion	1.0	9.3		
Extraterrestrial?	2.2				Nihilism	4.0	5.2		
Other delusions?	6.7				Thought withdrawal	0.5	5.2		

Source: Balakrishnan et al. (2008)

Form	British				Form	Western Turkey			
	Persecutory	Religious	Grandiose	Reference	Persecutory	Reference	Grandiose	Control	
Persecutory	30.0	26.7	23.2	15.6	Persecutory	24.6	83.7		
Religious					Reference	37.7	26.9		
Grandiose					Grandiose	9.5	26.2		
Reference					Religious	80.9	20.9		
Sensual	14.4				Grandiose	10.0	19.8		
Mixed Control	4.4				Being controlled	6.0	19.8		
Guilt	4.4				Mixed reading	4.5	17.4		
Mixed reading	4.4				Jealousy	3.5	14.0		
Thought broadening	3.3				Guilt	0.5	13.4		
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Extraterrestrial?	2.2				Nihilism	4.0	5.2		
Other delusions?	6.7				Thought withdrawal	0.5	5.2		

Source: Balakrishnan et al. (2008)

Table 3				
	Continental	English speaking	Middle	Far
Persecutory	30.0	26.7	23.2	15.6
Religious				
Grandiose				
Reference				
Sensual	14.4			
Mixed Control	4.4			
Guilt	4.4			
Mixed reading	4.4			
Thought broadening	3.3			
Thought withdrawal	3.3			
Believing that a stranger is a close relative	2.2			
Believing that they are someone else	2.2			
Believing someone is in love with them	2.2			
Extraterrestrial?	2.2			
Other delusions?	6.7			

Source: Balakrishnan et al. (2008)

Form	British				Form	Western Turkey			
	Persecutory	Religious	Grandiose	Reference		Persecutory	Reference	Grandiose	Control
Persecutory	30.0	26.7	23.2	15.6	Persecutory	24.6	83.7		
Religious					Reference	37.7	26.9		
Grandiose					Grandiose	9.5	26.2		
Reference					Religious	80.9	20.9		
Sensual	14.4				Grandiose	10.0	19.8		
Mixed Control	4.4				Being controlled	6.0	19.8		
Guilt	4.4				Mixed reading	4.5	17.4		
Mixed reading	4.4				Jealousy	3.5	14.0		
Thought broadening	3.3				Guilt	0.5	13.4		
Thought withdrawal	3.3				Hypochondria	1.0	12.2		
Believing that a stranger is a close relative	2.2				Erkennismis	2.5	6.3		
Believing that they are someone else	2.2				Thought broadening	0.5	11.1		
Believing someone is in love with them	2.2				Thought insertion	1.0	9.3		
Extraterrestrial?	2.2				Nihilism	4.0	5.2		
Other delusions?	6.7				Thought withdrawal	0.5	5.2		

Source: Balakrishnan et al. (2008)

Beyond formal features									
Form	Industry	Form	Industry	Form	Industry	Form	Industry	Form	Industry
Persecutory	30.0	Persecutory	75.6	Visual	22.7	Persecutory	72.2	Visual	76.1
Religious	26.7	Religious		Visual		Religious	6.0	Visual	54.7
Grandiose		Grandiose	8.0	Visual	14.0	Grandiose	40.2	Visual	3.0
Reference		Reference		Visual		Reference		Visual	
Sensual	14.4	Sensual		Visual		Sensual		Visual	
Mixed Control	4.4	Mixed Control		Visual		Mixed Control		Visual	
Guilt	4.4	Guilt		Visual		Guilt		Visual	
Mixed reading	4.4	Mixed reading		Visual		Mixed reading		Visual	
Thought broadening	3.3	Thought broadening		Visual		Thought broadening		Visual	
Thought withdrawal	3.3	Thought withdrawal		Visual		Thought withdrawal		Visual	
Believing that a stranger is a close relative	2.2	Believing that a stranger is a close relative		Visual		Believing that a stranger is a close relative		Visual	
Believing that they are someone else	2.2	Believing that they are someone else		Visual		Believing that they are someone else		Visual	
Believing someone is in love with them	2.2	Believing someone is in love with them		Visual		Believing someone is in love with them		Visual	
Extraterrestrial?	2.2	Extraterrestrial?		Visual		Extraterrestrial?		Visual	
Other delusions?	6.7	Other delusions?		Visual		Other delusions?		Visual	

Source: Balakrishnan et al. (2008)

Persecutory	34.8	Religious	33.9	1.0	2.7	Somatically	22.6	18.1	24.5
Mixed/Control	4.8	Grandiose	0.0	3.0	2.0	Guilt	20.2	4.9	5.8
Guilt	4.8	Misdeeds/	19.4	19.8	18.7	Anhedonia	17.0	8.5	5.6
Mixed/misdeeds	4.8	special ability				Poverty	2.3	4.2	5.0
Threatful	3.3	Control	0.0	2.0	0.0	Misdeeds	0.7	2.1	5.6

Table 1

Form	English	African	American	Continental European	English speaking New Europe	Asian	Middle Eastern	Far Eastern	Caribbean
Persecution	26	40	37	34	31	22	6	7	31
Reference	36	31	6	6	3	12	6	13	31
Jealousy and religion	11	19	21	6	6	6	6	7	6
Control and thought	34	6	11	7	3	6	6	27	30

Beyond formal features

Content: social – threat

Form	English	French	Italian	German	Spanish	Portuguese	Swedish	Thailand	Japan
Persecution	26	40	37	34	31	22	6	7	31
Reference	36	31	6	6	3	12	6	13	31
Jealousy and religion	11	19	21	6	6	6	6	7	6
Control and thought	34	6	11	7	3	6	6	27	30

Grandiosity (religion)  
Erotomania

Body  
Guilt  
Nihilism

Misidentification  
Reference

Table 1

Form	English	African	American	Continental European	English speaking New Europe	Asian	Middle Eastern	Far Eastern	Caribbean
Persecution	26	40	37	34	31	22	6	7	31
Reference	36	31	6	6	3	12	6	13	31
Jealousy and religion	11	19	21	6	6	6	6	7	6
Control and thought	34	6	11	7	3	6	6	27	30

Beyond formal features

Content: social – threat, power

Form	English	French	Italian	German	Spanish	Portuguese	Swedish	Thailand	Japan
Persecution	26	40	37	34	31	22	6	7	31
Reference	36	31	6	6	3	12	6	13	31
Jealousy and religion	11	19	21	6	6	6	6	7	6
Control and thought	34	6	11	7	3	6	6	27	30

Grandiosity (religion)  
Erotomania

Body  
Guilt  
Nihilism

Misidentification  
Reference

Table 1

Form	English speaking									
	English	African American	Hispanic	European	European	Asian	Middle Eastern	Far Eastern	Caribbean	Other
Persecution	26	31	27	24	21	22	2	7	21	11
Jealousy	35	31	27	24	21	22	2	7	21	11
Control	31	31	27	24	21	22	2	7	21	11
Thought	31	31	27	24	21	22	2	7	21	11
Form and content	31	31	27	24	21	22	2	7	21	11
Persecution (religion)	31	31	27	24	21	22	2	7	21	11
Jealousy	31	31	27	24	21	22	2	7	21	11
Control	31	31	27	24	21	22	2	7	21	11
Thought	31	31	27	24	21	22	2	7	21	11
Grandiosity (religion)	31	31	27	24	21	22	2	7	21	11
Erotomania	31	31	27	24	21	22	2	7	21	11
Body	31	31	27	24	21	22	2	7	21	11
Guilt	31	31	27	24	21	22	2	7	21	11
Nihilism	31	31	27	24	21	22	2	7	21	11
Misidentification	31	31	27	24	21	22	2	7	21	11
Reference	31	31	27	24	21	22	2	7	21	11

Beyond formal features

Content: social – threat, power

Setting aside the others

Form and content

Persecution (religion)

Jealousy

Control

Thought

Grandiosity (religion)

Erotomania

Body

Guilt

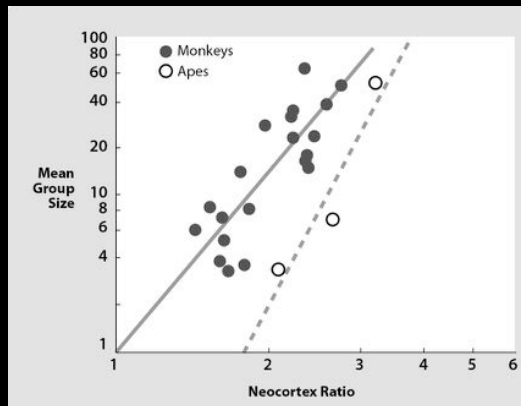
Nihilism

Misidentification

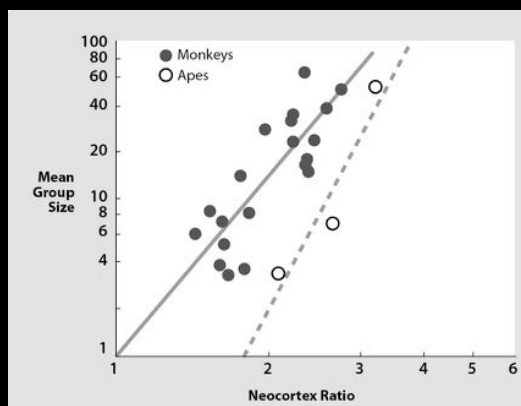
Reference

Big brains

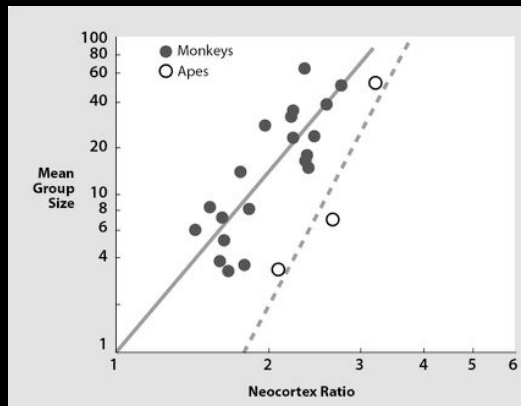
## Big brains



## The social brain hypothesis

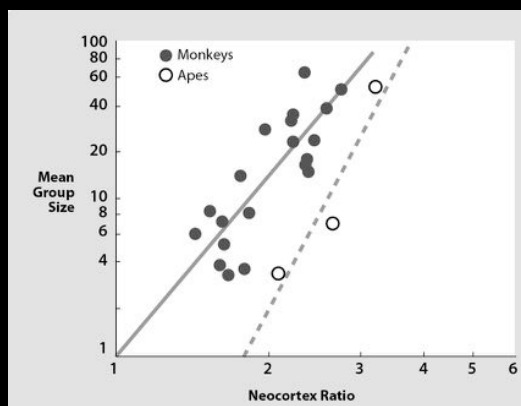


## The social brain hypothesis



Cooperation

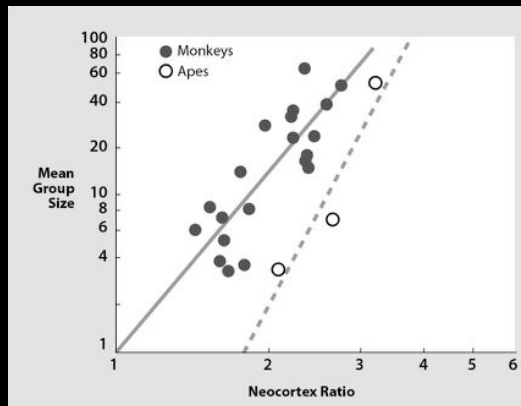
## The social brain hypothesis



Cooperation

Exploitation

## The social brain hypothesis

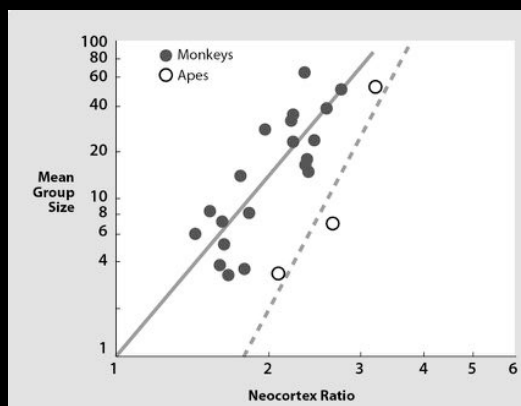


Cooperation

Exploitation

Cooperation stops

## The social brain hypothesis



Cooperation

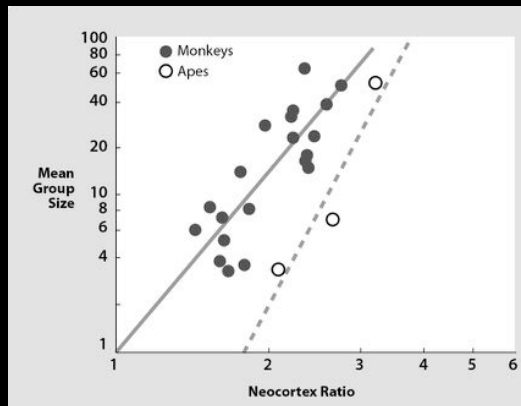
Exploitation

Cooperation stops

Defense:



## The social brain hypothesis



Cooperation

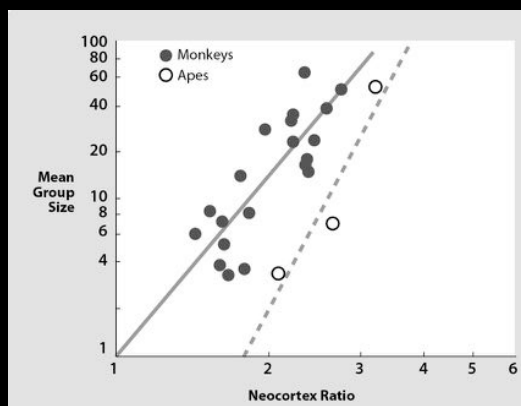
Exploitation

Cooperation stops

Defense:

Gossip

## The social brain hypothesis



Cooperation

Exploitation

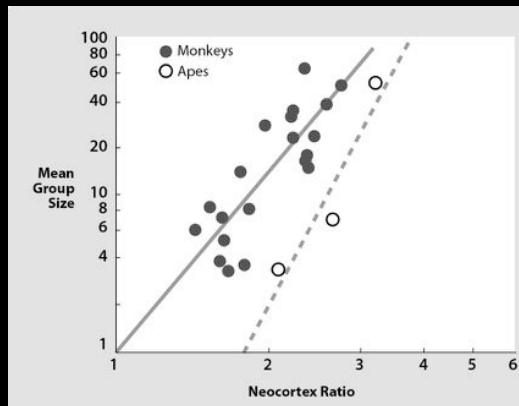
Cooperation stops

Defense:

Gossip

Reputation

## The social brain hypothesis



Cooperation

Exploitation

Cooperation stops

Defense:

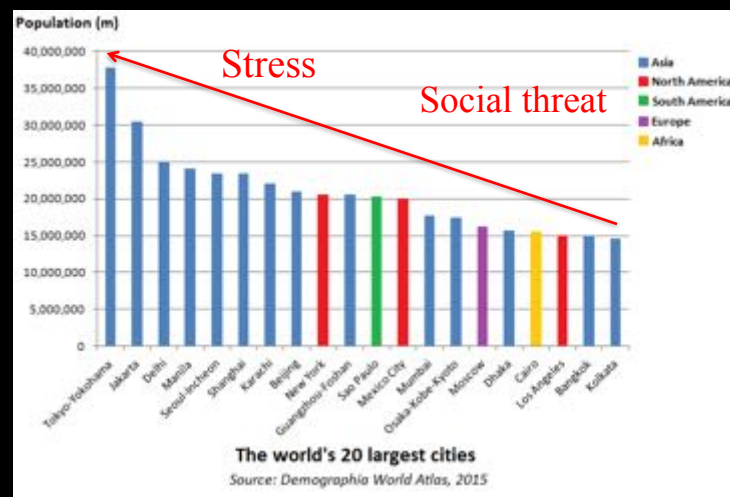
Gossip

Reputation

Suspicion

A cognitive system

## Hypothesis



Merci!  
Questions?

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