1st International Seminar of Cognitive Linguistics . 2021

- Scientific Secretary: Dr. Arsalan Golfam
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Section 1: Farsi, 9 A.M to 14 P.M.

< Dr. Ahmad Pakatchi- A cognitive-cultural approach to conceptualization of number
< Dr. Sepideh Abdolkarimi-Cognitive considerations in grammaticalization of prepositions
< Dr. Ramin Golshaie- A new look at the meaning from the perspective of embodied cognition
< Dr. Alireza Qhaeminia- Cognitive Linguistics and the future of religious studies
< Dr. Mohammad Javan- Genes, brain and language

Section 2: English, 15 P.M. to 19 P.M.

< Prof. Werner Sommer - Social factors in verbal communication
< Prof. Rasha Abdel Rahman - Semantic integration in audiovisual communication
< Prof. Manuel Martin-Loeches - The influence of others in language comprehension

Date: 29th September, 2021

Register dates: ——— 16th September, 2021

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دانشگاه الزهرا
Alzahra University

Section 1: 9 A.M to 14 P.M.

Dr. Ahmad Pakatchi- Institute for Humanities and Cultural Studies

A cognitive- Cultural Approach to Conceptualization of Number

At the beginning Dr.Pakatchi mentioned that he always tried to combine cognitive domain with culture. In this speech, he focused on conceptualization process and application of image schema in number conceptualization.

Image schemas are discussed in 1987 by Johnson in cognitive science. Image schemas are recurring structure within our cognitive processes which establishes patterns of understanding and reasoning. Image schemas are pre-conceptual structures and mathematics has pre-linguistic structure, when we consider these two propositions, we feel that we can consider image schema about numbers.

Image schema and numbers

According to Langaker and other cognitive linguists boundedness is an important matter (identifying countable and mass units).

Countable and mass image schemas are related to number conceptualization. Dividing things to countable and mass is a cognitive-cultural matter. In book women, fire and dangerous things, Lakoff and Johnson paid special attention to multiple-mass transformation.

Large numbers are used to represent much concept. We also see large number representing much concept in poems. We also use number to represent few number.

Combining scale and link schema:

-repetition

-addition

-reduction

Multiplication is done based on counting units and this pattern is used to represent number in some languages. All of the mentioned schema are used in languages of the world and according to different cultures, usages are different and is not a universal matter.

Dr. Sepideh Abdolkarimi- Shahid Beheshti University

Cognitive considerations in grammaticalization of propositions

At first, Mrs. Abdolkarimi stated that her lecture focuses on cognitive semantics to reach an analysis of preposition (until) grammaticalization in order to explain cognitive concept changes and its grammaticalization process. In this study, secondary grammaticalization of the mentioned preposition by considering image schema is explained.

Therefore, different meanings of this preposition extracted from different dictionaries. Then, by using meaning component analysis method and meaning related to image schema, cognitive concept changes during secondary grammaticalization have been investigated. Therefore, by determining static and repetitive meaning component and related repetitive image schema, data related to polysemy and secondary grammaticalization has been investigated.

Polysemy is an expression used in semantics against monesemy. Polysemy is used to represent linguistic units that have different meanings but related. Therefore, in semantics lexical units that have more than one meaning are considered as polysemy.

Image schema

Image schemas are structures of human bodily experience that are in peoples mind. These structures are not detailed but they are abstract concepts including patterns of repetitive experienced and are embodied concepts. The origin of image schema is physical structure of human and his/her relationship with the surrounding world and his/her conceptualization following experiencing the world.

Grammaticalization

Grammaticalization is a change that during which a lexical item gets a grammatical usage or a grammatical item gets new grammatical usage. Grammaticalization is historical process and its result is emerging linguistic units which are linked to new meaning usage.

Proposed criteria by Taylor and Evans (2003) to determine prototype meaning:

-the oldest existing meaning in dictionaries

-the frequency of usage of one meaning is more than others

-composability with other elements

-Grammatical prediction

Different meanings of (until):

-end of place

-end of an interval

-from the time

-sequence

Local destination, time destination, destination of abstract path, time beginning and sequence indicate that time metaphors are constructed based on local concepts and abstracting place. In second place it is clear that time concepts and abstract path are understood based on place concept.

Conclusion

Preposition (until) derived from ancient Persian / /tāvat/ and Sanskrit /távat/ indicates it means very large, far.

Semantic usages of this preposition includes: local destination, time destination, from the time and sequence. Related image schemas to these meanings are space, place and movement which include path, source and target image schema.

Dr. Ramin Golshaie- Alzahra University

A new look at the meaning from the perspective of embodied cognition

An enlightenment movement occurred in 17 and 18 centuries. Some of the philosophers discussed about different subjects like politics and art. These people believed that:

Reason is self-conscious.

Reason is non-emotional.

Reason is abstract.

Reason is universal.

Linguistic categories are consistent with the world.

First generation cognitive science (1950)

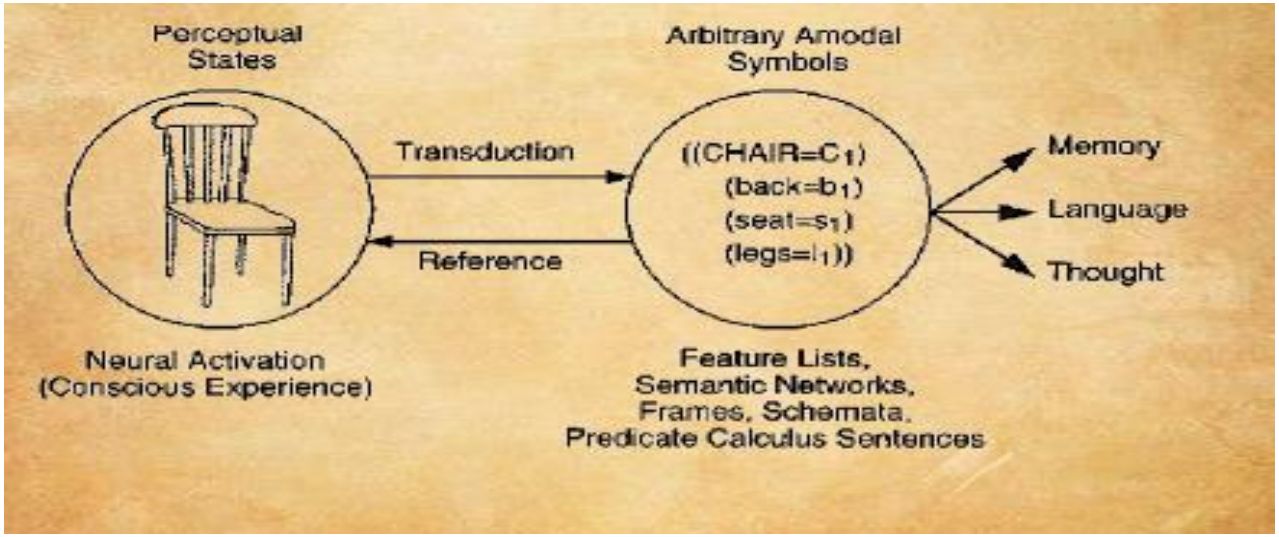
First generation cognitive science was simultaneous with emergence of computational science and first computers.

Thought is based on reason and needs using symbols.

Knowledge elements include clearly defined, bounded and unchangeable concepts which are related to each other with propositions.

Language is reason based and is output of thought, it means mind is separate from language.

Mind represents reality.



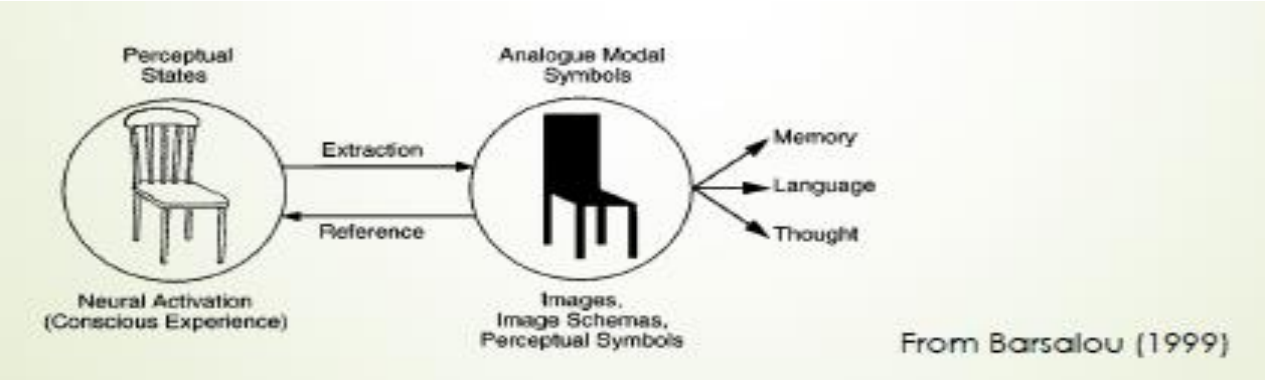
Symbol-grounding problem

If we investigate meaning of words (which are linguistic symbols) in logical semantics, we reach to predicates meaning of symbols which are clearly defined in terms of meaning of another symbols.

Solution of second generation cognitive science

Embodied cognition

Our cognitive processes use the same neural representations which are active during comprehension and visualization.

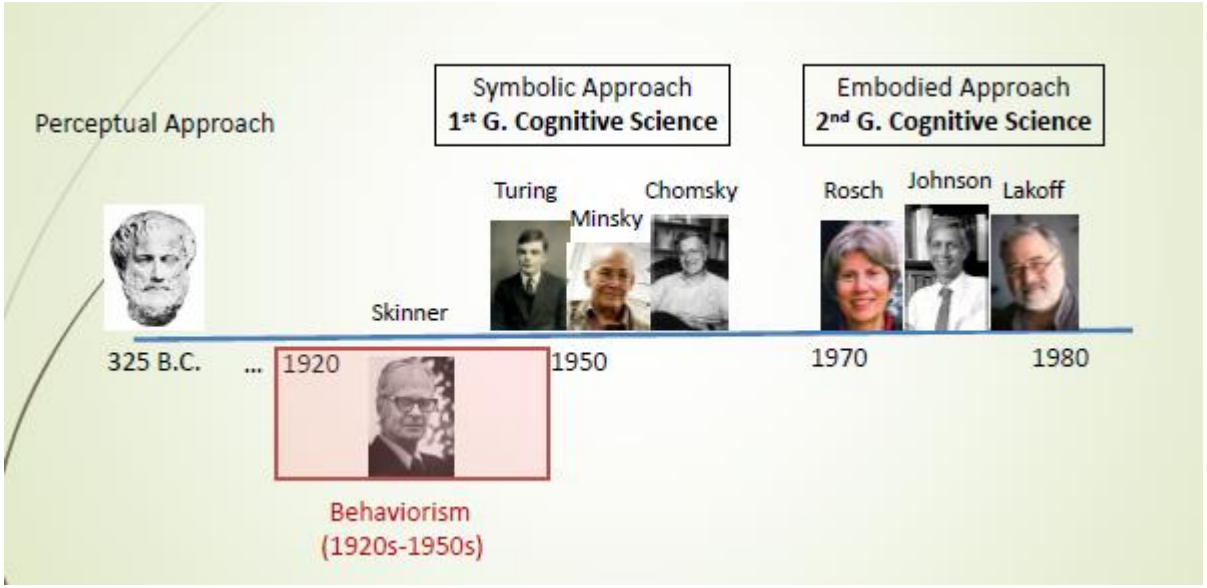


Second generation cognitive science:

Enlightenment reason hypotheses are rejected.

Concepts lack defined boundaries and are context bound.

Thought is based on conceptual frames and metaphor.



Embodied view to meaning

Concrete words (sensory-motor)

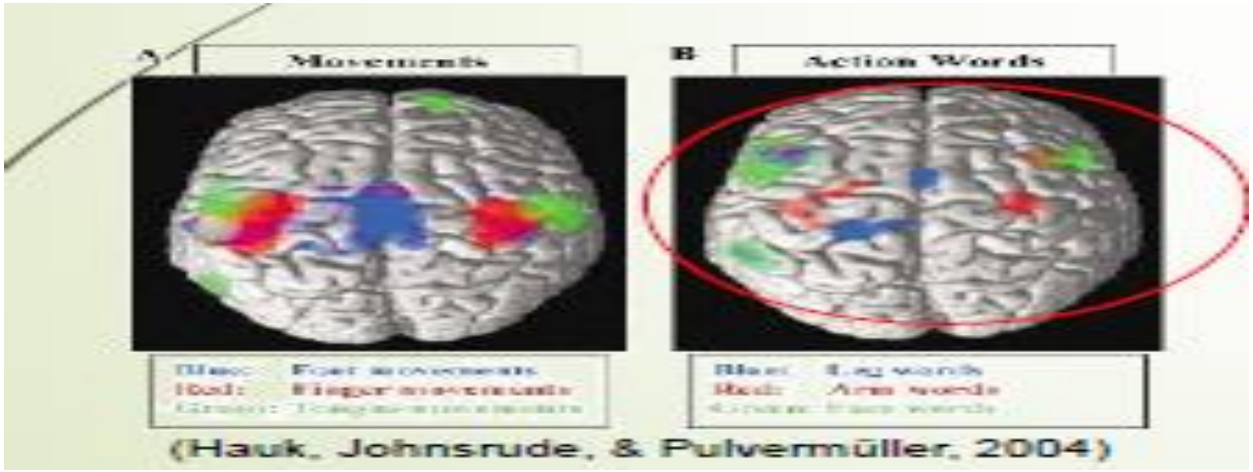
Identical neural structures are active when:

You kick a ball.

You see someone kicking the ball.(stimulation)

You are said someone is kicking the ball.(stimulation)

Mirror neurons are activated during stimulation. In this way linguistic meaning linked to neural networks.



Abstract words

Variation of sensory-motor patterns is more for abstract words than concrete words.

Reasonable circuits in language areas which are responsible for processing reasonable words, combining with sensory-motor circuits can make the basis of processing abstract words.

Understanding part of abstract words is done through metaphor and by using sensory-motor system.

Abstract words mainly have emotional content and are related to other parts of the brain which processes emotions.

How meaning components are discussed by using embodiment hypothesis?

Sub-branch of structural semantics

Language is a system of units and structures , each unit is related to other units in language system.

	table	*horse*	*boy*	*man*	*girl*	*woman*
animate	−	+	+	+	+	+
human	−	−	+	+	+	+
female	−	−	−	−	+	+
adult	−	+	−	+	−	+

Extracting meaning component I done in language system and is amodal.

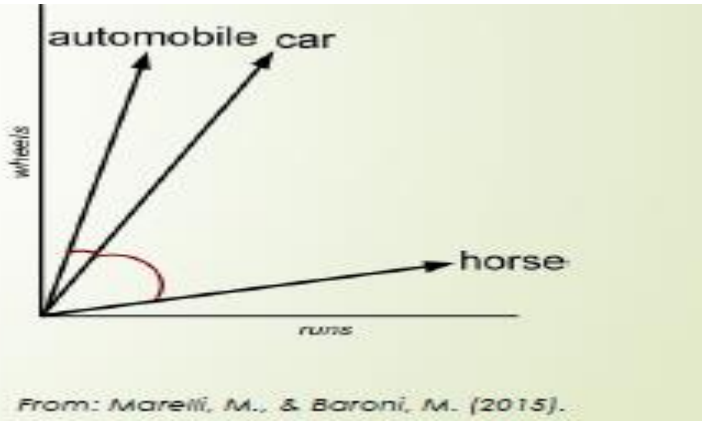
1) ____ died. Sub: [+animate]

2) The man broke the ____ Obj: [- liquid]

Distributional hypothesis

Words that are used in similar contexts have similar meanings.

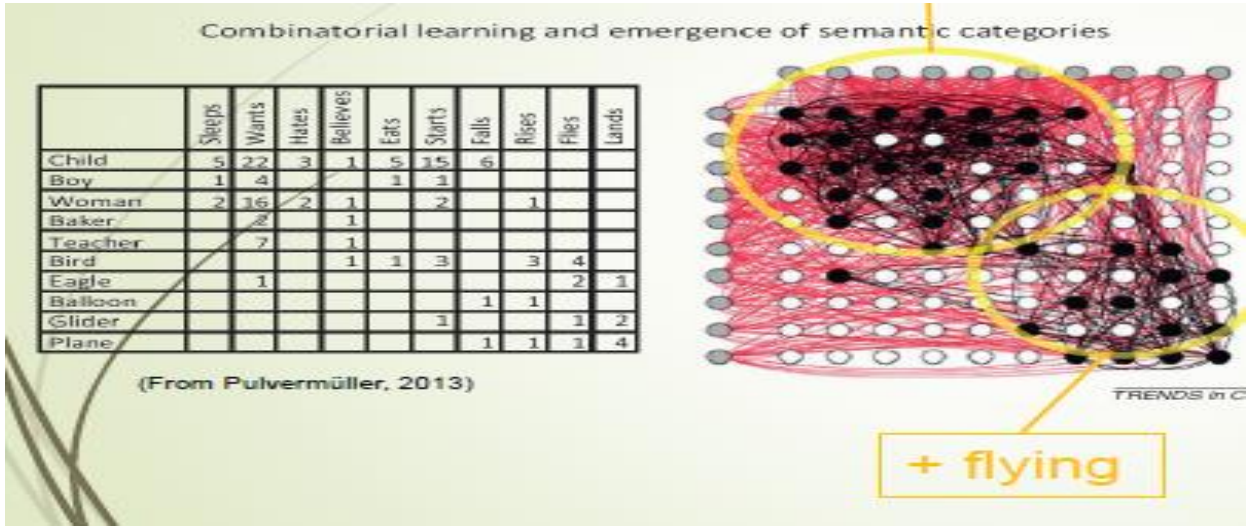
	runs	wheels
automobile	1	4
car	2	4
horse	4	1



From: Marelli, M., & Baroni, M. (2015).

Distributional meanings

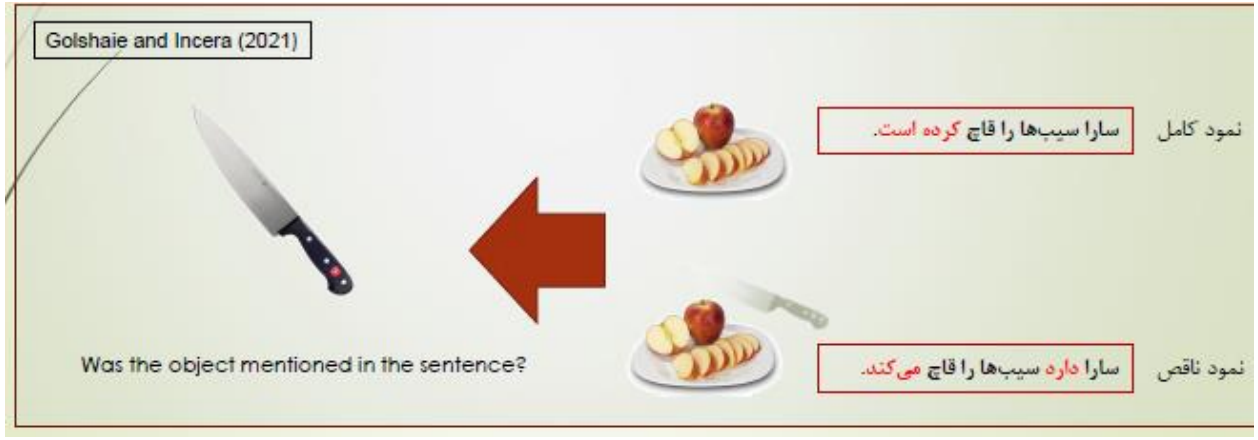
After learning sensory-motor aspects of words meaning , learning meaning characteristics in context of sentences form another kind of meaning which is distributional meaning and leads to some meaning categories which are defined by using meaning components.



	Sleeps	Wants	Hates	Believes	Eats	Starts	Falls	Rises	Flies	Lands
Child	5	22	3	1	5	15	6			
Boy	1	4			1	1				
Woman	2	16	2	1		2		1		
Baker		2		1						
Teacher		7		1						
Bird				1	1	3		3	4	
Eagle		1							2	1
Balloon							1	1		
Glider						1			1	2
Plane							1	1	1	4

Grammatical meaning and sentence comprehension

Grammatical elements are clues to construct a situational model.



Applications

Teaching science and environmental challenges:

Greenhouse metaphor to understand globe warmth

Changing views to environmental challenges (love metaphor is more effective than war metaphor)

Teaching foreign language

Conclusion

First generation cognitive science considered meaning symbolic, abstract and amodal. Symbol-grounding problem is one of the main challenges of symbolic approach of meaning. Embodied cognition considers symbols in sensory-motor system. In embodied cognition meaning is formed by activation sensory emotional system of the brain. Embodiment have different usages including teaching especially teaching foreign language. Manner of representation of abstract concept and modal and amodal role in comprehension of linguistic meaning are challenges for future studies.

Dr. Alireza Qhaeminia- Research Institute for Islamic Culture and Thought

Cognitive Linguistics and the future of religious studies

Cognitive linguistics is a branch of cognitive science which studies relationship between mind processes and language. Cognitive linguistics has begun in 1970s by criticizing Chomskys' generative grammar. Cognitive linguistics must not be considered as identical with neurolinguistics.

Some theories of cognitive linguistics:

-cognitive grammar (Langaker)

-image schema network (Tagi)

-frame semantics (Fillmore)

-conceptual metaphor (Lakoff)

Cognitive science models

Two models are used to understand mind:

1. Conceptual theories of mind (CTM)

2. Processes distributed parallel (PDP)

Cognitive linguistics is affected by second generation cognitive science and focuses on embodiment.

Important characteristics of meaning in cognitive linguistics:

1-meaning is perspective.

2-meaning is dynamic and flexible.

3-meaning is encyclopedic.

4-meaning is based on experience.

Importance of cognitive linguistics in studying religious texts

1. Linguistics is transformed to a kind of psychology in this method and by investigating speakers ‘ language we reach to speakers’ mind and become familiar with his/her mental categorical structures.

2. Psychology through language leads to exploring culture. Investigation of speakers’ conceptualizations is a way to explore mental categories.

3. Some conceptualizations are focused in this way and each one is investigated separately.

The science of principals, which is considered as the logic jurisprudence is actually used as the logic of understanding religious texts. Much of this knowledge deals with the subject of words it is clear that cognitive linguistics can change this part.

Relationship between cognitive linguistics and Islamic studies

Theories of cognitive linguistics can change religious scientists view regarding language and metaphor, concept discussion. Philosophy and Ilm al-Kalām with the help of this knowledge can gain particular analysis of existence understanding way and God descriptions. For example, image schema and conceptual metaphors can give new direction to philosophical discussions.

Religious studies in different fields are subject to investigating effect of linguistic concept and must focus on the following points:

1. Interpreting acceptance of basics

2. Innovation in Islamic knowledge

3. Criticizing unacceptable views

Dr. Mohammad Javan- Tarbiat Modares University

Genes, brain and language

What we know as language and is specialized to human has some differences with vocalizations made by other creatures:

Language	Complex-pattern Vocalization
Semantic information Grammar End less word learning Endless sentences	Sound communication Imitating, rarely comprehension Limited signs, Words, Symbols (up to hundreds) Do not combine words or signs
Human	Songbirds, Parrots, dolphins, whales, bats, elephants, monkeys, …

If we want to have a basic discussion about language we must consider genetic basis of language and genome for language that provide material for developing language. Like other complex abilities a group of genes should be involved evolution of language. There are two types of studies: 1.behavioral genetics 2.evolutionary biology

In behavioral studies it is tried to find relationship between behavior and genes and in evolutionary biology it is tried to compare different abilities f creature during evolution.

One of the discussions raised during studying human behavior is that in studying human behavior specially language we must rely on human sample for our investigation. Therefore scientists use twins study method. In this method they investigate behaviors in monozygotic and dizygotic twins.

TWINS STUDIES MAIN FINDINGS

Genetic factors play a greater role for language-impaired people than normal

Genetic factors affect all aspects of language

Probable existence of some language specific genes

Possible existence of some genes specific to different aspects of language

Specific language impairment (SLI)

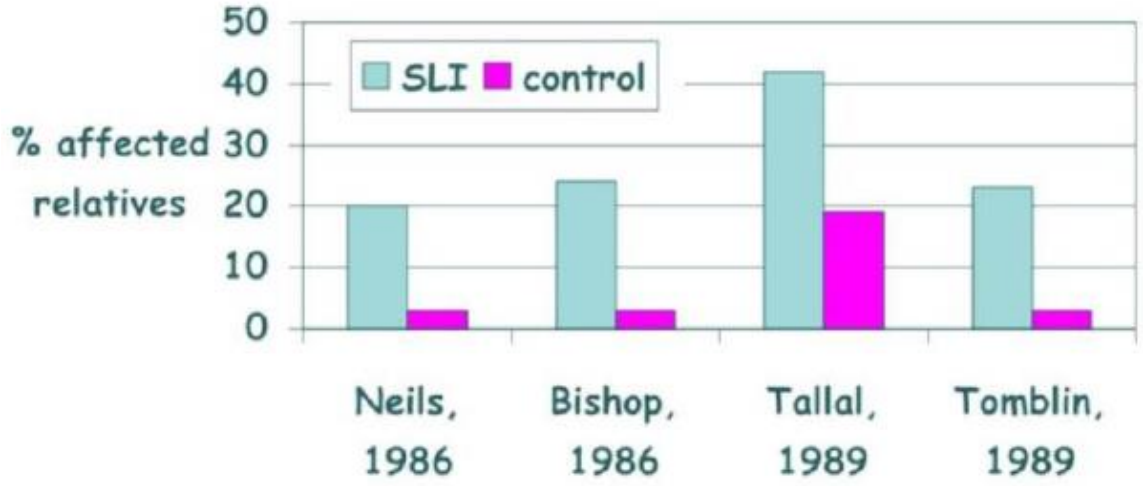
-diagnosed in children when language doesn't follow normal developmental course

-problems with language structures (syntax and phonology) common

-not due to hearing loss, physical abnormality, acquired brain damage

-normal development in other areas

Different studies indicate that rate of language/ learning difficulties is more in relatives of those with SLI.



FOXP2 STORY

In the 1990s,“KE family” came to the attention.

15 members (out of 31), across 3 generations were affected.

The affected individuals experienced difficulties in clearly articulating certain sounds, problems with many aspects of language, including sentence construction and grammar.

Their overall intelligence seemed normal.

PROTEIN SEQUENCE ALIGNMENT FOR FOXP2

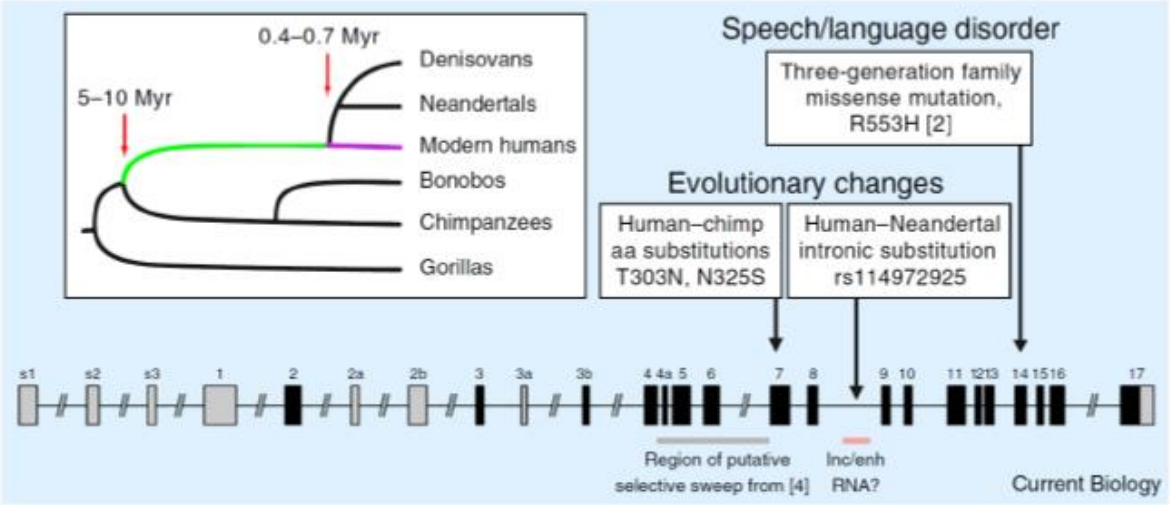
Scientists compared sequence of Foxp2 gene in human, monkey and et. They found that sequence of this gene and sequence pf protein made by it has not changed over generations so they concluded that this gene and protein made by it are so important that survived over generations.

Changing views of FOXP2 and human evolution: The human FOXP2 locus spans more than 600 kilobases of genomic DNA. Boxes represent exons, lines represent introns, and black shading indicates exons that code for protein.

In 2001 an exon 14 missense mutation was found in KE family.

Evolutionary changes at the FOXP2 locus: two amino acid (aa) substitutions in exon 7an intronic derived polymorphism between exon 8 and 9, and a conserved element in that intron which may represent a long noncoding or enhancer RNA.

The lineage leading to archaic hominins- the lineage exclusively leading to modern humans



More than 20 pathways are related to language and practically FOXP2 is a controller gene which controls expression of 1000 genes. It has been seen that parts of the brain involved in language processing has more FOXP2.

Gene Expression and Function

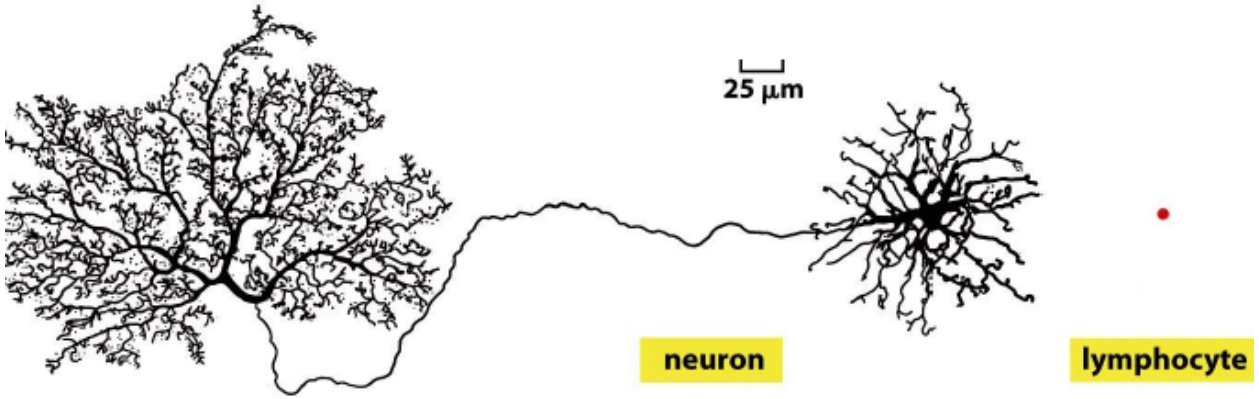
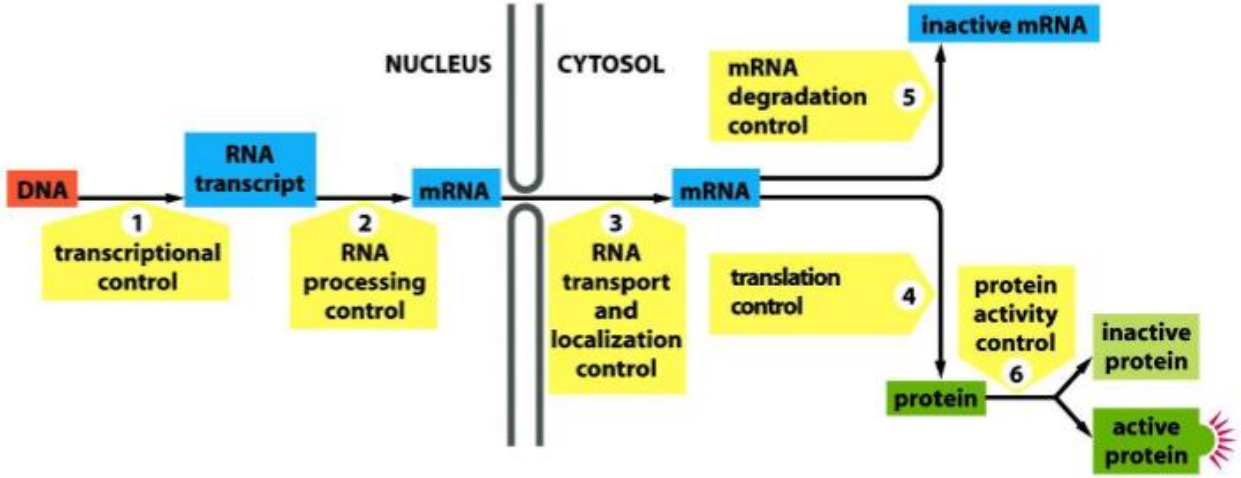
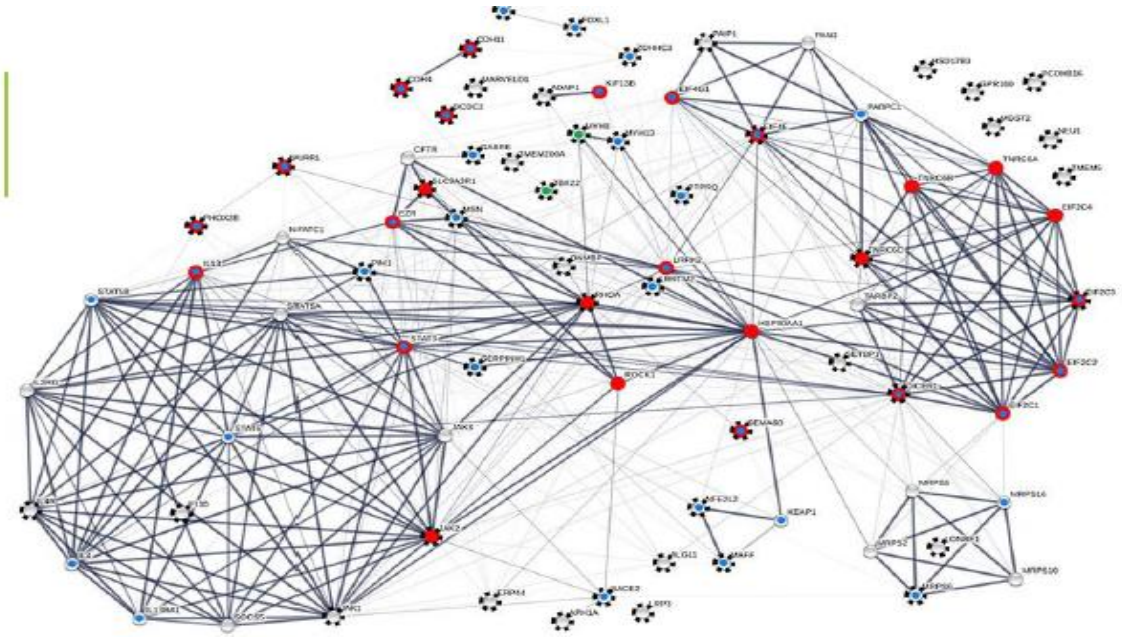


figure 7-001

GENE EXPRESSION AND STEPS AT WHICH GENE EXPRESSION CAN BE CONTROLLED

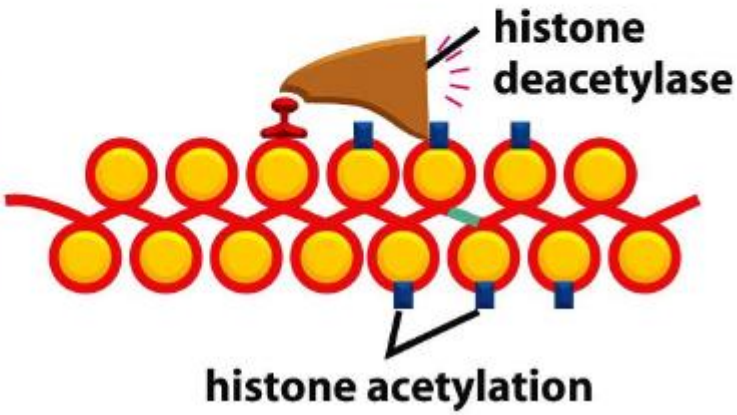


FOXP2 driven protein-protein interaction(PPI) network including 80 proteins. Seventy-four nodes are contained in the largest connected component (LCC). Black rays highlight 49 proteins with empirical evidence for FOXP2/FOXP2 driven and or songbird-song related expression.



HISTONE ACETYLATION AS EPIGENETICS MODIFIER

recruitment of histone deacetylases



DNA METHYLATION AS EPIGENETICS MODIFIER

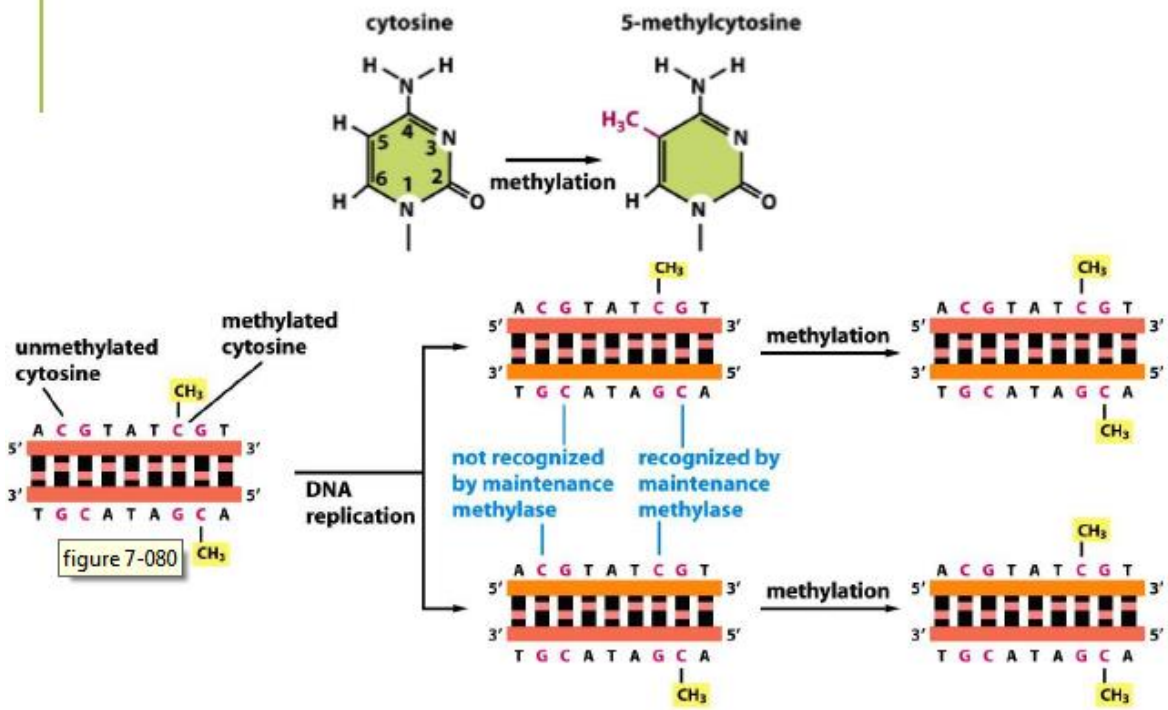
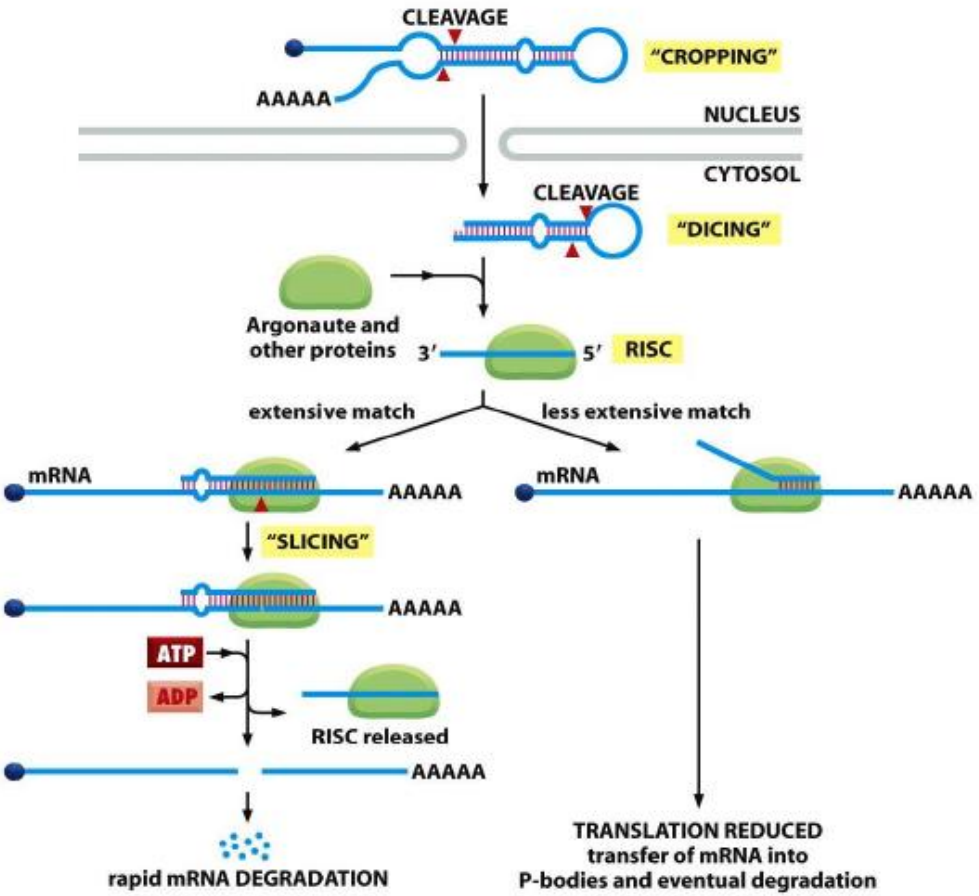


Figure 7-80 DNA methylation patterns are inherited

miRNA PROCESSING AND ACTION, ANOTHER EPIGENETICS MODIFIER



Section 2: 15 P.M. to 19 P.M.

Prof. Werner Sommer- Humboldt-University, Berlin

Semantic integration in audiovisual communication

Verbal communication is multimodal and beyond the auditory information, there are facial expressions, body movements, paralinguistic information.

Traditionally: listening+ speech reading

Neural correlates of audio-visual integration?

At the phoneme level: several studies showed effects of (consistent) visual information on early auditory ERPs (Beslet.al, 2004;Kluchareeve et.al,2003; vianwassenhove et.al,2005)

Several studies showed effect of audiovisual integration on early ERPs components

Lexico-semantic level: visual saliency of lip movements in videos of sentences(/p/ vs /k/) increased N400 (low vs. high constraint)(Brunellere et.al, 2013)

A salient lip movement gives you a high visual constraint and non-salient lip movement gives you a low visual constraint.

What we see here is the amplitude of N400 and the results indicate when there is high visual constraint when you see /p/ then there is a change in amplitude of N400 , when you see /k/ there is only at front electrodes, this is not where N400 takes place.

Methodological problems in auditory sentence processing

Problems controlling the stimulus material:

-high temporal density of spoken words

Selecting proper time marker for stimulus onset(isolation point, recognition point, start of auditory burst)

One solution: using the same auditory sentences and manipulating their predictionability by the context.

Orthogonal manipulation of predictability (and frequency)

Potsdam sentence corpus 3 (p5c3)

-144 items

-design: frequency (low/high predictability (low/high) on target words

High frequency: in his right hand he held a ship of considerable length.

Low frequency: in his right hand he held a scepter of considerable length.

Both sentences are identical except for the underlined words.

Context sentences: the man on the picture fiddled around with models of Columbus' fleet)

In this occasion the sentence with ship is more expected than the sentence with scepter

Alternatively if the sentence be like this:

The man on the picture wore a golden crown and sat stately on a throne, in this case you will expect the scepter but the ship in this context is unexpected so we can manipulate the expectancy of target words, it means such a manipulation allows us to use exactly the same preceding sentence and exactly the same target word but have it in a condition of low or high expectedness.

Target sentence and target word in high and low predictable conditions are exactly the same; no problem with differential overlap and trigger setting

Visual presentation (Dambacher et.al, 2012) used this corpus

We converted these sentences to spoken versions. In one experiment we showed videos in one condition and in another condition we just played the audio and image of the face so in one condition we have full audiovisual information and in another condition we have degraded audiovisual information which is non congruent so what we expected is a reduction of amplitude of N400 when the video is also seen and compared with when the video is not seen when we looked at the unexpected words and compared the dynamic presentation it means with moving face and static presentation they have still image and there is a nice N400 really big but it is not affected at all.

Whether the image is shown or the video is shown conversely if we look at expected words we find something puzzling we find a big ramping up during epoc when the video is seen there is no strong activity, this is really strange and unexpected for us. Maybe whenever this unexpectedness occurs the system is very busy and does not care about the video but where this is expected the visual information is somewhat considered and this leads to P300 because P300 is elicited when there is a salient information in the environment so what we did then we systematically manipulated the available visual information.

Which face part is more important?

We exclude mouth or eyes, we assumed by excluding the mouth we really degrade visual information and similar reduction is also present when the eyes are excluded maybe the reduction is less because there is more action in mouth area.

Results

What we said before we see no change in N400 in unexpected words, this is also true for the other experiments when eyes are excluded no change in unexpected word and also this is true when the mouth is excluded but for the expected words we see a great modulation of slow positivity, it is reduced in both exclusions but it is more reduced in mouth exclusion.

Conclusions

-ERP investigation in dynamic connected speech plus visual information are feasible

-clear and large N400 responses integration enhancement of these responses

But a posterior positivity emerges for high expected words which depends in size on visible parts of the face

-information is expected from the moving face if there is low load on language processing (P300-like responses)

-whole face provides more information than faces without eyes or mouth

Prof. Rasha Abdel Rahman - Humboldt-University, Berlin
Social factors in verbal communication

Aim of language production:

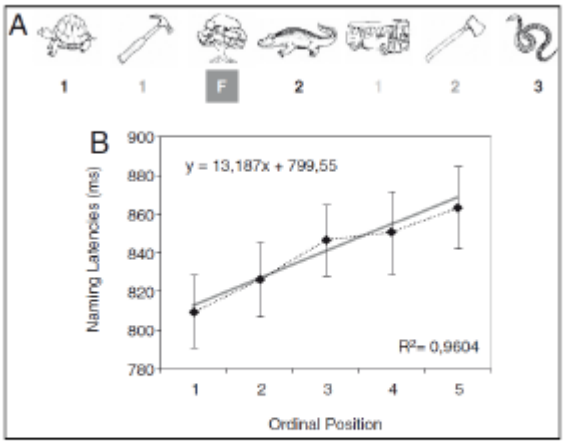
Communicating meaningful messages

Experiments on the role of communication partners during language production

Typical situation in the lab: Participants are alone, talking to themselves

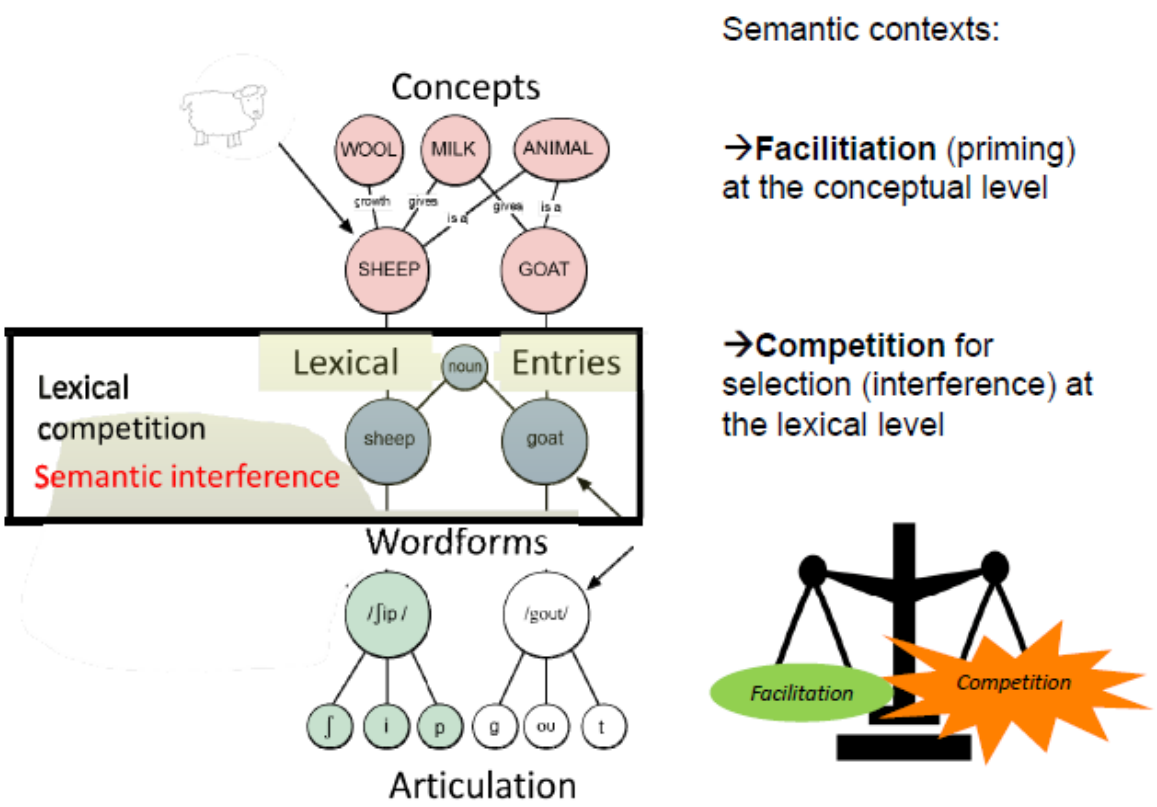
Typical task: picture naming

semantic context manipulation: semantic interference effects



Howard et al., 2006
From Costa et al., 2009

the pictures are presented on the screen and what is typically done in this situation is naming task, the pictures are in semantic context, for instance the pictures are presented in seemingly random order in this sequence of unrelated pictures , there is a categorical relation principle. Here is a language production mode which assumes we start producing language by activating message that we want to produce.



Adapted from Levelt et al., 1999; Roelofs et al., 2001; Roelofs, 2018

Picture naming about sheep: we have related words like goat, wool,… after this activation in the second step we access to the mental lexicon. We activate the lexical entries of sheep we also activate other concepts like goat in this model it is considered we have lexical competition if

we want to name sheep categorically related to goat it also activated the selection of target sheep, what we actually find when we manipulate semantic context is an effect of conceptual level

Language production in the wild: inherently social and communicative

• Listening to and speaking to others

• Observing others (e.g., facial movements or expressions)

• Taking turns

How is lexical processing affected by the presence of a conversational partner?

Background:

Joint action perspective: Acting alone is different from acting together (e.g., Knoblich et al., 2011; Sebanz et al., 2003; 2005)

Partner‘s task is co-represented

Partner‘s actions are anticipated and simulated

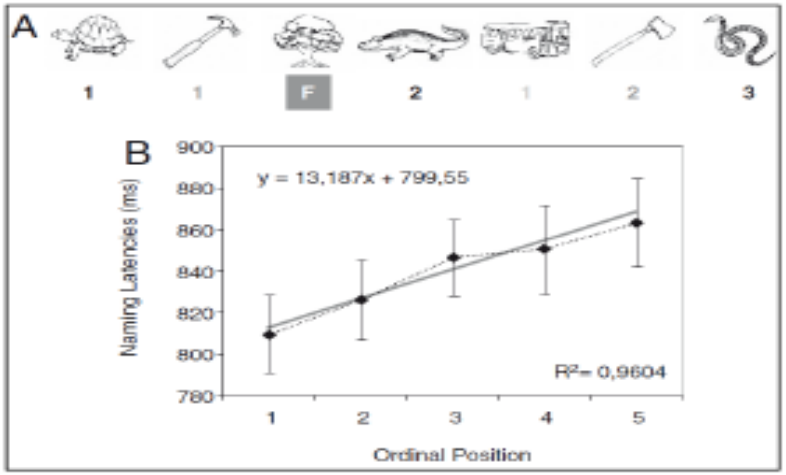
Our study: Is speaking alone different from speaking together?

Pickering & Garrod (2013): Language production and comprehension are forms of action and action perception

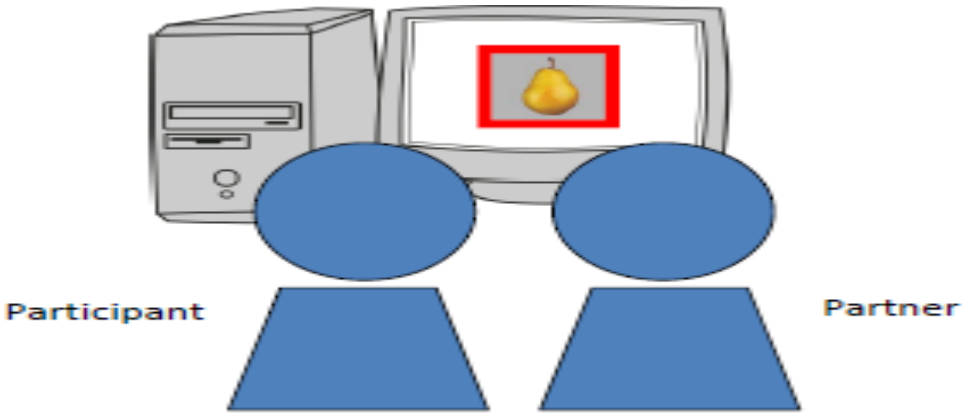
Predictions are crucial for successful conversations

Semantic context paradigm

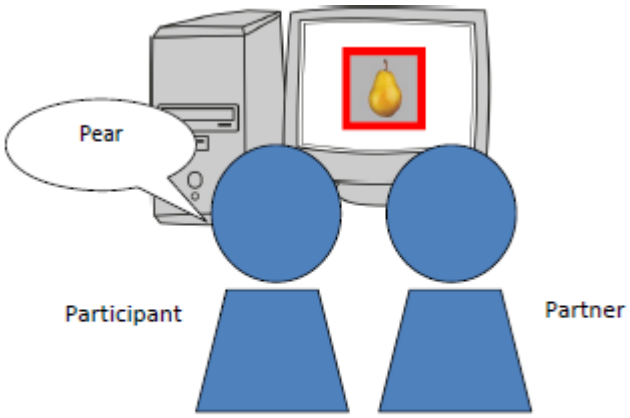
Cumulative semantic interference induced by partner simulation?



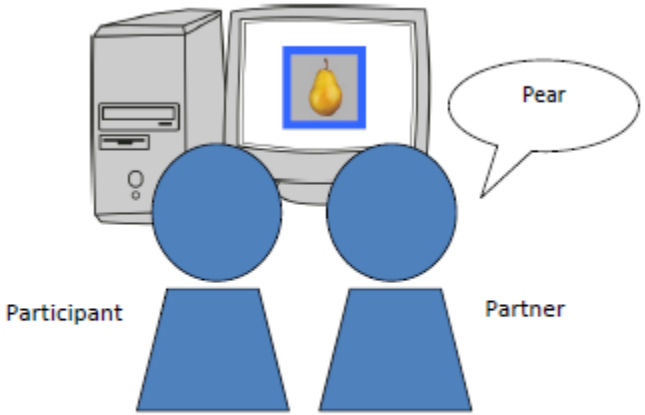
In our experiment we have 2 participants one is the actual participant and the other is partner they must do an naming task, a picture was presented in a red rectangle on the screen and the participant was supposed to name the object



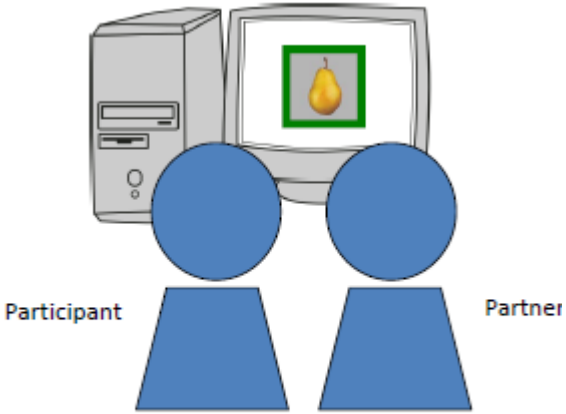
In the participant Go condition the participant said (pear) and in the partner Go condition the object is framed with a blue rectangle the partner can name the object and in the join Go condition no one can name the object.



Participant Go



Partner Go



Joint No Go

Experimental design

Ten exemplars of one semantic category

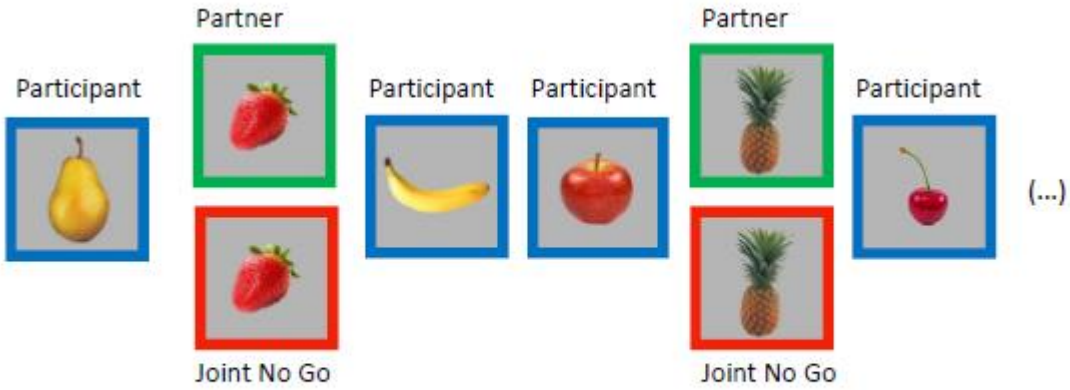
• Five exemplars are named by the participant (blue frame)

• Five additional exemplars are named either

• by partner (green frame) -> Joint Naming Condition

• by nobody (red frame) -> Single Naming Condition

• Within-participant: cat. assigned to condition; across participants: counterbalanced



Kuhlen & Abdel Rahman (2017)

Predictions

Cumulative semantic interference

Social semantic interference

Participants co-represent their partner’s task

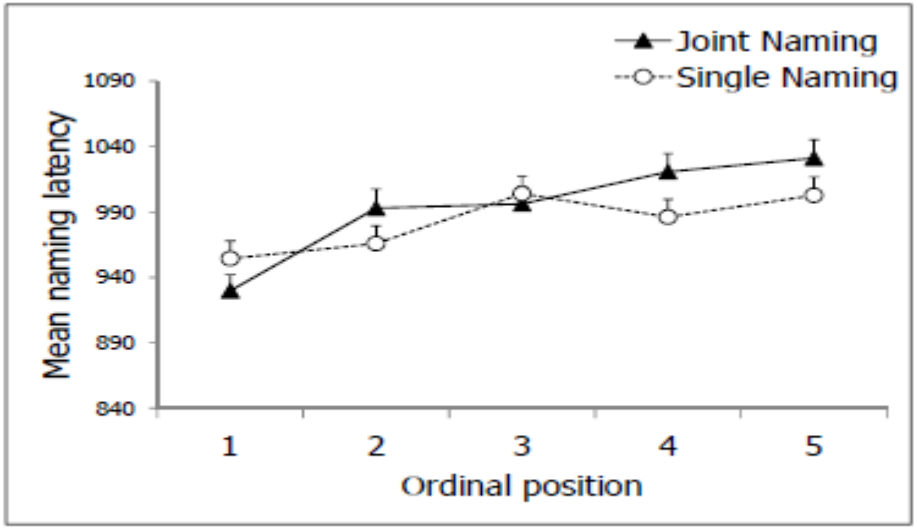
Lexical activation of the object named by the partner that is comparable to the activation elicited by naming it oneself

Result: steeper increase in naming latencies for categories co-named with a partner compared to categories named by the participant only.

Partner-elicited semantic interference

Cumulative interference

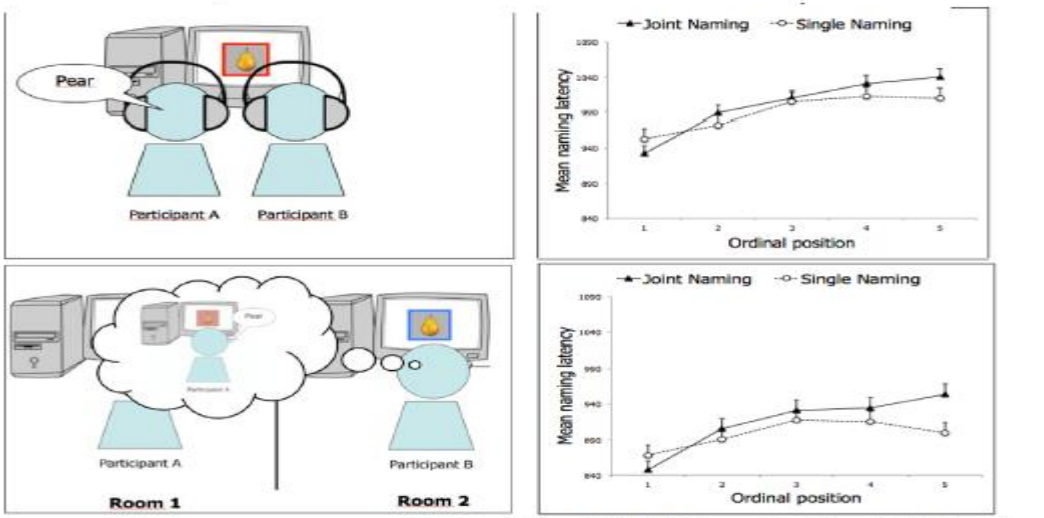
• Stronger interference when pictures were co-named by partner



Partner-elicited semantic interference

Due to auditory input?

No. Also when participants cannot hear their partner name pictures.



Kuhlen & Abdel Rahman, Cognition (2017, Experime

Social semantic interference

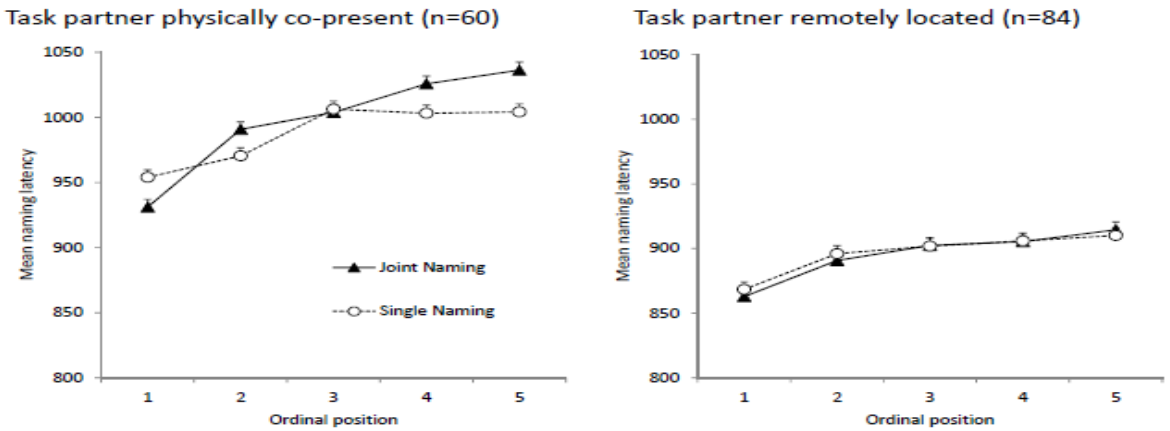
Pictures named by the partner contribute to the interference effect

• Partners‘ verbal action is co-represented (predicted and simulated)

• These findings are supported by other studies on joint picture naming (e.g., Baus et al., 2014; Hoedemaker et al., 2017)

However, not every study finds this partner effect on interference …

Pooled analysis on partner-elicited interference (5 experiments)



With physically co-present partner speakers name pictures overall more **slowly** – and they show **greater cumulative semantic interference** and **greater partner-elicited interference** (compared to remotely located task partners)

Kuhlen & Abdel Rahman, JEP:LMC (2021; pre-registered under osf.io)

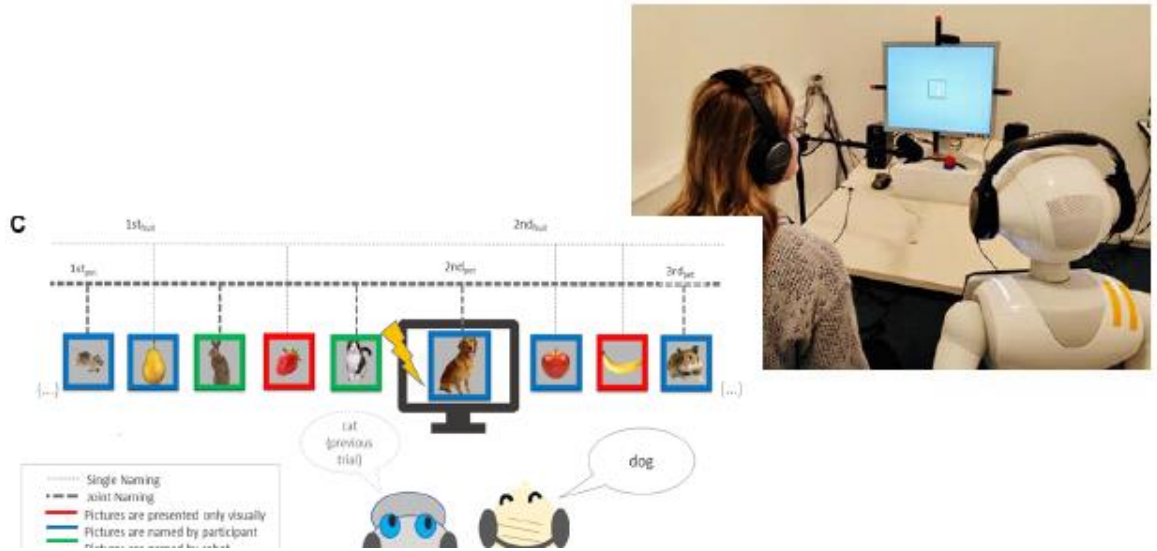
Pictures named by the partner contribute to the interference effect only (or especially) when the partner is co-present

• Partners‘ verbal action is co-represented (simulated and predicted) at the conceptual and lexical level, resulting in enhanced cumulative semantic interference (joint naming vs. single naming condition)

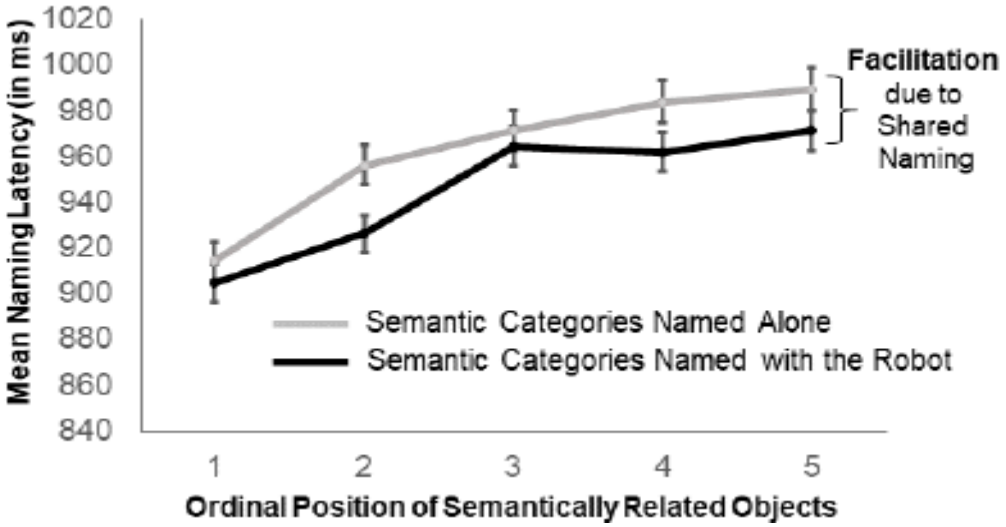
How about artificial agents as conversational partners?

Are robot‘s verbal actions co-represented as well?

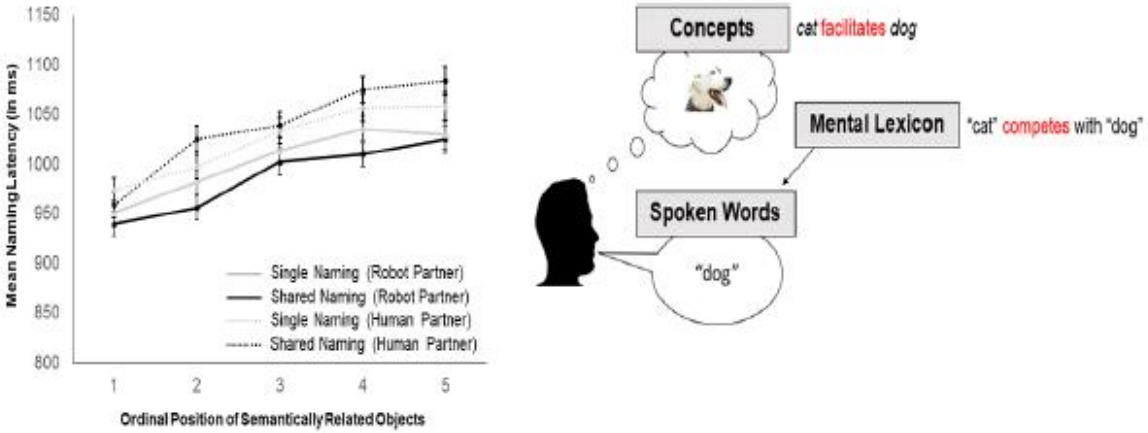
Same design and procedure, but with humanoid robot as naming partner



Facilitation: naming was generally faster for categories co-named with robot (not cumulatively slower)



While naming is inhibited by human partner (cumulative semantic interference) it is facilitated by robot partner



Wudarczyk et al, Scientific Reports (2021; pre-registered under osf.io)

Discussion

Social factors affect language production

Human partners' verbal actions are co-represented (simulated and predicted) at the conceptual and at the lexical level during language production (lexicalization on behalf of the partner), reflected in similar cumulative interference as own naming

Robot partner's verbal actions are co-represented only at the conceptual level, but not at the lexical level (thinking on behalf of the partner), resulting in facilitated conceptualization

Prof. Manuel Martin-Loeches - Universidad Complutense, Madrid

The influence of others in language comprehension

THE SOCIAL NATURE OF LANGUAGE

At the beginning of his talk, Martin Loeches emphasized on language role in social communication and he also stated that most research on language uses individual and unnatural contexts. According to Loeches, social factors are inherent to language, and indeed social information (context, persons, etc.) is taken into account during language processes (comprehension and production). As Loeches said language inherently implies the presence of others. Actually, most theories on the evolutionary origins of language remark its social nature as a necessary condition for language to emerge. As Frith (2007) stated "the human language emerged to influence or impact on others' minds "and allows (for instance) lying (even to oneself). According to Tomasello (2008)" The human language emerged thanks to the extremely cooperative nature of our species (joint attention and intentionality)" and it would not have emerged otherwise.

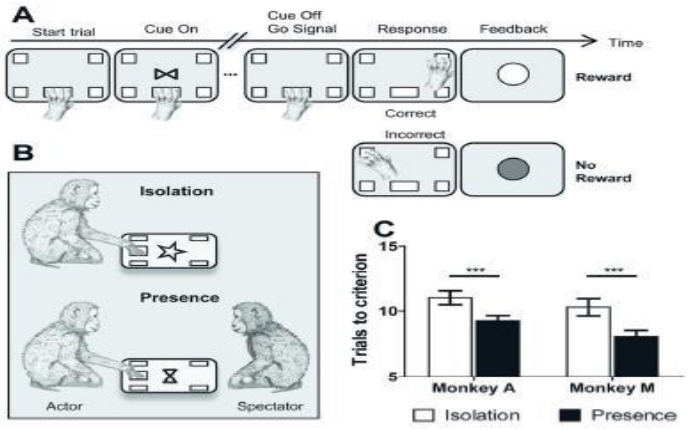
SOCIAL PRESENCE EFFECTS (SOCIAL FACILITATION)

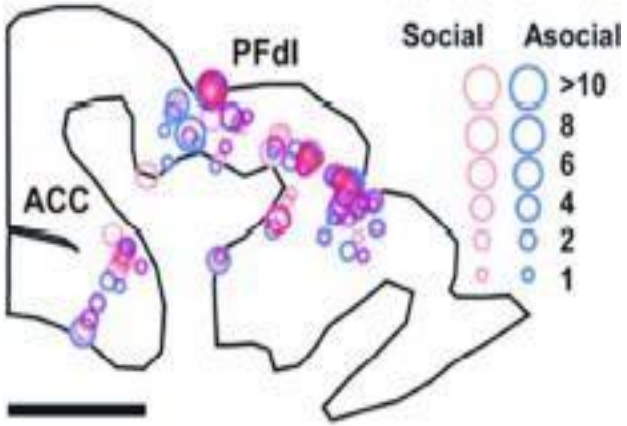
The presence of others (vs. alone) significantly affects performance. Normally presence of others facilitates cognitive processing, but this depends on several factors:

- Task difficulty or complexity, type of task
- Type of presence (friend vs. unknown, competitive vs cooperative, or mere presence)

The brain does not work the same when in presence of others. Human is a hyper-social species.

Social presence effects are not exclusively human





•Macaque monkeys: the mere presence of a conspecific improves performance in memory and visuospatial tasks. It activates “social circuits” for the same task in DLPFC and ACC (non-overlapping neurons in the same regions)

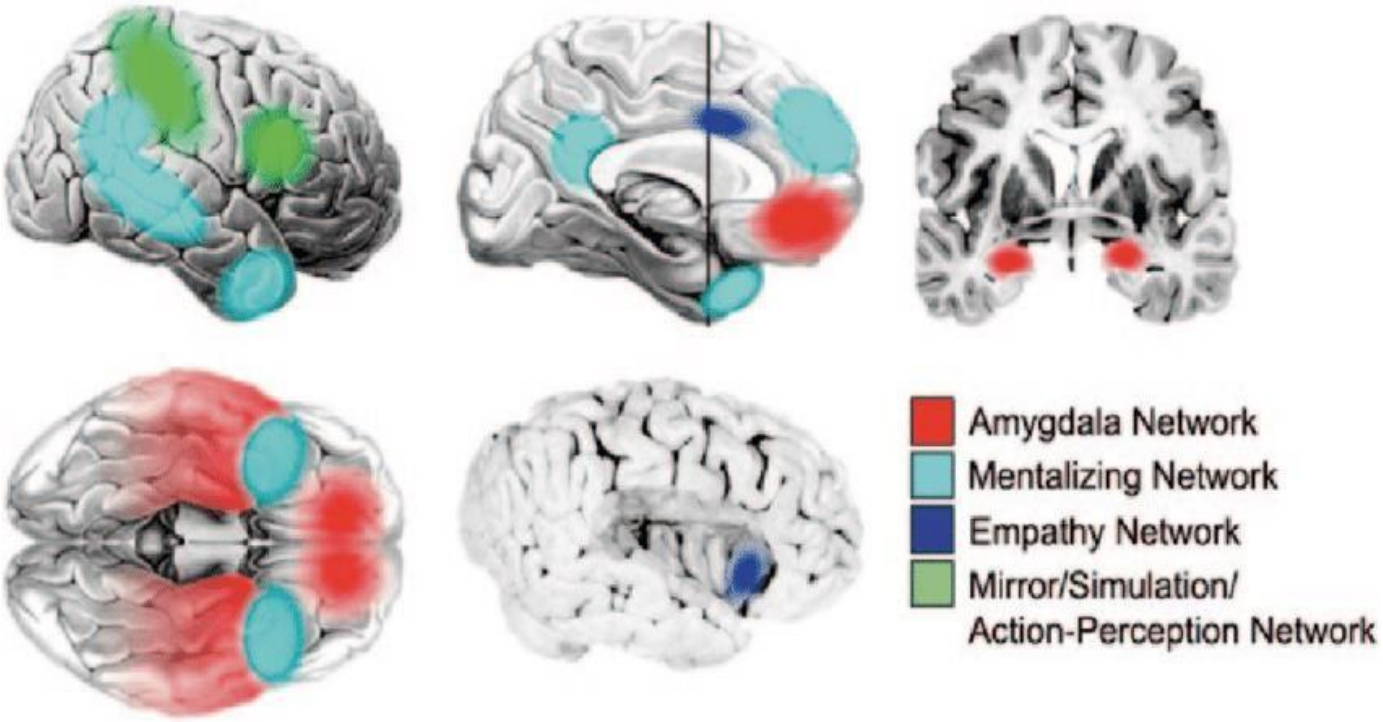
Social presence effects are understudied

This is particularly the case for language processing

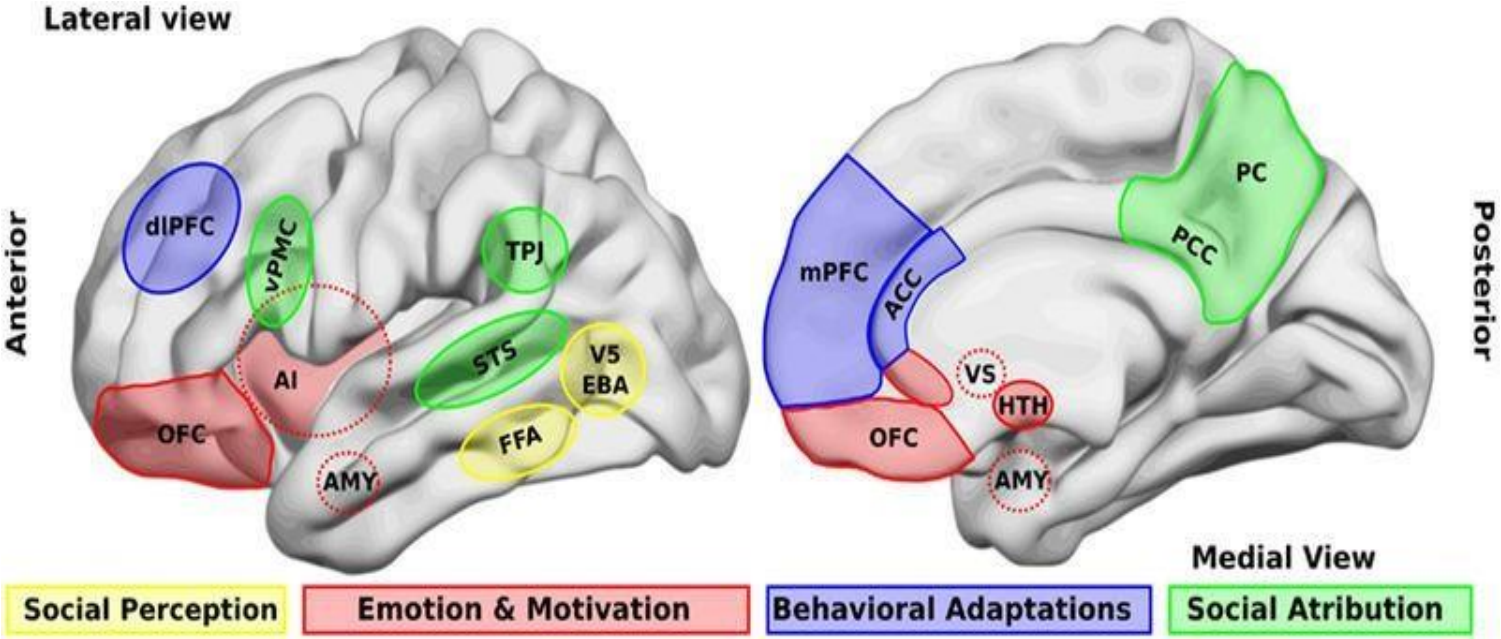
This is so in spite of the social nature of language

Indeed, the “social brain” and the “language brain” seem to partially overlap

The social brain

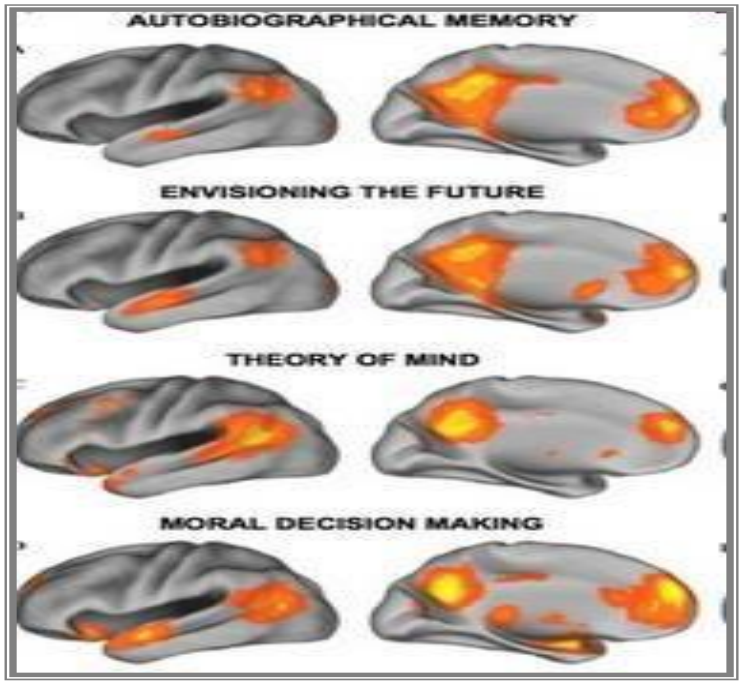


Stanley & Adolphs, 2013


Lateral view
Anterior
dlPFC
vPMC
TPJ
AI
STS
V5
EBA
OFC
FFA
AMY
mPFC
ACC
PC
PCC
VS
HTH
OFC
AMY
Posterior
Medial View
Social Perception
Emotion & Motivation
Behavioral Adaptations
Social Atribution

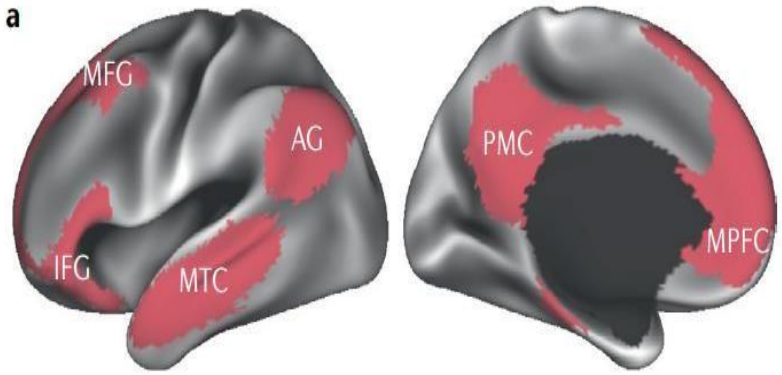
Lo, 2019

The Default Mode Network (DMN)



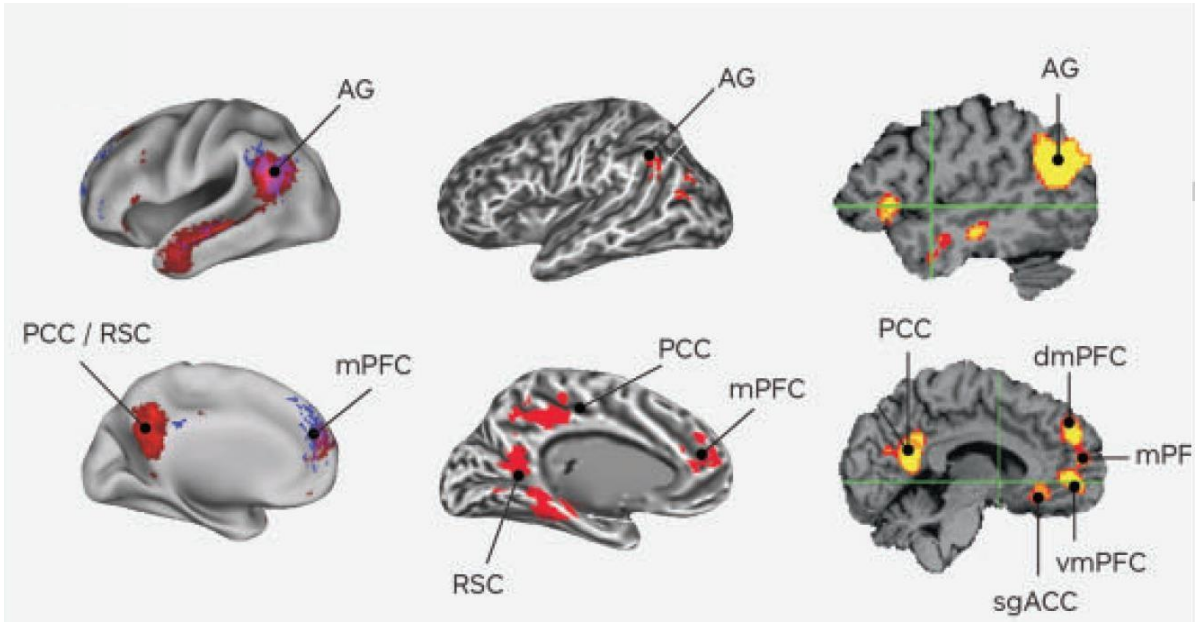
The DMN is our “default” state

It is social: Highly used in social decisions, recreations, etc.



Social/language brain overlap

The DMN may actually be the core portion for the conceptual system (semantics)



Left: Emotion concepts [Skerry and Saxe (2015)]

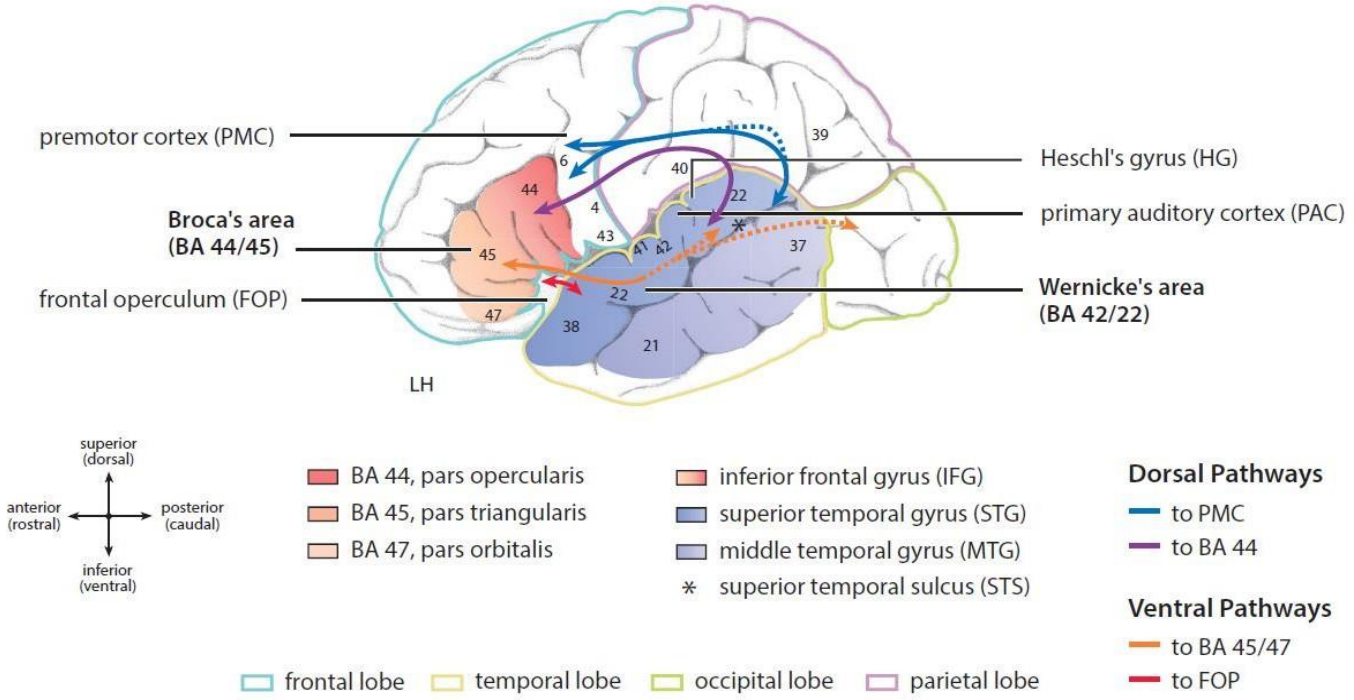
Center: Representations of sensory-motor properties (color, shape, visual motion, sound and physical manipulation [Fernandino et al. (2016)]

Right: Semantic processing [Binder and Desai (2011)]

The language system for syntax comprises portions of the social brain

-STS

-Parts of Broca's área (IFG, BA 45/47)



Friederici 2017

As Loeches stated that the influence of social factors on language processing at both the semantic and syntactic levels is being currently studied. Loeches et.al studied the effect of the mere presence (simplest situation) of a conspecific on both semantic and syntactic processing (relatively simple task). No previous study explored the effects of social presence on syntax. A few explored semantic processing (e.g., empathic N400 or "social N400" as a function of co-listener's knowledge (Jouraviev et al., 2019; Westley et al., 2017)

In a study entitled 'Language comprehension in the social brain: Electrophysiological brain signals of social presence effects during syntactic and semantic sentence processing', Hinrhrli et.al conducted a research with a sample of 30 people (28 female); right handed, native Spanish speakers. They did this by using 300 neutral sentences:

long (det+n+adj+v+complement)

short (det+n+adj+n+v+prep+complement)

+ 100 fillers (other structures; always correct).

Three versions of the neutral (experimental) sentences:

A) Correct
B) Semantically unacceptable by pseudo randomly interchanging adjective or verb [acceptability checked through hits on Google of combinations of n+adj or n+v

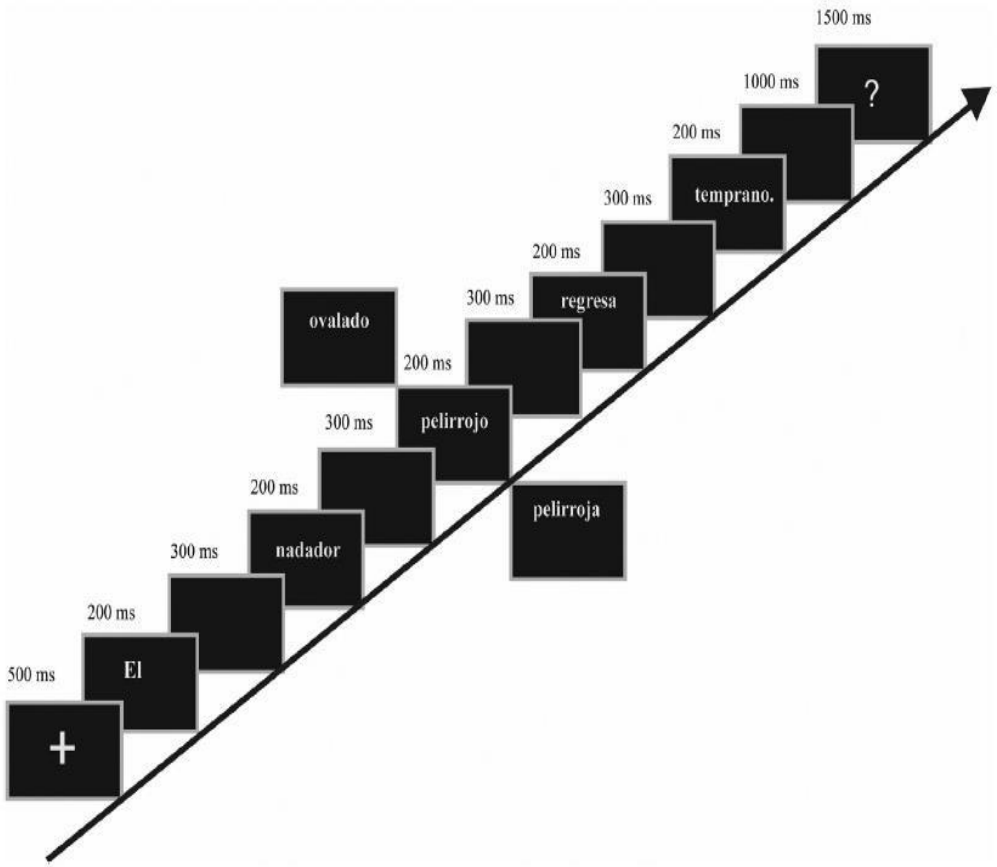
C) Syntactically incorrect: gender or number in adjective, number in verb

Table 1 — Types and examples of s entences used in the experimental procedure.

Short Sentences	Determinant	Noun	Adjective	Verb	Complement
Correct	Los	Oenes	**noctxzmos**	llegan	puntu Yes.
	The	tmins	night (m.)	*arrive*	punctually.
Semantic	Los	Oenes	persistentes	llegan	puntu âtes.
Anomaly	The	tmins	persistent	*arrive*	punctually.
Syritacñc	Los	Oenes	**noctumas**	llegan	puntua!es.
Anomaly (Gender)	The	tmins	night J.)	*arrive*	punctually.

Long Sentences	Determinant	Noun	Adjective	Verb	Preposition	Complement
Correct	La	noche	serena	sitña	al	explozador.
	The	night	serene	situates (eg.}	the	explored.
Semantic	La	noche	**serena**	**legista**	**aI**	explozador.
AnootaIy	The	night	serene	legislates	the	explored.
5yntacQc	la	noche	**serena**	**sitñan**	**aI**	explozador.
Anomaly (Plurality}	The	night	serene	situate {pl.}	the	explored.

Note. Literal Oanslations (noun -adjective order inverted) into ErigiisJ where m., masculine; f., feminine; sq., singular; pt., pluraL Bold words repmsent semaooc or syntactic anomaly.



The first Word in each sentence started with capital letter, the last word was followed by a period

Each anticipant read 200 sentences alone and 200 sentences in social presence condition (order balanced)

Each 200-sentences block: 50 correct, 50 semantically anomalous, 50 syntactically incorrect, 50 fillers (all randomized)

Social presence: confederate of the same sex and similar age, approximately 55 cm to the participant's right (within participant's peripheral vision)

The confederate was supposed to perform a memory task with the same material

Recordings

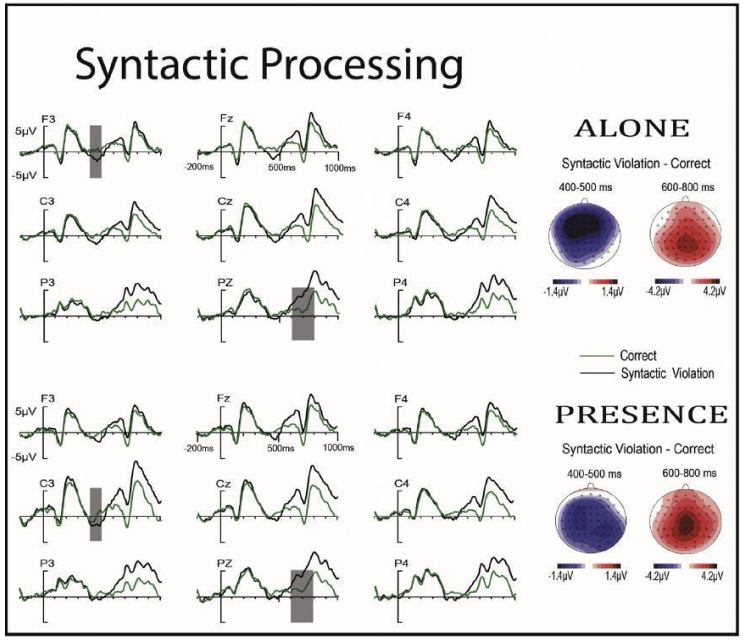
-Skin conductance (was not significant: social presence effects not due to arousal levels)

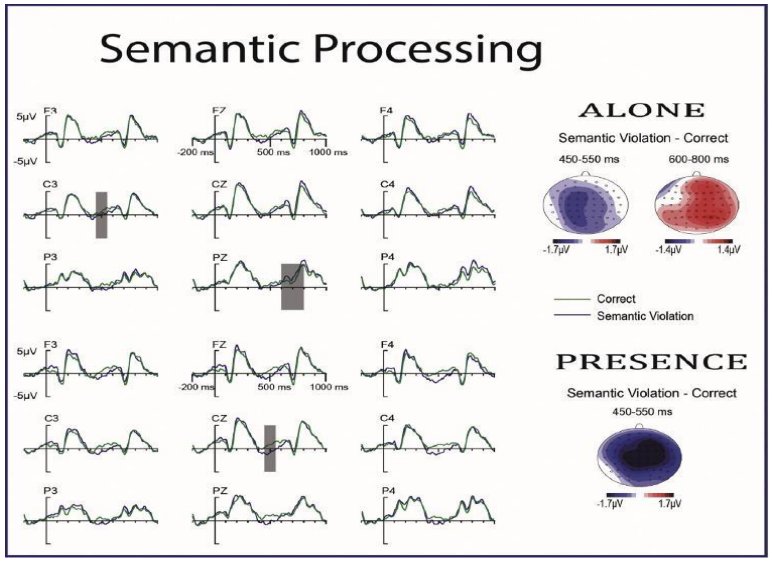
-EEG 60 electrodes, M1-M2 reference offline

-EOG electrodes

LAN turns into N-40 N400-like component in social presence

No effects on P600

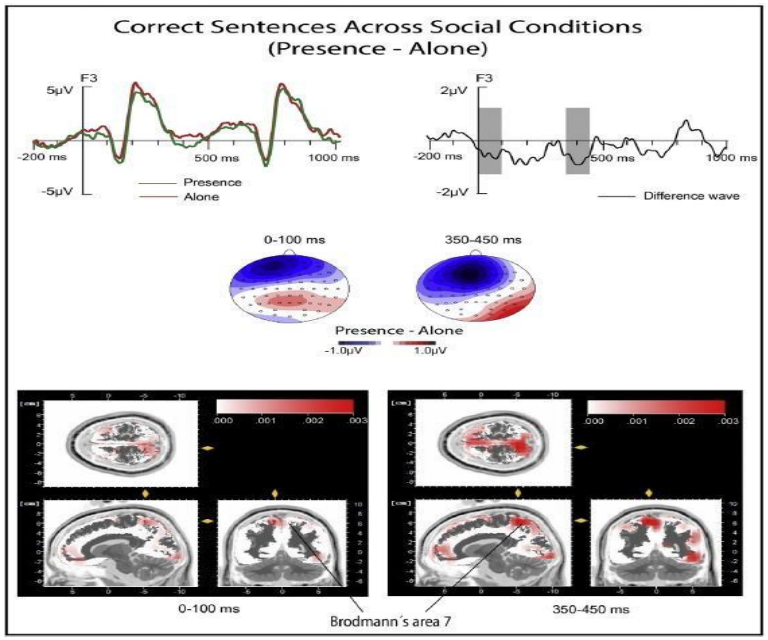




N400 boosting in social presence

P600 smearing probably a consequence of N400 boosting

P600 is normally weak in semantic processing

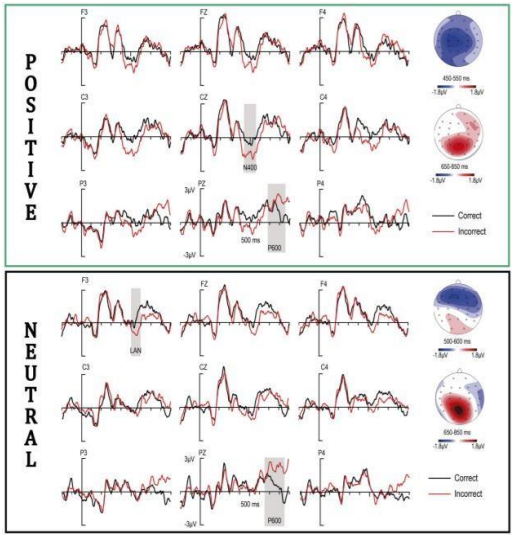


Long-lasting negativity

Probably originated in preconeus (BA7, part of DM DMN)

Social presence seems to trigger a change in strategy used to process language (syntax)

The more rule-based and algorithmic strategy normally seen for syntactic processing is turned into a heuristic, lexico-semantic analysis (proper of positive states).



Example: Jiménez-Ortega et al. 2017. Subliminal valanced words preceding critical words

N400 boosting in the semantic anomalies is in the same line

N400 to grammatical violations also occasionally (e.g., for some grammatical categories). But here the difference is only the social condition (same violations)

REASONS FOR THIS EFFECT?

Not by arousal (SC)

Social attention/cognition: activation of the precuneus, which is part of the DMN

BA7 in the precuneus is implicated in evaluating mental states of others, joint attention and orientation to biologically meaningful stimuli

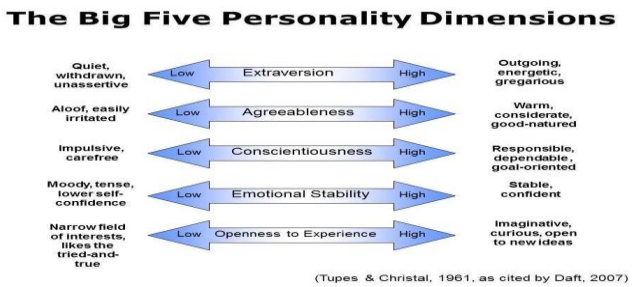
Conclusion: part of the attentional resources is being employed in pondering the close presence of another person and her/his possible mental states. This possibly determined a change in strategy

Extension:

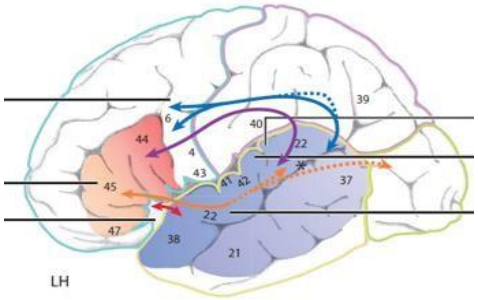
-Could these effects differ as a

function of personality?

-Social effects may vary as a function of personality (e.g., extraversion)



-Some overlap between circuits underlying personality and language (syntax) processing, e.g. the uncinate fasciculus



CONCLUSIONS

Language comprehension at both semantic and syntactic levels seems to proceed differently as a function of social context. The mere presence of other person impacts how we process language, even at early stages (LAN, N400)

More to be researched: different social presences (friend, other sex, etc.)

Personality factors seem also of relevance: more research to be done