MedNeuro

# Charité NeuroScience

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# Communicating New Beginnings

No man is an island. Truer words have never been spoken. Every day, every minute we are in constant communication with the world. Online, offline, verbal, nonverbal: Regardless of how we say something, or even when not saying anything at all, communication is an integral part of our lives.

In this issue on Communication and Social Media, we cover communication from before birth to the other end of the spectrum where we begin to construct our own languages (perhaps you are one of a handful of people worldwide who speak fluent Klingon). Also, read about how different animal species get their messages across to each other. Ronan Keating may have put it more eloquently in his 1999 hit single, but just how important is nonverbal communication?

The good, the bad, and the ugly about social media cannot be spoken about enough. Are we all internet addicts? Can social media cause psychosis? What is the CSI effect? Do scientists even care about social media? These are some of the topics we try to shed light on. In this issue, we also introduce a new article format where we feature a TED talk related to the current theme. Read about Prof. Sherry Turkle's talk on social media's influence on us in "Alone Together".

The newsletter's editorial team is still adjusting to the resounding absence of Marietta, the Editor-in-Chief for 18 issues. We are only now beginning to realize how much "behind the scenes" work she was taking care of. We'll leave it up to our readers to decide, but we hope that we managed to put together yet another stimulating issue. A big thank you to all our writers and contributors! Farewell to one and hello to another; the writing team extends a warm welcome to Priscilla Koduah.

With the end of the year just around the corner, what better time than now for new beginnings? We would like to wish all our readers a wonderful Christmas and a great start to the next year.

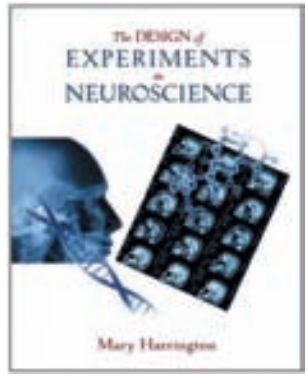
Enjoy reading!

Apoorva Rajiv Madipakkam and Ahmed Khalil,
Editors-in-Chief

# Contest

We are always interested in including your contributions. You can submit anything you see fit on the topic of neuroscience. Send us your most exciting microscopic pictures, or a creative photo, thoughts on neuroscience or self-written poems – whatever comes to mind! The best contribution will be published and rewarded with the book **"The Design of Experiments in Neuroscience"**. So, what are you waiting for? Start the engine of your mind and get going! Trust us, it is worth participating! Send your contribution to cns-newsletter@charite.de to win "The Design of Experiments in Neuroscience". **Deadline for submission for the next issue: January 31, 2014.**

This issue's winner is **James Kerr** who contributed the fantastic article titled 'Hash yer asti k'athijilari? Bringing Languages to Life'. Thank you very much for your contribution!



# Communication in the Womb

## Mother-child Communication

A high proportion of pregnant women believe some form of contact exists between them and their unborn babies. This notion was first scientifically proven by Professor Peter Hepper of the School of Psychology at the Queen's University of Belfast. His research focused on prenatal learning, and found that mothers who watched soap operas during their pregnancy had babies who later responded to the shows' musical themes after birth [1,2]. Interesting, right?

This is what one of the mothers had to say to Prof. Hepper in a recent interview:

*"During the last month of my second pregnancy, I noticed how the baby inside me would react to familiar TV signature tunes, kicking furiously and moving excitedly. After the birth of my daughter I was constantly amazed at her reactions, almost from birth and for the next four or five months, to hearing these familiar tunes. She would jerk her head towards the TV as soon as the tune started and stop feeding and turn her whole body toward the source of the sound. It was certainly evidence that babies hear and remember pre-birth sounds. I only wish I had introduced her to something a bit more classical!"*

There is also evidence that babies respond to the mother or anyone else who presses on the abdomen by pushing back [2]. How do babies perceive these different forms of communication, and at what age does the fetus begin to learn?

A study conducted in Ireland using ultrasound and measurements of sound pulses revealed that babies with normal hearing abilities react to sound as early as 16 weeks. This occurs two months before the completion of ear development, suggesting that there is more to hearing than the ear alone [3]. Interestingly, babies are also able to use their auditory abilities to start learning the native language of the mother while in the womb [3]. Communication between mother and baby, therefore, appears to be bidirectional.

## Two-way Communication

In her master's thesis in humanistic and clinical psychology at the Center for Humanistic Studies in 1984, counselor Rosalie Denenfeld studied the relationship between mothers and their unborn children. Working with ten first-time mothers, Rosalie used techniques such as focusing to discover deep levels of awareness within the body through intuitive means, keeping a journal, interviewing, art, and music. The women were well educated, middle-class, and married. They were also experiencing a minimal amount of internal, family, and social conflict due to their pregnancies. She comments that their clear verbal descriptions and artistic expressions impressively introduced how pregnant women may experience a relationship with their unborn child. "The first-time pregnant woman needs to believe she is capable of communicating with and positively influencing her baby", says Denenfeld. On the spiritual level, she further claims that pregnancy is the ultimate level of intimacy between human beings. Some of the women in the study reported that they sometimes experienced strange feelings and did not know where those feelings came from. However, they realized later that this was the feeling of the unborn baby in the womb [2].

Many women in the study had touching stories and experiences to share. For example:

*"I personally really love storms. I love to hear the thunder and I like to see the lightning. But I woke up and I was really afraid. I got out of bed and I walked around the house. I couldn't figure it out and suddenly I realized I wasn't the one who was afraid. It was the unborn baby. So I talked to the little one. I told the infant inside me that there was a storm and although the noise was disturbing, it was quite safe. The fear went away."*

Most of the things the pregnant woman encounters – the food she eats, the drinks she consumes, the chemicals she is exposed to as well as the emotions she feels – is shared in some fashion with the fetus. To the fetus, these are biological postcards from the outside world. These postcards tune and tweak the fetal brain to be more adapted to the birth environment, such as the golden-grassed savanna of Africa or the snow-swept tundra in Siberia [4]. Babies in the same womb also communicate among themselves, implying that social skills begin early in pregnancy.

Source: Häggström, Mikael. Wikiversity Journal of Medicine

## Communication Between Unborn Twins

When most babies are born, we perceive them as clean and unmarked by life, when in fact, they have already been shaped by the physical environment, the mother, and even their womb co-residents. How do twins communicate in the womb?

A study conducted by Umberto Castiello at the University of Padova in Italy showed that performance of movements towards the co-twin is not accidental. In this study, twins were filmed using a four-dimensional ultrasound at the 14$^{th}$ and 18$^{th}$ week of gestation, and this footage was recorded and analyzed. 14-week old twins often touched each other head to head, arm to head, and head to arm. Using kinematic analyses, the study confirmed that these movements were not reflexes, but planned and coordinated actions. The study also showed that at week 18 of gestation, twins would spend up to thirty percent of their time reaching out and stroking their co-twin. The twins were more sensitive when touching the delicate parts of each other such as the eye [5].

Learning and social interaction therefore starts much earlier in the womb than most of us perceive. So go ahead and start teaching your unborn babies some tricks before they are even born. Talk to your fetus today and get them used to your way of life.

[1] http://www.innerself.com
[2] Communicating with your unborn child-Cassandra Eason, 'The Mother Link', 1999
[3] https://birthpsychology.com/free-article/parents-ask-about-life-womb
[4] http://edition.cnn.com/2011/12/11/opinion/paul-ted-talk
[5] Castiello et al, PLoS ONE, 2010

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# Twin Talk

## Secret Language or Baby Babble?

In February 2011, yet another baby video hit the internet and went viral. The video shows two 17-month-old twin brothers from Brooklyn having an avid conversation in the family's kitchen, dressed in only diapers and socks. The twins mime, gesticulate, laugh, and banter back and forth, apparently having a proper conversation. However, the only syllables used throughout the video are 'da-da-da'! To date, the video has accumulated over a million hits on YouTube, was featured on the news, and on Good Morning America. It has sparked much fascination and speculation about whether a 'secret twin language' exists and how it might be constructed.

Indeed, language development of twins and the appearance of secret language has been a topic of research for centuries [1]. Developmental milestones suggest that babies start vocalizing non-reflexive sounds at an age of 6 to 8 weeks [2]. Slowly, they learn to articulate different meaningful sounds (linguists call these phonemes) and by the age of 6 to 9 months babies start babbling [2]. Babbling also goes through several phases including jargon babbling, in which toddlers imitate the intonation of adults in their babbled 'sentences' [2]. Experts say that this is what the Brooklyn twins' video captures, not, in fact, a secret language.

### The Myth of Twin Communication

Truly secret languages between twins have been reported in case studies such as the 'silent twins', who refused to speak to anyone except their twin. They developed an extremely fast, autonomous language, which they used up to their twenties and which was only intelligible to close family members over time [3].

Former studies claimed secret language to be quite prevalent in twins. Twins were thought to have a notable delay in language acquisition, as a consequence of the secret language [1]. However, more recent studies have taken into account the higher risk of neurological defect in twins due to obstetric or perinatal complications and have carefully excluded such cases from the sample population [1].

Also a more detailed definition of secret language has challenged former findings: Thorpe et al. implemented a distinction between 'shared understanding' and 'private language' [4]. Shared understanding means that the siblings use an immature language, which they understand better than adults, but use the same immature language to address others [4]. Private language comes closer to the notion of a secret language, as it describes a unique form of communication between siblings, incomprehensible to others [4].

### 'Secret' Communication is not Exclusive to Twins

Thorpe found that both shared understanding and private language are not exclusive to twin pares but is also reported for close siblings, although at a much lower rate [4]. At 20 months, about 50 % of twins pairs, but only half as many close siblings, displayed a shared understanding [4]. At three years of age, when it is expected that toddlers use about 200 words, the number of sibling pairs exhibiting shared or private language had markedly decreased [4, 5]. The number of close-spaced singletons exhibiting shared understanding has dropped to 2.5 %, while private language almost exclusively appeared in twins (6.6 %) [4]. Although in this study private language was also reported by parents at 20 months of age, it is highly likely to be a misinterpretation [4].

Interestingly, twins exhibiting a private language are more often boys, and often

**About 7 % of twins use a private language at age 3**

display a relationship of unusual dependence on one another [4]. Most often, the private language and the interdependence of twins disappear by school age [4].

With more careful selection of sample population, the apparent deficit in language development of twins was also challenged: Researchers found that at the age of three, the language capacity of twins showed a mild developmental delay of 3 months [1]. This delay grew even smaller compared to singletons with siblings close in age, whereas only-children performed best in these studies [1]. So the supposed language delay of twins seems to be less severe than originally proposed. Also, 'secret' language of twins only seemed to be a factor influencing delayed language development in cases in which twins did have a private language at the age of three [4].

Other studies have investigated factors influencing the developmental delay in twins, to which they are more predisposed, independent of the existence of a private language [1]. The main factor is environmental, which is to say, depends on the level of language stimulation at home [1]. Preventive strategies encompass education of parents as how to provide a stimulating language environment for their children and generate awareness of how important language stimulation is [1]. Emotional and practical support for parents of twins is also suggested, encouraging parents to spend more time with each child individually [1].

### The Lure of Secrets

It seems that we have a fascination for secret communication – who wasn't keen on having a secret language as a child, be it signing, a spy code or one imagining that the own language may function as 'secret' and incomprehensible in a foreign country? The Brooklyn twins' video has received a wide range of interpretation, ranging from Ellen DeGeneres' April Fool's Day interpretation over a mafiosos dub to an animated discussion about foreign politics. Apparently, the natural occurrence of secret languages in children is far less common than we wish to believe...

P.S. Watch the Brooklyn twins babble on www.youtube.com/watch?v=_JmA2ClU-vUY

[1] Thorpe, Early Hum Dev, 2006
[2] Wang, Understanding Language and Literacy Development, 2014
[3] Wallace, The Silent Twins, 1996
[4] Thorpe, et al., Int J Lang Comm Dis, 2001
[5] http://bit.ly/1wal1Zo

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# Hearing the Unspoken

## Exploring Nonverbal Communication

### Exploring Nonverbal Communication

Nonverbal communication, as the name suggests, is the process of sending and receiving wordless cues between people. While only the ears pick up spoken language, nonverbal communication can be received by all our five senses. Both verbal and nonverbal communication are made up of vocal and nonvocal aspects.

### Vocal Nonverbal Communication?

It may sound counterintuitive, but paralanguage is the vocal element of nonverbal communication. This includes pitch, tone, and speaking rate, which are elements of the vocalized but nonverbal part of language. The nonvocal part of nonverbal communication consists of body language like facial expressions and eye contact. On the other hand, spoken words form the vocal element of verbal communication, while sign language and writing are nonvocal elements of verbal communication [1]. Body language is the most well-known and studied aspect of nonverbal communication, which however, encompasses much more like proxemics (the informal space around the body), haptics (touch), oculesics (frequency of glances, pupil dilation, blink rate), and our physical appearance [2].

### Actions Before Words

Nonverbal communication evolved before verbal communication and is primarily biologically based compared to verbal communication, which is culturally based. Evidence comes from the fact that no two verbal communication systems share the same universal recognizability while some nonverbal communication has the same meaning across cultures [3]. In a conversation, 65 % of what is understood from the other person is taken in through nonverbal signals [1]. This kind of communication is harder to control and therefore has more credibility. Due to the innate nature of nonverbal signals, even children who have been blind since birth can make the same facial expressions as other children. Thus, it is easier to trust nonverbal cues and this innateness makes it harder to fake [3].

### Why Do We Need To Communicate Without Words?

The primary purpose of nonverbal communication is to convey meaning by reinforcing, substituting for, or contradicting verbal communication [1]. Facial expressions usually help reinforce our emotional state during verbal communication. For example, smiling when we tell a funny story conveys the meaning better.

In situations where verbal communication is not possible, either because of language barriers (like when traveling) or because it may be disturbing to others, for example, when sitting in a library, nonverbal communication can substitute for verbal communication by making gestures and facial expressions. In situations where a person sends mixed signals, nonverbal communication helps us understand their intentions. When a person says, "You are so inefficient!" in a mean tone but winks, you will understand that they are joking. Persistent mixed signals, where verbal and nonverbal communication contradict each other, however, can lead to confusion.

Nonverbal communication helps in deception. Animals engage in nonverbal deception to help them attract mates, hide from predators, and to attract prey. Evolutionarily, the better a species are at deception, the higher the survival rate. It is no surprise therefore, that humans have survived so long! Nonverbal signals also affect our relationships. In this aspect, touch plays a key role and so-called "tie signs" like hugging, kissing, and hand holding, which signal the intimacy and connection between two people, are most frequently studied [4].

While verbal communication is used to communicate detailed instructions, nonverbal signals are used to communicate emotion. Finally, we use nonverbal signals to express ourselves in the way we dress, set up our living environment and carry ourselves.

### Nonverbal Learning Disability

Nonverbal learning disability (NLD or NVLD) is a neurological disorder characterized by a significant discrepancy between higher verbal skills and lower motor and visuo-spatial skills on an IQ test [5]. The disorder affects one in ten learning disabled children [6]. NLD is often observed in people with Attention Deficit Disorder and in Asperger Syndrome (see also the article on page 7). People with this disorder have problems in socializing as well as understanding humor and nonverbal cues, although they have excellent verbal and memory skills. They suffer from anxiety as they worry about offending other people and are often clinically depressed as they find it hard to make friends and feel isolated [7]. NLD often goes undiagnosed and such individuals are forced to deal with their issues themselves, often resulting in suicidal ideation.


Source: http://bit.ly/1nPVjI7

In summary, verbal communication is important to interact with another, but an even bigger role is played by nonverbal communication in every aspect of our life.

[1] http://bit.ly/1zejCDQ
[2] Guerrero and Floyd, Nonverbal Communication in Close Relationships, 2006
[3] Andersen, Nonverbal Communication: Forms and Functions, 1999
[4] Nonverbal Communication Theories. (2009). In the Encyclopedia of Communication Theory
[5] Afifi and Johnson, The Sourcebook of Nonverbal Measures: Going beyond Words, 2005
[6] Treffert, Darold. "Nonverbal Learning Disorder (NLD or NVLD)". Wisconsin Medical Society[7] Little, J Soc Pediatr Nurs. 1999

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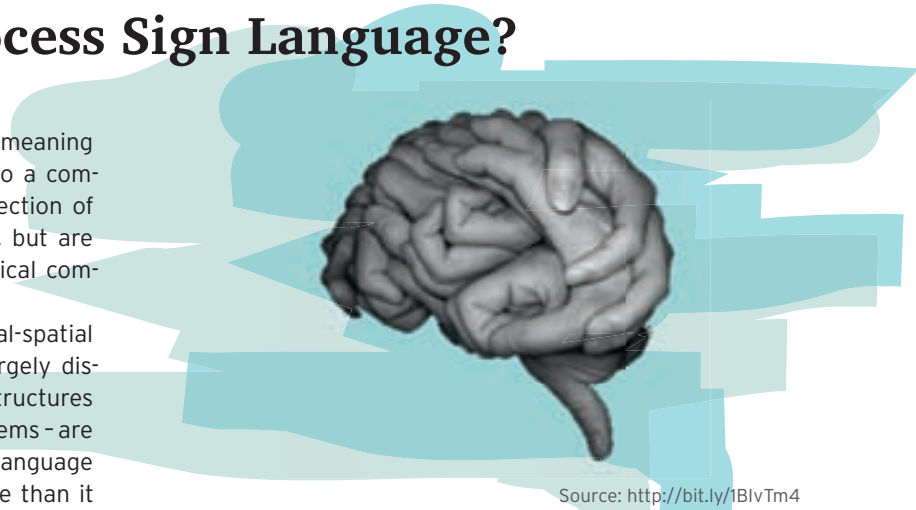
# How Does the Brain Process Sign Language?



Source: http://bit.ly/1BIvTm4

Sign language is similar to spoken language, but its meaning is transmitted in a much different way. Contrary to a common misconception, sign languages are not a collection of gestures or manual versions of spoken languages, but are highly structured linguistic systems with grammatical complexity.

Sign language involves both linguistic and visual-spatial processing – two abilities that are supported by largely distinct neural systems. When sign language is used, structures in both hemispheres – representing these two systems – are activated. However, the neural organization of sign language has more in common with that of spoken language than it does with the neural system involved in visual-spatial processing [1].

Like spoken language, sign language appears to have a critical period during childhood as well. If this critical period for language development is missed, specific brain regions will not be devoted to language. According to a recent functional MRI (fMRI) study, the brains of native signers show high activity in the right angular gyrus when processing sign language, but this activity is not seen in people who learned signing after puberty [2].

Furthermore, infants acquiring sign language babble with their hands [3]! Thus, the acquisition of sign language seems to have the same developmental track seen in children acquiring spoken language.

It is puzzling how similar the acquisition and processing of sign language is to spoken language, even though the form of communication is so different! Unfortunately, in many countries sign language is still not recognized as a language. Even Germany only acknowledged German sign language as an official language in 2002.

[1] Hickok et al, SciAm, 2001
[2] Newman et al, Nat Neurosci, 2002
[3] Petitto et al, Cognition, 2004

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# Stuttering

## From Genes to Therapy

Stuttering is a speech disorder in which words are repeated or prolonged, also referred to as primary and secondary stuttering, respectively. The degree of stuttering varies among individuals from mild to severe hampering of speech [1]. In terms of etiology, stuttering is classified into a) developmental, which is more common and manifests itself in the first two to five years of life, and b) neurogenic, after a severe head injury or stroke. The prevalence of stuttering is around 1% among the adult population, constituting a major health issue. It is two times more frequent in men [2].

The exact pathological mechanisms are not yet clearly defined. In 2010, the first three genes implicated with the disorder were isolated from families with multiple cases of stuttering. Present in chromosomes 12 and 16, these genes code for enzymes necessary for the folding, breakdown, and recycling of proteins [3].

### Social anxiety prevents stutterers from expressing themselves

Anxiety and fear of negative evaluation, also known as social anxiety, is another important issue in stutterers. Effectively, this anxiety not only prevents them from expressing themselves, leading to social withdrawal, but also influences the speech inefficiencies as it partially mediates the stuttering events [4].

The available treatment methods focus on early intervention with behavioral therapy. Treatment aims to minimize the impact stuttering has upon speech, but not the stuttering itself, as well as to relieve patients' anxiety [5]. Ongoing function magnetic resonance imaging (fMRI) and positron emission tomography (PET) studies also try to identify specific speech patterns related to higher frequency of stuttering events by monitoring the brain of stutterers. Avoidance of such patterns would lead to a significant relief of the symptoms [6]. It still remains tough however, to associate the recent gene discoveries with a causative treatment that would benefit these patients even more.

[1] Perkins, J Speech Hear Disord, 1990
[2] http://1.usa.gov/13mzbMq
[3] Kang et al, N Engl J Med, 2010
[4] Blood et al, J Commun Disord, 2007
[5] Blomgren, Psychol Res Behav Manag, 2013
[6] Van Borsel et al, Brain Lang, 2003

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# When Communication Becomes Difficult...

## Autism and Asperger's Syndrome

According to the fifth and most recent edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), the diagnostic criteria for autism spectrum disorder (ASD) are "persistent deficits in social communication and social interactions" and "restricted repetitive patterns of behavior, interest or activities" [1]. Here, ASD includes entities previously considered distinct diseases such as Asperger's disease, Kanner's autism or pervasive developmental disorder [1]. However, according to the International Classification of Diseases (ICD-10), autism and Asperger's disease are still considered separate entities [2].

### Asperger's patients may seem perfectly healthy

Aspergers disease is characterized by intact language and cognitive development, as opposed to autism [2], with the two symptoms mentioned in the DSM-5 (deficits in social communication and repetitive behavior) being affected in both disorders. In the eyes of an observer, Asperger's patients may seem perfectly healthy [3], whereas autism patients do not show any of their thoughts or feelings and are unable to engage with others [1].

ASD is a neurodevelopmental disorder with heterogenous underlying mechanisms. No single mutation accounts for more than 1-2 % of autism cases in the population [4]. The disease itself affects many regions of the brain in various ways, from differences in gene expression to connectivity patterns [4]. Studies show that the cytoarchitectural organization in the developing brain is altered in the frontal, parietal, and temporal lobes, cerebellum, and subcortical structures.

### The disease affects many regions of the brain

Cerebellar dysfunction may be responsible for the sensory and motor symptoms of ASD, whereas frontal and temporal lobes are supposedly involved in the social and language impairments [4]. Connectivity abberations in the prefrontal cortex, the anterior cingulate cortex, and the superior temporal regions are associated with language, working memory, and other cognitive impairments [4].

[1] American Psychiatric Association, DSM-5, 2013
[2] World Health Organization, ICD-10, 1993
[3] www.nimh.nih.gov
[4] Won et al, Front Mol Neurosci, 2013

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# Empathetic Abilities in Schizophrenia

## How Patients Fail to Understand and Exhibit Emotions

Small hints in a person's behavior, like a facial expression or something they said, are usually enough to inform us of their feelings. Even then, there are many instances where an ambiguous cue leaves us puzzled. The interpretation of others' feelings and the perception of their emotional state is a complicated, covert process termed empathy. It is perhaps one of the most important social tools. Empathy, like the closely related "theory of mind", is multi-dimensional, with an emotional and cognitive component. It refers to the integration of learned information for the interpretation of others' feelings and is a prerequisite for a true empathetic response [1].

Social cognitive deficits in patients with schizophrenia are not a new concept. However, only recently has a thorough classification and investigation of their causality begun. Because patients with schizophrenia exhibit a broad spectrum of symptoms, like hindered working memory, it is difficult to attribute their social communication deficits to only one of them. Indeed, studies based on questionnaires assessing empathetic abilities found that patients are impaired in almost all cognitive and empathetic fields [2-4].

Difficulties in understanding emotions, sarcasm, or lies inferred from gestures or contextual information has been documented in these patients [2]. Additionally, they seem to be unaware of these deficits [3], making any form of intervention challenging. Interestingly, one study found that the emotional component of empathy, i.e. spontaneous emotional reaction, was less affected [4]. Besides the difficulties in perceiving social cues, the display of fewer nonverbal gestures and attenuated emotional expressions hampers social interactions in patients with schizophrenia [5].

The implications of the aforementioned findings are not only restricted to the management of social deficits, but also to an increased awareness in the social environment of the patient.

[1] Rankin et al, Cogn Behav Neurol, 2005
[2] Sparks et al, Schizophr Res, 2010
[3] Bora et al, Psychiatry Res, 2008
[4] Montag et al, Schizophr Res, 2007
[5] Lavelle et al, J Nerv Ment Dis, 2014

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# Mirror Neurons and Motor Process Understanding

Mirror neurons are a subset of visuo-motor neurons found, among other neurons, in an area of the ventral premotor cortex called area F5. Neurons here typically encode motor actions that have a specific goal, such as grasping a glass. Mirror neurons are distinct from this population in the sense that observing another being performing a similar action with the same outcome activates them. However, they remain inactive when we observe a similar movement with a different goal or an object that would be the target of the movement. Their role also extends to the imitation and understanding of sounds and emotions [1].

### The outcome of an action activates mirror neurons

The visual and the direct-matching hypotheses are the two prevailing theories attempting to shed light on this subject. The former proposes that visual centers in the brain decompose the visual stimuli of an observed action and analyze each part separately without any involvement of motor neurons. Neurons in the superior temporal sulcus, however, seem to decode information about the direction of movements in general rather than distinguishing between the movement of different body parts [2].

On the other hand, strong evidence supports the direct-matching hypothesis. To perceive an action, we employ the same areas that are activated when we actually perform this action. Single-neuron studies on macaques were the first to provide solid evidence about the function of mirror neurons [3]. Human studies using electroencephalography [4] and magnetoencephalography [5] then showed that rhythmic oscillations in the central region underwent the same changes when the subjects performed or observed a specific action.

Mirror neurons contribute to the understanding of motor actions without the involvement of higher order processes; a superficial one though. For a more explicit analysis of the actions happening around us, e.g. the determination of the reason or their implications, fMRI studies have shown that other cortical regions must be activated [6].

[1] Oztop et al, Neurosci Lett, 2013
[2] Rizzolatti et al, Nat Rev Neurosci, 2001
[3] Casile, Neurosci Lett, 2013
[4] Altschuer et al, Soc Neurosci Abstr, 2000
[5] Hari et al, Proc Natl Acad Sci U S A, 1998
[6] De Lange et al, Current Biology, 2008

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# What Aphasia Tells us about the Organization of Language in the Brain

Small focal lesions in the brain can lead to severe disturbances of communication with others. The clinical term for this impairment of language is aphasia. It is a typical and frequent symptom of a left-hemispheric stroke [1]. The different types of aphasias are surprisingly diverse.

Broca's aphasia is a so-called expressive or "motor" aphasia. Patients have impairments in expressing themselves; they cannot form words or name things. However, the understanding of spoken and written word is intact, which makes the whole situation the more frustrating for the patient. Often, a lesion in the posterior part of the left inferior frontal gyrus, known as Broca's area, is responsible for Broca's aphasia.

### Aphasia is a surprisingly varied symptom

Patients with Wernicke's aphasia have very different symptoms. They have severe problems with understanding while their speech production is intact. They will talk fluently, spontaneously, and with a normal melody and rhythm of speech. However, what they speak makes absolutely no sense. Lesions in the posterior part of the superior temporal gyrus, a part of the auditory association cortex, is often responsible for these types of symptoms.

If language generation and comprehension are disturbed, because both Wernicke's and Broca's area are affected, global aphasia is present and the patient can neither speak nor understand. If the fibre bundle between the two regions is lesioned, patients show a so-called conduction aphasia that also includes impairment in repetition [1].

### Aphasia is common in left-hemispheric strokes

The fact that these very distinct versions of speech impairment exist implies that different aspects of communication are mediated by different regions in the brain. It also suggests that a highly specialized network of brain areas function together to make communication work. Interestingly, when aphasia symptoms improve with speech therapy, the surrounding brain region can take over parts of the function of the damaged area [2].

[1] Mumenthaler and Mattle, Neurology, 4th edition, 2004
[2] Szaflarski et al, J Stroke Cerebrovasc Dis, 2011

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# Culture Smart and Science Intelligent

## How do we know what we believe we know?

We subconsciously reflect our cultural backgrounds in daily communication, expecting others' reactions based on (our own) implicit cultural rules. However, as Paul Watzlawick once asked: "How do we know what we believe we know?" [1]. We tend to expect that everyone interprets the world in the same way, but different people live in slightly different realities.

Cultural miscommunication often stems from different communication styles [1,2]. One must take the time to scientifically study human cultures of interaction to understand the information being transmitted. Cultural misunderstandings can even pertain to a kiss.

### A Kiss Is Not Always Just a Kiss

Kissing someone always means entering another person's zone of intimacy – and the amount of effort this requires largely depends on culture. Paul Watzlawick describes an interesting example in his book "How real is real?" [1]: During the Second World War, American soldiers dated British women while they were stationed in England. Surprisingly, both groups accused the other of being too fast and eager to have sex. American men and British women used the dating routines they had learned within their own culture. However, their order of steps was different. While kissing was considered an early step for the Americans, it was an intimate act occurring just prior to sex for the British. On the first date, when an American soldier gave a British woman a kiss as a form of pleasant entertainment, but of no serious consequence, she either felt that he was moving too fast and cancelled the date or she started taking her clothes off – which made him feel that she was the one going too fast.

There is a bright side to the confusion as well [3]. Sometimes, when confused and faced with too many options, we still have the chance to make a good decision. In the "Dàodéjīng", Lǎozi called this state of productive confusion "Wúwéi", which means "action without action" [4]. In this state, we find a solution unexpectedly despite a lack of awareness of the best solution. It seems that there are alternative, implicit ways of dealing with questions without a thoroughunderstanding of the answer.

Through examining other cultures, we may be able to gain a better understanding of ourselves and achieve breakthroughs in communication. For example, in most cultures we have a "Jein" response, which is the combination of "Yes" and "No" ("Ja" and "Nein" in German), that is usually reserved for situations that cannot be judged before having a better understanding of the matter. This "Jein" is often essential in science, which itself is essential for progress in the domain of communication.

### Cultural Neuroscience

To examine how cultural diversity shapes the brain and behavioral variations, the interdisciplinary field of cultural neuroscience was developed. The psychologist Nalini Ambady proposed a framework for cultural neuroscience with two core strategies: 1) Culture Mapping – mapping the cognitive or neural processes common to, as well as differing between, cultures; 2) Source Analysis – determining the sources of observed similarities and differences in culture mappings [5]. There are three main sources: genetic commonality or difference, cultural learning mediated by brain plasticity, and the degree of similarity between cultural environments [5]. These two strategies outline one possible approach that can show how individuals from different cultures process the same environment differently. One well-studied example is the divergent self-perception in communication that individuals from Western and Eastern cultures have [2,5].

### The Me-We Dimension

In Western culture, individuals tend to lean towards the "me" dimension. They value uniqueness and emphasize being independent from a group. In Eastern culture, however, individuals are more likely to tend towards a "we" dimension. They value social harmony and adherence to group norms [2,5].

Cultural variation in self-reference is mirrored in neural responses, which affect cognitive and emotional processes [6]. A study on self-referential processing in Caucasian and native Chinese subjects has shown that the medial prefrontal cortex, an area engaged in self-reference, was activated in Chinese subjects when judging themselves as well as their close relatives, whereas this activation only occurred in Caucasians when they judged themselves [7].

Source: http://slidesha.re/1FThTWc

### Culture Smart + Science Intelligent = Communication Wisdom

William Lawrence Bragg said "the important thing in science is not so much to obtain new facts as to discover new ways of thinking about them". Science creates diverse ways of thinking that lead people towards different understandings of certain phenomena in the realm of culture. Culture reflects society's impulses and values. Culture is smart. Science creates new thoughts and insights. Science is intelligent. Thus, an intelligent application of science can enrich culture while a smart use of culture can motivate science. Taken together culture and science can produce wise communication.

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# What Does the Fox Say?

## Understanding Animal Communication

Maybe you are one of the over 450 million viewers of a music video from the Norwegian duo "Ylvis" who wondered, in a very entertaining manner, how the fox communicates. Although this concern was not predominantly driven by scientific interest, it still got many people interested in animal communication. How do animals exchange information without the use of language? The answer is as multifaceted as faunal biodiversity itself. Among the capabilities of visual, auditory, olfactory, electro, touch, thermal, seismic communication, and many more, this article focuses on the communication skills of four impressive representative species.

### Waggle, Waggle: Informative Dancing Pattern of Honey Bees

Living in large colonies, honey bees are highly organized and to them, effective communication is absolutely essential. In order to inform other foragers of an attractive resource, a foraging bee performs a dance. It codes location and profitability of the food source [1].

The bee dances an eight, and moves the abdomen from side-to-side. Thereby, the waggle orientation clockwise from vertical encodes the related orientation of the source from the position of the sun. The duration of the waggle is proportional to the distance to the resource, and reflects the effort to reach it, respectively (e.g. in a strong headwind). The waggle-dancing bees also produce a scent that is directly related to the intensity of the dance and the profitability of the source [1].

### Electrifying Dialogues

A specialized way of communication, enabled by the high conductance of water, is electronic communication. A dedicated organ with modified nerve or muscle cells called electrocytes can generate an electric organ discharge (EOD) by the synchronized activation of thousands of electrocytes [2].

Source: Betty Jurek

Strongly electric fishes like the Atlantic torpedo ray, which can create discharges up to 220 V, use this organ for defense and hunting. Weakly electric fishes like Peters' elephantnose fish use the discharges for navigation and communication and therefore have electroreceptors as well.

Different patterns of EODs create a sexual dimorphism where male fishes communicate their sex by emitting low frequency EODs, while female fishes are recognized by high frequency patterns. Some electric fish produce exotic discharge patterns (similar to 'chirps', 'raps' or 'creaks') to serenade potential mates during courtship [2].

### Good Vibrations: Communication in Blind Mole Rats

Adapted to their dark and narrow surroundings in dug tunnel systems in the ground, mole rats use different tools for communication. While naked mole rats (Heterocephalus glaber) live in eusocial colonies and use low frequency vocalization and odors to communicate, the blind mole rat (Spalax ehrenbergi) lives a solitary life [3].

Individuals are highly aggressive and try to avoid contact. Therefore, it is essential to communicate through long distances in a narrow tunnel system where airborne transmission of sounds is limited. Spalax ehrenbergi therefore uses antiphonal, substrate-borne seismic communication: It generates vibratory signals by tapping its head rapidly on the roof of the tunnel and perceives seismic signals by pressing the lower jaw to the tunnel wall. Only during mating period in the winter, individuals have closer contact and use vocal communication to promote mating [4].

### Can Apes Ape Humans?

With apes being our closest ancestors, a lot of research has been done to investigate the differences and similarities between the communication skills of humans and apes. Similar to humans, apes communicate with each other using vocalization and gestures, including facial expressions [5].

Source: Betty Jurek

In chimpanzees, vocalization is very distinctive, as they have a broad range of sounds for different kinds of predators and for a spectrum of emotions. There are even dialects between distinct chimpanzee groups, which facilitate identification [6].

Apes can also be taught to recognize symbols or hand signs and use them to communicate. Still, this is far away from the complexity of human language. All attempts to teach apes to speak have failed, probably due to differences in the anatomy of vocal muscle structure and the lack of highly specialized speech-related areas and connections in the brain [5].

Perhaps we are very privileged to have a communication system as sophisticated as language. That way, we can describe everything that we feel, see, hear, think, and know. But sometimes, when I stroke my cat's head and she purrs, I treasure non-verbal communication. By the way, the fox "says" a lot. It has a repertoire of vocalization sounds that vary from barking like a dog to cawing like a crow and to screaming like an old lady. What a chatty species!

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# Sing me the Song of Your… Finches?

## Prof. Constance Scharff and the Neurobiology of Songbird Vocal Learning

As can be seen from many other articles in this issue, communication is absolutely not restricted to human language, but occurs throughout every species, no matter in what form. However, the origin and processes of vocal communication comprise a major interest in that field.

Similar to human babies, juvenile songbirds acquire their "vocabulary" by imitating adults nearby. Because of this striking similarity, songbirds, and more specifically zebra finches (Taeniopygia guttata), have become a model organism for research on vocal learning. Here in Berlin, Prof. Constance Scharff, holds the chair of Behavioural Biology at Freie Universität in Dahlem. She has dedicated her career to pursuing the neurobiological questions behind the acquisition, production, and use of vocal communication.

She started her work on the songbird as a system for vocal learning at Rockefeller University in the lab of neurogenesis pioneer and Berlin Brain Day 2013 keynote speaker Fernando Nottebohm. He discovered that seasonal changes in songbird brains correlate with song production. These changes comprise neurogenesis in a region of the parolfactory lobe they termed area X [1,2]. Area X in the brain of birds corresponds to the human basal ganglia, which are essential for human language processing [3]

Zebra finches, like humans, acquire their songs during a specific pre-adolescent time frame according to a tutors' model, and this is likewise influenced by social circumstances. Any variations and imperfections of those may reoccur in their pupils' songs as well. While zebra finches learn once in their life, other birds may seasonally vary their repertoire.

Female and male Zebra finches
Source: wikimedia commons

Together, Nottebohm and Scharff showed, using lesion experiments, that the learning of a tutor's song requires recursive processing of auditory feedback [4], a process similar to the human situation. In subsequent publications, it was shown that there are not only morphologic changes, but differential gene activation amongst the two sexes as well, and even different kinds of song [5]!

One gene must have particularly caught her interest: the transcription factor Forkhead Box Protein 2 (FOXP2). The FOXP2 gene was identified in a family with numerous cases of verbal dyspraxia, affecting the expression and articulation of language [6]. Among vertebrates, the FoxP2 gene and respective protein are highly conserved. Thus, Scharff and her team assume its importance in the development of brain circuits is necessary for, although not restricted to, the production of speech/song [7].

The work of her group here in Berlin revealed that FOXP2 expression in striatal neurons of male zebra finches is negatively correlated with the animal's age and its sing stability [8]. They also showed that knocking the gene down causes general impairments in the reproduction of their tutors' songs. Furthermore, it interferes with the birds' ability to modulate their singing-related behavior according to the social context [9].

In collaboration with many other researchers, Scharff has furthered our knowledge of the songbird genome [10] as a basis for sophisticated neurogenetic strategies applied in her research. Using state-of-the-art invasive and noninvasive imaging techniques, she was involved in providing science with revolutionary three-dimensional data on the delicate morphology of the zebra finch syrinx, even revealing an unknown structure for sound modulation [11].

In a recent publication, they brought the similarities between the human and songbird speech/song production to a whole new level. They produced stuttering birds by inflicting neurotoxic damage to the pallial-basal-ganglia-thalamic-pallial pathway. Interestingly, this only occurred in those birds that already had a tendency to repeat syllables at the end of their songs [12].

Prof. C. Scharff, Source: Thomas Berg

However, the work of the Scharff group is not limited to zebra finches. Together with invertebrate neurobiologists, they assessed the role of FOXP2 in Drosophila melanogaster [13]. They also work on communication systems of an animal one would not necessarily think of as a model system: nightingales (Luscinia megarhynchos), a songbird know to produce up to several hundred syllables a night. Since 2000, the group is running long-term field studies in Berlin's Treptower Park where they record and study migration, singing, and territory dynamics [14,15].

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# Silence On the Line

## A False Start in the Study of Communication

There are dozens of ways to study communication scientifically. But this article won't tell you about a single one of them. Instead, what follows is an exploration of a scientific phenomenon rejected by the international community: Telepathy.

The term, coined by Frederic Myers in 1892, came to envelop a colourful pseudoscience embraced in the late 19th century [1].Yet for all its lurid history of exposed fraud and scientific malpractice, the history of telepathy research has much to tell us about how we deal with rejected scientific hypotheses today. As a field, it's bizarre. As a model for perseverance and faith in findings, it's something else entirely. Furthermore, the story of telepathy can tell us how even the most damning dead ends can have important (and surprising) consequences.

### Laying Down the Law

Many people did (and some still do) take telepathy very seriously. For example, both the Society for Psychical Research (SPR) and its American equivalent (the ASPR) were founded in the 1800s to study psychic phenomena. Throughout their long history, the groups have devoted themselves both to investigating the above-mentioned practices and debunking fraudsters [2]. Both organizations continue to have active membership today, and operate several peer-reviewed journals including The Journal of Parapsychology [3].

Scientists from these groups have also helped to standardize experimental practice. Often, "Zener Cards" are used to test whether a card viewer can transmit information to a subject far away. Another well-known family of experiments relies on the "Ganzfeld", a sensory deprivation chamber in which participants try to communicate with a "receiver". Though the setup has been roundly criticized, a meta-analysis published in the more mainstream Psychological Bulletin found a tiny, yet significant statistical effect [4]. In intervening years, however, the methodology of this review has also been called into question [5].

Perseverance is a critical quality in science, and indeed, the proponents of telepathy research have shown remarkable staunchness. In fact, experiments in extended consciousness have recently moved from Ganzfeld chambers into fMRI scanners. Theoretically, if one can show that one participant's brain activity simultaneously covaries with another's, there could be mental forces at work [6,7]. Alas, the promise offered by even the most up-to-date scanners have thus far failed to provide unassailable results. As with earlier techniques, experiments still suffer from questionable design and small sample numbers [7].

### Revenge of the Skeptics

Alas, most findings, including the Ganzfeld meta-analysis above, likely represent a fluke. Despite its 100+ year history, there has never been a single experiment that proves the existence of telepathy. But this was certainly not for lack of trying [5,7]. In one memorable example, the US government spent 20 years and more than 20 million dollars on a top-secret project aimed at spying on the Soviet Union through telepathy and related techniques [8]. Formal meta-analyses and revisiting of original scientific data have also led to dead ends, with most effects explained-away through poor experimental design [5,7,9].

This is not to say, however, that "spooky" communication is not real. Humans' drive to communicate is so strong that it seems we may pick up information from others in the form of subtle body language (see article on page 5). In the past, these phenomena were used to disprove hundreds of experiments, but there are more contemporary explanations of why we can't shake a nagging feeling that telepathy might be real. For example, JM Rudski was able to show that perceived telepathy could be due to covariation and hindsight bias [9]. Furthermore, expectancy bias and wishful thinking may also contribute [5,7,9].

### Dead End or Lively Beginning?

While all may be lost for telepathy, we still have a few wonderful souvenirs of its one-time popularity. Perhaps the best comes from the life-long quest of a scientist to explain mysterious communication between himself and his sister.

Source: Wikimedia Commons

Driven by this need, he found a way to attach electrodes to a subject's skull and detect faint electrical activity. Dr. Hans Berger was certain that he had finally discovered telepathy, but instead, was embarrassingly wrong. But through his error, Berger had laid the foundations for electroencephalolographic readings: the substrate for today's EEG.

In closing, it seems that Berger might have the last laugh after all. While his dream of a telepathic force met with a dead end, researchers are starting to use EEG and fMRI to detect communicative patterns of activity in patients trapped in a vegetative state [11]. Perhaps one day, electrical transmission of thoughts may be a workable reality, enabling information flow only dreamed about previously. Until then, may the study of telepathy hearten us all with its colorful characters, and perseverance in the face of widespread disdain. Even if you don't believe in a science, there's an awful lot that you can learn from those who once did, or still do.

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# Hash yer asti k'athijilari?

## Bringing Languages to Life

If you understand the title of this article, you probably know you're special. So special that only a handful of people in the world share this ability with you. But the number is growing. In early October this year, 'Living Language' released an app as part of a language package allowing eager fans and curious linguists to learn Dothraki, the invented language of the warrior nomads from George R. R. Martin's "A Song of Fire and Ice" series, adding the fictional language next to more familiar options such as Spanish or Mandarin Chinese [1].

### Conlangs

Dothraki may have its own app, but it is only the latest in a long lineage of so-called constructed languages, or conlangs. A conlang differs from a natural language in being consciously designed by a human mind, rather than emerging spontaneously from it. This definition somewhat strangely groups computer programming languages alongside artistic languages such as J. R. R. Tolkien's Quenya, and encompasses history's myriad idealistic attempts at creating a universal, or just improved, language. These range from sincere and concerted efforts to fanciful and bizarre creatures of the imagination, with many falling somewhere in between.

Often these creations are philosophically motivated: Lojban is designed out of predicate logic to be syntactically unambiguous, and Láadan, invented as a women's language, offers words such as lóda (to be pregnant wearily) and áshána (to menstruate joyfully) [2].

While conlangs vary widely in popularity and practicality, they all have one common feature: no conlang has ever made it past a dedicated group of followers into a broader population.

### Thing Which Is Flat

Simple exposure to a language during childhood is not enough for a child to adopt it; the language must be useful in allowing it to communicate desires to the group: it has to be relevant.

A nice insight into the importance of relevance comes from that weird cousin of conlangs: Klingon. Klingon boasts its own language institute, a dedicated annual conference, and around 30 fluent speakers, with many less proficient hobbyists. As far as conlangs go, it's doing pretty well. It has also tasted that most important ingredient for a healthy living language: a native speaker.

In 1992, computational linguist and Klingon speaker D'Armond Speers became a father and attempted to raise his son to speak Klingon. To an extent, it worked; father and son managed a degree of communication in the warrior-alien language. But it wasn't easy. At that point, the Klingon vocabulary consisted of about 1,000 words, mostly war and space related, but conspicuously lacking concepts relevant to a human child, such as table. D'Armond was forced to improvise, coining terms like "thing which is flat", but eventually his son stopped responding, and in 1997 the first native speaker of Klingon forsook his language for the tongue of the tribe, English [3].

### A World Apart

The importance of group communication is further emphasised by perhaps the most famous conlang, Esperanto, a language invented as a neutral lingua-franca. Now spoken by 160,000 to 2 million people worldwide, it is the largest conlang ever. Amazingly, it has between 350 to 2,000 native-speakers, and even one 2nd generation speaker, meaning that in the world of conlangs it is the closest to becoming a living language [2].

However, this population is spread across over 100 countries [4], preventing a critical mass of speakers from catalysing the emergence of an Esperanto speaking community concentrated in one location. All native Esperanto speakers are therefore bilingual, and when other options of communication are available to a child, the benefit of adopting a language with limited local speakers is diminished.

### A Resurrection

Although Esperanto hasn't yet materialised the hopes of conlangers, there is one language that has been artificially implemented into a population and achieved a community of native speakers – 9 million to date. The Jewish diaspora that converged on Ottoman-ruled Palestine in the late 19th century required a common mode of communication. Since Hebrew had remained articulated through religious practice, it was adopted by default as a means of rough communication between communities [2]. It became a pidgin restricted to marketplace interactions, but when Eliezer Ben-Yehuda came along with his modernised version and vision of a shared Jewish language, there was not only an existing need for it, but some experience as well. His son became the first native-speaker of Hebrew, and started a unique linguistic event that continues today [2]. Hebrew is not a constructed language, but it stands as proof that a non-living language can enter a population and flourish. This success highlights the importance of relevance, group, and identity to a language that the more ambitious conlangs are forced to confront in their attempts to spread their tongue.

source: wikimedia commons, http://bit.ly/1zfejUw

### One Language Is Never Enough

The difficulties facing conlangs are precisely what makes it so hard to save dying natural languages, which are ironically seeing a rapid period of extinction as conlangs are blooming. Some linguists see hope in conlangs preserving elements of these endangered languages, the irony of which surely couldn't be lost on those pushing for a universal tongue. Of course, the dream of a world language is beset by the reality of language evolution; once native speakers emerge, they will adapt the language into regional dialects and eventually separate tongues. To which an Esperantist might say "Unu lingvo neniam sufiĉas".

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# Imaging Language and Communication

## Modern Imaging Techniques Reveal the Complexity of Language

The classic brain areas associated with language – Broca's and Wernicke's area – have been identified from patients with brain lesions (see page 8). It is plausible that other regions, such as the auditory cortex for hearing and the visual cortex for reading, also play a role in communication. However, in recent years, imaging has contributed a great deal to a more network-like understanding of the representation of language and communication in the brain and demonstrated its complexity.

### Different Imaging Modalities

Imaging studies with combined functional magnetic resonance imaging (fMRI) and diffusion tensor imaging (DTI) have shown that the arcuate fascicle directly connects Broca's with Wernicke's area [1]. This fiber bundle is thought to represent the dorsal pathway of language. It connects auditory cortices to parietal and frontal lobe networks, and seems to mediate between hearing sounds and articulation of words [2]. Furthermore, a second pathway exists and is represented by the extreme capsule [1]. This ventral stream projects from auditory cortices to the temporal lobe. It is thought to be the connection between hearing sound and understanding the meaning of spoken words [2].

Resting-state fMRI studies demonstrate that the language network is even more extended. MRI signals in Broca's and Wernicke's areas have a positive correlation with signals in neighbouring prefrontal, temporal, and parietal regions, but also with subcortical structures like the basal ganglia [3].

Studies on communication and language have also been performed using near-infrared spectroscopy (NIRS). This technique allows subjects to communicate in a natural environment. NIRS has proven useful in examining the brain activity of infants to get an insight into how we learn to speak [4].

It seems that with every fMRI, PET or NIRS study conducted on the subject, it is proven further that the language network is more extended and complex than previously thought.

### Clinical Applications

This more detailed knowledge of the extent of the language network also has direct clinical applications. Brain surgeries on tumor or epilepsy patients need to avoid areas that can affect the ability of the patients to speak. The Wada test, which "switches off" one cerebral hemisphere with barbiturates, was formally the gold standard to determine the dominant hemisphere for language production. Modern imaging methods, like fMRI or navigated transcranial magnetic stimulation (nTMS) can map the individual brain areas involved in language much more precisely and in much more detail. Therefore, these methods are increasingly being used for preoperative planning [5,6] and are considered an adequate replacement for the Wada test [7].

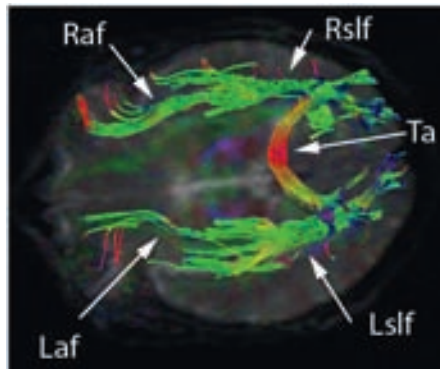
Furthermore, imaging studies are a great tool to help us understand how functional recovery takes place after stroke or surgery, and to what extend other structures can take over functions essential for communication [1]. This further adds to understanding of the language network.

### Social Aspects of Communication

Not only have the structural components of the language network been analyzed with imaging, the social aspects of communication have also taken center stage in recent years.

A study conducted with simultaneous MRI scanning of close female friends showed that neuronal coupling happens during live verbal communication about autobiographical events. The time course of neural activity in language areas was coupled with the time course of neural activity in the friends' auditory cortex, representing very basic reciprocal mechanisms of social interaction [8]. So-called hyperscanning – the parallel scanning of two subjects who can interact during the session – is a great way to study brain activation during live social interaction.

However, in a social context it is not only the literal meaning of words and sentences that have to be processed, but also the intended meaning of the speaker. This is especially true for metaphors and sarcasm. Differences in brain activations during communication with metaphors and sarcasm have been investigated with fMRI. Interestingly, brain activation related to metaphors was found in the head of the caudate. Sarcasm elicited activation in the left amygdala, which probably represents the processing of the speaker's emotional status [9].




Source: Aaron Filler, MD, PhD

All in all, imaging has given us much insight into the complexity of the language network and its use in social context. To know how the brains of healthy participants function during communication is important to understand conditions such as autism or schizophrenia and has great clinical implications in rehabilitation and surgical planning.

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# Academic Social Networks


Source of all three: Wikimedia Commons

Social media like Facebook and Twitter have been around and very popular for a while now. Both have science-related applications. On Facebook, you can find invitation-only group pages for specific research fields. Twitter is a popular discussion forum, especially during conferences. However, neither of them are specifically designed for scientists.

**Scientists Care About Social Networking**

There have been a number of attempts to launch academic social networks. Until recently, they were unsuccessful. This was blamed on the wariness of scientists to share data, papers, and comments online [1]. The tide has changed, and now there are even three academic social networks competing with each other: ResearchGate, Academia.edu, and Mendeley.

A Nature reporter assessed the popularity of these media among 3500 scientists from different fields (Table 1). Many of the respondents knew of these social networks and had used at least some of them.

So, apparently it is generally accepted, and possibly even expected of you, to be a part of a social network.

**Which One Should You Use?**

With all academic networks, becoming a member is free and on each website you get a profile page with similar features (Table 2). Based on this, I could say that you may choose whichever webpage design you like better.

However, there are some differences to consider. Mendeley is originally a reference manager and is still used mostly for this purpose. Although networking is encouraged, it is not nearly as interactive as ResearchGate or Academia.edu. But many users of the two networks confessed that they signed up only in case someone wanted to contact them, rather than for the purpose of active networking themselves. Another interesting fact is that social scientists are more fond of Academia.edu while life scientists focus rather on ResearchGate [1]. This also seems to hold true for the Charité scientists (Table 1).

**Table 1. General Data**

| | ResearchGate | Academia.edu | Mendeley |
|---|---|---|---|
| Start date | 2008 | 2008 | 2007 |
| Members | 4.5 million | 11 million | 3.1 million |
| Charité members *per 1 November '14 | 2443 | +/- 100 | Not possible to search based on affiliation |
| Awareness [1] | 88 % | 29 % | 48 % |
| Regular visits [1] | 48 % | 5 % | 8 % |

[1] Data from R. van Noorden, Nature, 2014

**Table 2. Profile Features**

| | ResearchGate | Academia.edu | Mendeley |
|---|---|---|---|
| Profile picture | Yes | Yes | Yes |
| CV | Yes | Yes | Yes |
| Upload documents | Yes | Yes | Yes |
| Follow others | Yes | Yes | Yes |
| Discussion Forums | Yes | Yes | Yes |
| Post-publication reviewing | Yes | Coming up | No |
| Reference manager | No | No | Yes |
| Analytics on your profile | RG score | Analytics tab | None |
| Question portal | Yes | No | No |

I created a profile with all three of the networks, and browsed around for about a month to get to know them. I found myself more engaged in the ResearchGate community, which in part was due to the regular email updates. Upon registration, and any time after, you can also decide on not receiving these updates, or receiving them less frequently if they annoy you.

ResearchGate also sends out scientific questions from members to other members based on the topic selected as their interest. It works; those who ask usually receive several in-depth answers within a couple of days!

Based on the above-mentioned facts and experience, I decided to keep my profile on ResearchGate. I invite you to do the same (or get your own impression by checking them out for yourself). Take part in interesting scientific discussions, stay up to date on relevant papers, and be available for networking!

Judith Houtman
PhD Student, AG Heppner

# "Scientist to Earth…Please Respond"

## Public Perception of Science Stories Through Media

After years of hard work, disappointments, literal blood, and tears, you feel like your contribution to science and knowledge is going to be nothing. But then, either by a well-thought-through experiment or dumb luck… EUREKA! You just made an important discovery!

After telling everyone, your supervisor, fellow lab inhabitants, and professor, you feel ever more proud. But wait a minute… this is not everyone. These are just the people that were there all the time, supporting you through the rough times, acknowledging the importance of your work throughout. What about the others? You know, the people who were ignorant of what you were doing the whole time: the public, for whom your discovery is actually really interesting and important.

The story of your discovery, and most of all, the implications of this will be conveyed to the public by the media. Do the media succeed in translating science for the public to understand?

**Facts vs Interpretations**

Not the details of a scientific story, but rather a general image of the matter sticks with the public. A 2002 survey [1] evaluated the effect of traditional media coverage of climate change and the controversy concerning the MMR (measles, mumps, and rubella) vaccine on public understanding of these matters. Stories on climate change were mostly told by expert journalists and considered scientific topics. Non-expert news reporters on the other hand covered the MMR case. It became the focus of a more general discussion, leading to many opinionated pieces, longer stories, and readers' comments.

**Scientists prefer to have their stories told by experts**

On the issue of climate change, many respondents consider nuclear power plants and the hole in the ozone layer the causes of the problem. This is not claimed in the media, but many people think so anyway. Climate change and the ozone layer are often mentioned in the same sentence, without any causal relation asserted. Because no other explanation is offered, the public assumes a causal relation. Another example of this assumption of a causal relationship is between organic produce and climate change. This is due to the fact that the term 'organic' is generally associated with environmentalism. A quarter of all respondents convey this as a causal rather than a thematic relation.

**The public often jumps to causal conclusions.**

A balanced approach of reporting an issue led, in the case of the MMR vaccine, to the assumption that the pros and cons were balanced as well. While actually just one scientist claimed a relation between the vaccine and autism, versus all others in the decade before who found either different results or could not reproduce the data. Also, repeated mentioning of a decline in take-up of the vaccine led the respondents to believe it was a bigger decline than ever mentioned anywhere.

**Virtual Interaction**

The Internet and its many applications affect the public's understanding of scientific matters. Science communication is moving from traditional media to blogs and other online forums that are hosted by former journalists, scientists, or non-experts. These online forums offer the opportunity to broadcast the reader's opinion in comments below the text, which is commonly done. The non-expert comments change the public's perception of the original article. For instance the politeness of comments on potential risks of a new technology influences the perception of those risks [2].

Besides offering a communication platform, information on the Internet is also more available and for a longer time. When a person is interested in a scientific topic, he or she can find everything by googling the terms. Google uses algorithms to predict what kinds of webpages are most interesting to the searcher, and displays the results accordingly. This might affect the way a person learns about a subject. Motivated individuals, however, actively select stories and tend to choose blog writers with greater expertise [3].


Source: Almyki, http://bit.ly/1y28eH3

Scientists prefer to have their stories told by experts. Interestingly enough, the survey mentioned above indicated that, out of all three topics, the public felt most informed about the MMR vaccine [1]. Also, the interaction and intent of the reader to find information on a subject affects their perception of the topic [2,3].

So, to increase public understanding, science topics should become an interesting, accessible and informative story that triggers the public to discuss the issue.

[1] Hargreaves and Lewis, ESRC, 2002
[2] Anderson, J Comput Mediat Commun, 2014
[3] Brossaard, PNAS, 2013

Judith Houtman
PhD Student, AG Heppner

# Caught in the Web

## Internet Overuse as a Psychiatric Disorder

Over the past few decades, computers and the internet have infiltrated every facet of our lives. Which is why it is somewhat difficult to process the concept of the internet as being addictive; if we're all online almost all of the time, is everyone an addict? Or is there a line between useful from harmful internet use?

Ivan Goldberg first coined the term 'Internet addiction disorder' in 1995 [1]. At the time, Goldberg didn't actually believe that such a thing existed. On his website, he parodied the diagnosis of pathological gambling, replacing gambling with internet use, using it as an example of how human behavior was becoming increasingly medicalized.

Twenty years later, the disorder is far more than just a satirical joke. Although it hasn't made it into the latest version of the Diagnostic and Statistical Manual of Mental Disorders (DSM), many experts believe it to be a legitimate condition.

### Seeking Socialization or Solace?

The most addictive aspects of the internet seem to be those that involve contact with others. So-called 'interactive real-time services', which include online chatrooms and web conferencing, seem to be particularly reinforcing. One study found that dependent internet users spent most of their online time in chatrooms and online multiplayer games or virtual worlds. Non-dependent users on the other hand spent most of their online time using email [2].

Online gaming can be very entertaining, and studies have consistently shown that its most reinforcing aspect is the ability to interact with other people. The more interactive a game is, the higher the likelihood that players become addicted [3]. Massively multiplayer online role-playing games (MMORPGs) involve a large number of players taking the role of a character and interacting with each other. World of Warcraft, a MMORPG, is one of the most widely played games in the world with almost 8 million currently active subscribers [4].

Interestingly, internet use can also be a powerful negative reinforcer. Dependent users often view the internet as a means of escaping from stressful interpersonal relationships and their negative consequences [5].

### A Social Paradox

From a social point of view, internet overuse is an intriguing phenomenon. The main reason why most people spend so much time online is due to the internet's inherently abundant opportunities for socialization [6]. Why then does internet addiction cause social isolation and loneliness?

It may be that people who are predisposed to internet addiction have a generally different perception of social life. In fact, most frequent internet users are somewhat introverted and lonely, and tend to consider their online interactions as important and real as face-to-face relationships [7]. They may prefer to spend the time they have dedicated to socialization in an online game rather than out in the real world, resulting in a vicious cycle that leads to more loneliness [8].

**Internet overuse can be detrimental to health**

### Far-Reaching Repercussions

The sheer magnitude of internet overuse has resulted in a major public health problem in a number of countries. The prevalence of the condition has reached alarming levels in China (11 %) and South Korea (18 %) [9,10]. For individuals, the consequences of overusing the internet range from mildly discomforting to seriously debilitating and share remarkable similarities to the consequences of substance abuse.

In terms of mental health, internet addiction is associated with increased hostility and aggression in real-life [11,12]. People who overuse the internet are also more than twice as likely as others to be depressed [13]. They are also more likely to suffer from insomnia and to abuse alcohol and tobacco [14].

In addition, MMORPGs are known to precipitate seizures. Evidence suggests that these fits differ considerably from classical video game-induced seizures [12], which were first described in the early '80s. Their pathogenesis is multifactorial, involving photosensitivity, anxiety, emotional excitement, and fatigue.

While non-dependent internet users perceive the internet as having a productive, positive effect on their personal and professional or academic lives, dependent users perceive the opposite [15]. Time disruption seems to be the key factor in causing dependent users to perceive their use of the internet as having a negative impact on their lives.

### All In Good Time

Experts believe that, when treating internet addiction, advocating complete abstinence is best avoided. Instead, they recommend using certain time management strategies to help achieve a 'normal' level of productive internet use [16]. Overall, a combination of cognitive behavior and motivational enhancement therapies seems to be the most effective strategy.

Internet addiction research is plagued by methodological issues that need to be addressed [17]. One particularly unsettling notion is that internet overuse itself may not be the problem. We may need to focus instead on treating the psychiatric conditions that are masked by the long hours spent online.

[1] http://tinyurl.com/3fm67w
[2] Young, Cyberpsychol Behav, 1998
[3] Ng, Cyberpsychol Behav, 2005
[4] http://tinyurl.com/wowsubscr
[5] Ng and Wiemer-Hastings, Cyberpsych Behav, 2005
[6] http://tinyurl.com/nwtmeld
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[8] Morahan-Martin, Cyberpsychol Behav, 1999
[9] Lam et al, Cyberpsychol Behav, 2009
[10] Ko et al, J Adolesc Health, 2009
[11] Yen et al, Cyberpsychol Behav Soc Netw, 2011
[12] Chuang, Cyberpsych Behav, 2006
[13] Lam and Peng, Arch Pediatr Adolesc Med, 2010
[14] Kim et al, Nutr Res Pract, 2010
[15] Chou and Hsiao, Comput Educ, 2000
[16] Young, Innovations in Clinical Practice: A Source Book, 1999
[17] Byun et al, Cyberpsychol Behav, 2009

Ahmed Khalil
PhD Student, AG Fiebach

# Alone Together

## A TED Talk by Prof. Sherry Turkle

Source: http://bit.ly/18Zpzac

In her TED talk, Sherry Turkle explains how technology changed communication over the last decades. She focuses on the social issues that derive from our use of, and dependence on, this technology.

Professor Turkle received a joint doctorate in sociology and personality psychology from Harvard University and is a licensed clinical psychologist. As the director of the MIT Initiative on Technology and Self, she is an expert on mobile technology, social networking, and sociable robotics. Over the last few decades, she has studied people's relationships with technology, especially computers.

In 2011, she published the book 'Alone Together: Why We Expect More from Technology and Less from Each Other'. This is the basis for her TED talk. Her belief is that all our modern day devices change not just what we do, but who we are. Our continuous but impersonal connection to the world is responsible for the loss of connection with the people around us.

We no longer develop the skill of self-reflection. Some individuals have difficulties having an actual conversation, where thoughts and feelings cannot be edited or deleted

**Our devices change not just what we do, but who we are**

before sending a response. Furthermore, Turkle claims that real relationships are in danger of being replaced by the illusion of companionship without the demands of friendship.

But there is still hope. We need to learn how to use technology to make reality the life we love instead of a cyber-life. Some of her tips: find space for solitude, to think and be without being interrupted by shares, tweets or the latest news. Create sacred spaces at home where no technology is allowed, and actual conversation can arise. Listen to each other, even the boring bits. This will reveal people, their values, and mistakes, so you can get to know them on a personal, human level.

Watch the TED talk:
http://bit.ly/1eQ6Flk

Judith Houtman
PhD Student, AG Heppner

# The CSI Effect

## Do TV Shows Impact Real-life Criminal Justice?

We all enjoy a good mystery. Whether it's spread across seven gargantuan books or crammed into a single one-hour TV episode, the unravelling of the unknown is a prevalent theme in entertainment nowadays. However, the way that popular fiction represents crime and justice in particular may affect real life in disturbing ways.

Decision-makers within the criminal justice system, particularly jurors, may be affected by their preconceptions (often misconceptions) of the justice system. Termed the 'CSI effect' after the popular TV series Crime Scene Investigation, such false beliefs may originate from exposure to fiction that oversimplifies or distorts the justice system. A crucial element of such shows, forensic science, is often depicted on TV as a quick and sure-fire way to get the bad guys.

**High burden of proof on criminal prosecutors**

Prosecutors are concerned that these shows instil unreasonable expectations in jurors. For example, less forensic evidence (or evidence of lower quality) is usually available in typical court cases than is portrayed in courtroom dramas. However, regular viewers of such shows may expect to see DNA or fingerprint evidence in every criminal case – immediately and without fail. Many experts believe that this makes it harder for jurors to decide on convicting an alleged criminal, resulting in higher rates of wrongful exoneration of guilty defendants [1].

Despite being conceptually plausible, the CSI effect is difficult to prove. Empirical evidence from mock-jury experiments suggests that watching crime series has no effect on jurors' decisions [2]. Interestingly, one study found that people who watch these shows were more critical of forensic evidence that was inappropriate or inadequate, suggesting that they make better jurors [3].

Of course, if these shows didn't distort reality far fewer people would watch them. Nevertheless, many of us who watch CSI might find it frustrating when our own PCR results aren't ready in the time it takes to brew a fresh pot of coffee.

[1] Cooley, New England Law Review, 2007
[2] Kim et al, Journal of Criminal Justice, 2009
[3] Schweitzer and Saks, Jurimetrics, 2007

Ahmed Khalil
PhD Student, AG Fiebach

# Psychosis from Using Social Media?

The title of this article could certainly be a cause for worry, as almost all of us use some form of social media daily. Researchers at the Charité recently reported a rare case of psychosis believed to be induced by 'Twitter', an online short-form communication system [1]. The article, titled 'Twitter Psychosis: Rare Variation or Distinct Syndrome', describes the development of psychosis in a 31-year-old female, Mrs. C, which coincided with the excessive use of Twitter. Mrs. C had no previous history of psychiatric illness prior to the episode of "twitter-induced psychosis". Even her family history was clean. The authors conclude that social media like Twitter might have the ability to induce psychosis in predisposed users [1].

### Twitter can induce psychosis in predisposed users

This may be the first documented case of psychosis being caused by Twitter, but such computer-mediated psychosis was already reported in 2011. Nitzan et al. talk about three patients who also experienced a psychotic episode, which coincided with excessive computer-mediated communication (CMC), such as Facebook or chats [2]. Similar to the case of Mrs.C, none of these patients had a history of psychiatric illness and also described symptoms akin to the 'Twitter Psychosis' episode, such as misinterpretation of information and hyperpersonal relationships with strangers.

Importantly, however, all these patients had turned to the internet as a refuge from loneliness, emotional distress and job insecurities. At the other end of the spectrum, studies have found that Facebook can actually help people suffering from depression [4]. Thus, CMC is capable of generating broad psychopathological phenomena especially in vulnerable individuals. Now, you can go back to your Facebook page since you know that casual use of social media is not going to make you psychotic but can actually have a positive effect. But remember to read "Like, Dislike or Disregard" below for more about Facebook and mental health.

[1] Kalbitzer et al, J Nerv Ment Dis, 2014
[2] Nitzan et al, Isr J Psychiatry Relat Sci, 2011
[3] Mota Pereira, Scientific World Journal, 2014

Apoorva Rajiv Madipakkam
PhD Student, AG Sterzer

# Like, Dislike, or Disregard?

## Facebook and Mental Health

Facebook can be both a blessing and a curse. While it can be a lot of fun to see what acquaintances are doing, scroll through pictures, or just laugh about cat videos, sometimes one can log off feeling unhappy. In the past few years, the social media site has truly become a force of nature, with more than 1.3 billion subscribers reported in 2014 [1]. Unsurprisingly, researchers have begun to study the site with intensity, looking for the ways in which it may change the way we see ourselves and others.

The field is still young, but for mental health, there have already been several interesting findings. Firstly, as any user will tell you, the site can be highly addictive. So much so, in fact, that a specialized scale has been developed to monitor Facebook addiction [2]. A recent meta-analysis demonstrated that lonely or bored users may start logging in with maladaptive frequency and giving up other worldly pleasures [2]. Other work has shown that use of the site can foster intense anxiety and feelings of social inadequacy [4].

But what about all the positive benefits of seeing friends or loved ones? A recent study has shown that Facebook may actually provide huge benefits to individuals suffering from depression [5]. Other studies have found similar effects in non-clinical populations, with Facebook having as positive effects on social esteem and communication skills [6]. Thus, it appears that the jury is still out on social networking sites. We just need to always remember to treat Facebook as a tool of fun and casual social interaction, not a place for comparing yourselves with others or feeding ravenous egos.

But please, if you're reading this article online, don't forget to "like" it!

Source: Wikimedia Commons

[1] http://bit.ly/1uZUCLf
[2] Andreassen et al., Psychological Reports, 2012
[3] Ryan et al., J. Behav Addict., 2014
[4]http://bit.ly/1DCJOWj
[5] Mota-Pereira, Scientific World Journal, 2014
[6] Pantic, Cyberpsychol Behav Soc Netw, 2014

Constance Holman
MSc Student, MedNeuro

# Conscious Experience of Time

## A Report about the Berlin School of Mind and Brain Conference 2014

This issue's conference report comes from Luisenstrasse 56, where the Berlin School of Mind and Brain hosted the conference "Conscious Experience of Time: Its Significance and Interpretation in Neuroscience and Philosophy". This integrative conference, bringing together philosophers, computer scientists, psychologists and neuroscientists, aimed to unite diverse perspectives to tackle issues in the study of time.

### How to study subjective time in an objective manner?

It should be noted that I, with great personal regret, have never had a formalized education in philosophy. Indeed, many of the philosophical presentations were quite over my head. However, many speakers still found ways to mix deep epistemological questions with examples from neuroscience and psychology. Of particular note was the first keynote presentation by Dr. Paula Droege, who seamlessly blended perspectives on the philosophy of time with everyday observations of consciousness.

On the neuroscience end of the spectrum, there were also many excellent talks and panel discussions about how to study time in a controlled laboratory setting. Scientific veterans such as Warren Meck had excellent talks about advances in research on time, while Hedderijk van Rijn gave an excellent seminar (possibly my favorite) on computational models of time perception. These talks were interspersed with poster sessions, where students could compare notes on everything from the history of philosophy of time to oscillatory activity seemingly underlying its perception.

At the end of the conference, all participants were invited to take part in an innovative art installation project. To do so, artists Sabai Ramedhan-Levi and Ariel B. Lindner filmed us while we were asked to close our eyes, and open them after we felt a minute had elapsed (link to wider project here: http://bit.ly/13xqJKi). This exercise, more than anything else in the conference really drove home the subjective nature of time. Despite the fact that we were a room full of (mostly) time experts, the population variance in one-minute estimates was astounding. This project provided a great end to a wonderful conference, and I can definitely recommend Conscious Experience of Time for future attendees!

Constance Holman
MSc Student, MedNeuro

# Human Biology: The Future of Biomedical Research

## Report About a Talk by Nobel Laureate Sydney Brenner

Source: flickr, http://bit.ly/1z5I8Ef

In October, one of the 2002 Nobel Laureates in Physiology, Dr. Sydney Brenner delivered an interesting talk on the future of biomedical research. He is well known for establishing C. elegans as a genetic model organism and his work on genetic developmental regulation and programmed cell death.

Dr. Brenner started off with bits of science history and major developments in molecular biology, all spiced with personal anecdotes. He followed with his views on the current developments in science, specifically criticizing unreflective data. In his words, "we need to convert data into knowledge and knowledge into understanding" to actually provide use of our work for society.

According to Dr. Brenner, "translational research" is the latest scientific catch phrase and converting basic science into application is the wrong way to do biomedical research. Instead we should spend our bench time to improve the bedside situation, where the actual questions arise. Today, technology allows us to analyze problems at the molecular level and biomedical science can correlate this to in-patient observations, not the other way round. Likewise, he was amused by the term evidence-based medicine, as he thought all medicine was based on evidence.

Regarding the ambitious human brain project, he warned "not to combine artificial intelligence with human stupidity", spending lots of money on the sole generation of data. He pointed out that today, it would not cost much to do science, since genomes are free to download and it takes only human mind and intelligence to draw conclusions from it.

Brenner concluded with general advice for todays scientist, criticizing PI-based science. "Graduate student slavery and postdoc laborers keep American science running" and Europe is about to aim for it, too. Dr. Brenner believes that the future of science lies with young scientists! He himself, he said, wouldn't be of any use for science today, since he knows too much. Young scientists, however, are ignorant enough to try anything coming to their minds, leaving beaten paths.

Bettina Schmerl
MSc Student, MedNeuro

# Brain in Press

## Magic Mushrooms Alter Brain's Pattern of Activity

Researchers at King's College London used fMRI to examine the brain activity of individuals administered the hallucinogen psilocybin, found in magic mushrooms. Although it is well established that this drug binds to serotonin receptors, the mechanism behind its psychoactive effects remains unknown. According to their findings, psilocybin alters the pattern of brain activity by stimulating tightly synchronized signaling in brain areas that are not typically functionally connected, which may cause the brain to enter a state similar to synesthesia. Although a more thorough understanding of this drug is needed, scientists are optimistic that it may lead to more effective treatments for depression and perhaps even to an increased understanding of abstract phenomena such as our sense of self.

Reference: Tia Ghose, Magic Mushrooms Create a Hyperconnected Brain, LiveScience, 29 October 2014, http://bit.ly/1zJd0yg

## Sex Balance Becomes Pivotal Factor in NIH Funding Decisions

As of October 2014, the United States' National Institutes of Health (NIH), will be requiring that grant applicants include both female and male organisms in their experiments in order to receive funding. In a statement to Nature, an NIH representative clarified that exceptions to the rule will be granted and also mentioned that they intend for the policy change to be gradual. This policy marks a large transition in biomedical research, as traditionally many fields have had exclusively male animals in their studies or have ignored sex differences. Experts postulate this history of disregard for sex differences may be the underlying reason that women suffer more side effects from, and have reduced benefits of, many medications.

Reference: Francie Diep: NIH Proceeds with Caution on Sex Balance in Biomedical Studies, Scientific American Online, 28 October 2014, http://bit.ly/1s2jX4l

## Man's Best Friend: the New and Improved Animal Model for Longevity Studies

Due to the many promising longevity drugs that were successful in model organisms such as yeast and mice but failed in humans, longevity researchers have sought out a new animal model. Scientists at the University of Washington are testing rapamycin, an anti-rejection drug that has shown longevity effects in mice. They intend to test the drug in dogs, more specifically in large pet dogs. Dogs typically live much longer than standard laboratory animals and pet dogs in particular may experience many of the same environmental exposures as their human counterparts. The group plans to recruit pet owners and may even ask for their help in funding this endeavor.

Reference: Erika Check Hayden, Pet dogs set to test anti-aging drug, Nature News, 29 October 2014, http://bit.ly/1nPkn22

## You Can Have Your Cake and Eat it Too: Chocolate Proposed to Have Memory Benefit

A recent study at Columbia University suggests that memory and diet may go hand in hand. Healthy adults aged 50-69 were administered a daily cocoa drink supplement over a three-month period. Some were given a drink with a high concentration of flavanols, a family of compounds found naturally in cocoa, and others received only trace amounts of flavanols. Researchers found that people given a higher concentration of flavanols performed pattern recognition tasks better as compared to their performance before drink administration and to controls. In addition, the high flavanol concentration group had increased blood flow to the dentate gyrus, an area of the hippocampus implicated in memory. Critics recommend that this study should be expanded to a larger test group.

Reference: Stuart Clark: Chocolate component reverses memory loss in older people, claims study, The Guardian Online, 27 October 2014. http://bit.ly/1wBPorl

## Olfactory Cells Transplanted into Spinal Cord Help a Man Walk Again

Polish and British doctors and scientists teamed up to perform a groundbreaking procedure with the hope of helping a man regain his ability to walk. The patient, Darek Fidyka, had been paralyzed from the chest down for over 2 years after a knife attack severed his spinal cord. After extensive physiotherapy, over 100 microinjections of olfactory ensheathing cells (OECs), and a nerve graft from his ankle, Darek has regained some feeling in his legs and can now walk using a supportive frame. OECs enable the continual regeneration of the olfactory system and scientists believe they may also stimulate regeneration in the spinal cord.

Reference: Fergus Walsch: Paralyzed man walks again after cell transplant, BBC News Health Online, 21 October 2014, http://bbc.in/1tGr74H

## Transcranial Direct Current Stimulation Makes its Way into the Start-up Scene

The start-up company Thync is attempting to bring transcranial direct current stimulation (tDCS) to the everyday consumer. Whether it be to avoid your midday loss of focus or your midnight insomnia, Thync would like to apply tDCS to help you manually manipulate your own brain signaling. Although tDCS is currently being tested as a treatment for pathologies such as depression and neglect, the effects of this type of brain stimulation on cognition and overall brain function are unknown. Even if efficacy is shown, it may be highly variable from person to person, particularly if the device is applied by a novice user rather than an expert. Evidence from larger scale clinical trials is awaited, but devices like those produced by Thync are already receiving huge investments through venture capital funding.

Reference: Heather Kelly: Wearable tech to hack your brain, CNN online, 23 October 2014, http://cnn.it/1yFS7zS

Carla Wood
MSc Student, MedNeuro

# PhD Thesis Awards

## Deutscher Studienpreis

Excellent PhD theses are awarded with the Deutscher Studienpreis. The PhD thesis has to have been defended in 2014 with magna or summa cum laude at a German university or, if you are a German citizen, at a university abroad. Deadline for submission: March 01, 2015.
Further information: http://www.koerber-stiftung.de/wissenschaft/deutscher-studienpreis.html.

## Promotionspreis 2015 of the Berlin Society for Psychiatry and Neurology

The Berlin Society for Psychiatry and Neurology awards a prize worth €500 for the best PhD thesis in the area of neurology and psychiatry defended in 2014 at any Berlin institution. Deadline for submission: March 01, 2015.
Further information: http://www.bgpn.de/preise.php

# Awards for Young Scientists

## Oppenheim-Preis 2014

The Deutsche Dystonie-Gesellschaft awards excellent clinical and basic research in the area of dystonia with the Oppenheim-Preis 2015 (€5,000). Contributions about the etiology, pathogenesis, diagnosis and therapy of dystonia as well as the psychosocial situation of the concerned are wanted, particularly from scientists below the age of 40.
Deadline: **Jan 31, 2015.**
More information: http://www.dystonie.de/die-ddg/oppenheim-preis.html

# Call for Applications: Neurasmus–European MSc Program

MedNeuro and five other partners from Europe and Canada offer Neurasmus. This Erasmus Mundus Master's Course is funded by the EU and offers MSc stipends to highly qualified and mobile students from Europe and abroad.

Deadline to apply for a Scholarship: **Dec 08 2014**
Deadline to apply as Self-funded candidate:
**Feb 28 2015**

# Movie Review: Nell

'Gah'inja' is how you would say Gaurdian Angel in Nellish. This was the secret langauge spoken by Nell: A movie released exactly 20 years ago in December 1994 that fits our current issue on communication to a T. "Nell" by Michael Apted (director of other magnificent films like "Gorilla in the Mist"), stars a brilliant Jodie Foster and Liam Neeson as the main characters and is based on Mark Handley's play 'Idioglossia'.

Nell (Jodie Foster) is a girl raised by her mother in an amazing and peaceful forest in North Carolina, isolated from the world in which her mother was heavily traumatized. Only when her mother's natural death is discovered does Nell, all of a sudden, have to face things outside of her own world. This is infiltrated by the doctor Jerry Lovell (Liam Neeson) and the ambitious psychologist Paula Olsen (Natasha Richardson).

She grew up in isolation from the rest of the world, with only her mother and a twin sister, who died at a young age. During this time, Nell developed her very own language and facets of communication. These seem utterly strange to the "intruders"; Olsen in particular, perceives her as underdeveloped and in need of protection. A hasty court order gives custody of Nell to Olsen. Lovell intervenes and claims that Nell should speak for herself. From there on, the two follow very different strategies to unravel the mystery of "Nellish", as they call her secret language.

With Jodie Foster playing the socially isolated wild child perfectly, this movie is a great study on communication brought to the cinemas. Her very own way of expressing herself even made others think that she was autistic, although all her attempts to communicate were heavily misinterpreted.

Source: http://www.impawards.com/1994/nell.html

Foster's performance in particular was received enthusiastically by the critics and she was nominated for an Academy Award (Best Actress), several Golden Globes (Best Motion Picture, Best Original Score, Best Female Performance), an MTV Movie Award (Best Female Peformance) and many more. Enjoy watching!

Bettina Schmerl
MSc Student, MedNeuro

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# „Wie die TK mich durchs Studium begleitet: Respekt!"

Katerina Mihova, TK-versichert seit 2009

Techniker Krankenkasse
Gesund in die Zukunft.

**Huge Crowd Attend Graduation 2014**

We have had it all. From a small crowd in a big room to a big crowd in a small room. The latter describes this year's graduation. The ceremony started off with the students presenting their master's theses in the form of posters or talks. Each talk and poster was a masterpiece and experts and interested attendees discussed them with great enthusiasm. Proud parents, friends, and better halves admired the work achieved and made the ceremony even more memorable.

We congratulate each of the graduates and wish them all the best for their future careers!

**26 Master's Students Join the Program**

With students from all around the world, the semester started for 26 students with the Orientation Week this October. The week kicked-off with friendly introductions and icebreakers before the boring business of matriculation took place. Fortunately, our senior MSc students jumped in with campus walks and lunch and got the newcomers ready for student life on campus.

The exciting orientation week even included tours around the center of Berlin which covered the Cold War and Prussia. Sam Noble, our guide, exceptionally hit it off by making even dark German history easily digestible with his British expertise and humorous charm. Sam also offers other tours (contact: sam.m.noble@gmail.com).

The first lecture took place on day 5 and a warm welcome reception concluded the Orientation Week.

**Medical Neurosciences Christmas Party**

Save the date: December 16th! After the first-year students' final exam, the MedNeuro family has decided to have its annual Christmas Party at Luisenstrasse 56 but only if YOU are interested. Please contact Lutz Steiner (lutz.steiner@charite.de) if you want to celebrate Christmas and post-exam stress with the first-years.

**Always Sunny in Bordeaux: Season 4**

The diploma handout by the Neurasmus partners started off cozily warm. If only we could say that about the rest of the day. The air conditioning felt like it had cooled down every particle in the lecture hall. While this helped during the over-heated graduation at the start, it dramatically failed during the rest of the day. A warm welcome to the new students almost turned into a lock-up in a freezer. This might explain the wine served at lunch – or it's just la vie en France.

Nonetheless, three nice, sunny days introduced the new Neurasmus students to the program, with socials, dinners, and of course some real work. A harbor cruise concluded the three exciting days in Bordeaux.

| | |
|---|---|
| **December** | |
| 3 | Symposium "Herz & Hirn - Interdisziplinäre Herausforderungen und therapeutische Innovationen", Vivantes Humboldt-Klinikum |
| 3-5 | 5th BSRT PhD Symposium: The Beauty and the Beast – What to Learn From Cancer and Development for Regeneration (http://www.bsrt-phdsymposium.de/) |
| 4-5 | Trilateral Symposium on Architectured Biomaterials, Medical and Tissue Engineering (http://bit.ly/1GaYgZJ) |
| 8-10 | 7. Forum Wissenschaftskommunikation (science communication, http://bit.ly/1h6wfVO) |
| **January 2015** | |
| 29-31 | Arbeitstagung NeuroIntensivMedizin (ANIM) 2015 (http://www.anim2015.de) |
| **February 2015** | |
| 2-3 | Global Engage's Biologics Congress: Examining Scientific, Technological and Business Trends to Advance Protein and Antibody Therapeutics (http://www.globalengage.co.uk/biologics.html) |
| **March** | |
| 19-21 | 4th Translational Immunology School (http://web.dgfi.org/translational-school/2015/) |
| 22-25 | Proteomic Forum 2015 (http://www.proteomic-forum.de/) |

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