

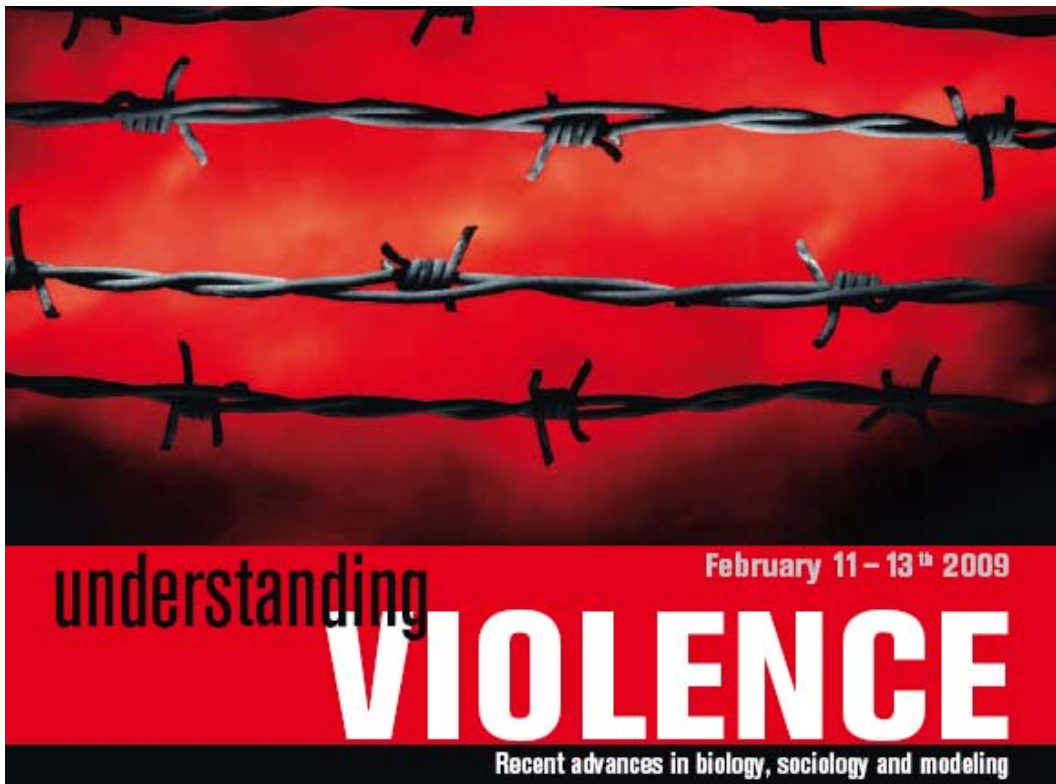
EPFL-LATSIS Symposium 2009

Understanding **VIOLENCE**

Recent advances in biology, sociology, and modeling

<http://latsis2009.epfl.ch/>

Post-Conference REPORT



Organizer:

Carmen Sandi (Brain Mind Institute, EPFL, Lausanne, Switzerland) <http://lqc.epfl.ch/>

Co-organizers:

Andreas Meyer-Lindenberg (Central Institute of Mental Health, Mannheim, Germany)

Mel Slater (UCL London & University of Barcelona)

Pierre Magistretti (Brain Mind Institute, EPFL, Lausanne, Switzerland)

The EPFL-Latsis Symposium 2009, on the topic “Understanding VIOLENCE: Recent advances in biology, sociology and modeling” took place at the Ecole Polytechnique Fédérale de Lausanne (EPFL) on February 11-13th 2009.

The Conference was comprised of 6 mini-symposia that consecutively addressed the following topics:

1. Are individuals born violent? Can we talk of ‘genetic’ determinism?
2. Are hormones key to understanding aggression?
3. What are the social, contextual and evolutionary causes of violence?
4. What works differently in the brain of violent individuals? What makes psychopaths different? Can we reverse, treat aggression?
5. Are individuals ‘made’ violent? Does stress shape individuals’ aggression?
6. Do people know how they would behave in an unexpected violent situation? How can virtual reality and modeling approaches help for treatment?

Speakers in these sessions included 23 worldwide leaders from 9 different countries (USA, Canada, Germany, Israel, Hungary, United Kingdom, Netherlands, Spain and Switzerland) and representing a variety of fields (neuroscience, genetics, neuroimaging, neuroendocrinology, animal behavior, psychiatry, psychology, sociology, modeling and virtual reality). Each session was ended with a general discussion animated by a specialist in the topic that provided a further step in making the content and messages of each of the speakers accessible to a public with a broad background and expertise.

In addition, there was a poster session with over 50 posters presented and a round table entitled “TACKLING violence” with participation of 6 experts in dealing directly with violence problems, violence individuals or their victims, from a wide range of institutions (including the Prevention of Violence Unit from the World Health Organization –WHO-, a Union European Football Association –UEFA- security officer, and different clinicians applying a diversity of techniques in a variety of treatment units).

One of the strongest points of the Conference was its truly interdisciplinarity, both at the level of the Conference as a whole and within each of the mini-symposia. Questions were tackled from different angles and the participants benefited from having an integrated picture of the main recent advances in fields as diverse as genetics and sociology or neuroimaging and modeling when trying to understanding violence.

Some of the key messages delivered by the Conference were:

- The problem of aggression in humans is not so much that aggressive behaviors are learned. During the first years of life, children should learn to ‘inhibit’ aggressiveness that is a natural behavioral expression on those early years. The highest aggression

levels are shown at early ages and therefore socialization teaches individuals to inhibit that behavior.

- Genetic factors certainly have an influence on the vulnerability of individuals to develop into different types of aggressive behaviors during their lifespan. The genes best characterized at the moment either because they increase or decrease the risk to develop high aggression are: genes related to the function and metabolism of catecholamines (particularly serotonin) and genes that code for peptides that play a key role in social behaviors, such as vasopressin and oxytocin.
- Life experiences, and particularly (early) stress, are key in moderating the impact of the genetic vulnerability in influencing aggression. No report was presented for genetic factors on its own (without the contribution of major stress) to determine the development of severely aggressive individuals.
- In fact, stress (both during the early postnatal, childhood and peri-puberty periods) by itself was emphasized as a very important factor in the development of aggression.
- A good characterization and classification of different types of aggression (for example, proactive versus reactive aggression, or instrumental versus impulsive) is a key issue to help progressing on the understanding of the biological basis of these conditions, as well as on the development of treatments. The pattern of brain activation of psychopaths is, for example, completely different to that of impulsive reactive individuals. A hallmark of psychopaths is an impairment on the activation of brain regions implicated in the processing of emotional fear-related behaviors (amygdala), as well as on brain regions implicated in cognitive function (medial temporal lobe). As to impulsive aggressive individuals, current evidence suggest an overactivation of the emotional brain centers (amygdala), while a hypoactivation of brain regions implicated in executive control and inhibition of emotionality (prefrontal cortex).
- Understanding the evolutionary roots of aggression is essential to grasping the nature of the phenomenon. The aggression that we as human beings display these days is the result of strong selection pressures that occurred throughout the course of evolution. Aggression has been selected for its highly adaptive value to help individuals to survive in cases of conflict and threat from other individuals and it entails a component of reward that is involved in the escalation of aggression and it can even be regarded as a problem close to addiction.
- From an epidemiological point of view, inequality in societies (as measured by socioeconomic differences that are used as an index of the inequity inherent to the particular society) was shown to correlate with enhanced violence. Stress was shown to have an important impact in the generation of social imbalance.
- Evaluation of the immediate context in which violence occurs provides important insights as to the eventual triggers of aggression. The triggering of violence is not trivial; individuals initially protect themselves from getting involved in crude violence, since it is something that always implies a risk to survival. Enhanced fear and anxiety in between

- opponents that interact is instrumental for the final explosion of violence, which will be triggered if a sign of weakness is detected in one of the opponents.
- People surrounding an escalating aggressive encounter (bystanders) can also have an important impact on its final outcome. Understanding how 'others' influence the course of violence can help controlling the problem from organizational points of view.
 - Modeling approaches are currently applied to make sense of the dynamics of dominant hierarchies and violence-related social behaviors. Applying their principles to the rich data arising from biological, psychological and sociological studies provides a further step on the understanding of the key elements regulating the complexity of violence.
 - Novel technologies, like virtual reality and analysis of close-circuit television (CCTV), are helping studying the phenomenon of violence from a psycho-sociological perspective and can be expanded to assist attempts in the biomedical domain. Virtual reality is already a very helpful element in therapies for individuals that are victims of trauma related to violence, such as soldiers that have developed posttraumatic stress disorder. The technique, combined with cognitive-emotional therapy, allows the progressive exposure of the subjects to relevant violent-related cues in a controlled and semi-realistic manner.

The general feeling expressed by the participants is that the Conference provided a successful framework to put together the different approaches to understanding violence and helped developing an integrative picture and providing ideas for future studies. The participants also emphasized the need of integrating theoretical studies with the needs identified by experts working in the applied domain. Ties should be strengthened and more collaborations established. The Conference represented an important step for the understanding of violence from a multi and interdisciplinary perspective and the participants felt that this is an important way to advance and continue on this endeavor from now on.

There were around 250 persons registered to the Conference.

A special issue on the topic "Understanding violence" and including contributions from most speakers in the Conference will be published in the open access journal *Frontiers in Behavioral Neuroscience* (<http://www.frontiersin.org/behavioralneuroscience>) towards the end of 2009.

Speakers

Richard E. Tremblay, Montreal, Canada
Klaus-Peter Lesch, Würzburg, Germany
Stephen J. Suomi, NIH, USA
Caroline Blanchard, Hawaii, USA
Richard J. Ebstein, Jerusalem, Israel
Andreas Meyer-Lindenberg, Mannheim, Germany
Jozsef Haller, Budapest, Hungary
Richard Wilkinson, London, UK
Stefan Klusemann, Pennsylvania, USA
Mark Broom, Sussex, UK
John Archer, Central Lancashire, UK
Kent Kiehl, New Mexico, USA
Sheilagh Hodgins, London, UK
Joshua W Buckholtz, Vanderbilt, USA
Francois Ansermet, Geneva, Switzerland
Pierre Magistretti, Lausanne, Switzerland
Inga D. Neumann, Regensburg, Germany
Jaap M. Koolhaas, Groningen, Netherlands
Carmen Sandi, Lausanne, Switzerland
Mark Levine, Lancaster, UK
Mel Slater, London, UK and Barcelona, Spain
Lee Alan Dugatkin, Louisville, USA
Albert Rizzo, Southern California, USA

Discussants

Didier Trono, Lausanne, Switzerland
Ronald de Kloet, Leiden, Netherlands
Alexander Burchart, WHO, Switzerland
Olaf Blanke, Lausanne, Switzerland
Daniel Schechter, New York, USA
Philippe Cotter, Geneva, Switzerland

Round table panelists

Hans-Peter Schmoll-Flockerzie, Basel, Switzerland
Stephen Thomas, UEFA, UK
Bruno Gravier, Lausanne, Switzerland
Christopher Mikton, WHO, Switzerland
Jakob Lund, Copenhagen, Denmark
Marie-Claude Hofner, Lausanne, Switzerland

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Understanding **VIOLENCE**:

Recent advances in biology, sociology, and modeling

WEDNESDAY, FEBRUARY 11th, 2009

- 8:00-8:45** **Registration**
- 8:45-9:00** **Opening Remarks**
Prof Dusan Sidjanski (Latsis Foundation)
Prof Giorgio Margaritondo (Vice-president EPFL)
- Session 1** **Are individuals born violent? Can we talk of 'genetic' determinism?**
- Chair** **Carmen Sandi**
- 9:00-9:45** **Richard E Tremblay**
Developmental trajectories of human physical violence and their determinants: From genes to social policy (or vice versa)
- 9:45-10:20** **Klaus Peter Lesch**
The neurobiology of impulsivity and aggression in ADHD
- 10:20-10:50** Coffee break
- 10:50-11:25** **Stephen J. Suomi**
Aggression, serotonin, and gene X environment interactions in primates
- 11:25-12:00** **Caroline Blanchard**
The evolution and adaptive functions of anger, aggression and violence
- 12:00-12:35** **Discussion - Didier Trono**

LUNCH

- Session 2** **Are hormones key to understanding aggression?**
- Chair** **John Archer**
- 14:00-14:45** **Richard Ebstein**
Nonapeptide social hormones, oxytocin and arginine vasopressin, the flip side of violence?
- 14:45-15:20** **Andreas Meyer-Lindenberg**
Neurogenetic and neurohormonal mechanisms of prosocial and aggressive behavior
- 15:20-15:55** **Jozsef Haller**
Types of aggression and types of brain mechanisms. The role of glucocorticoids
- 15:55-16:30** **Discussion - Ron de Kloet**
- 16:30-18:30** **Poster Session with Coffee and refreshments**

THURSDAY, FEBRUARY 12th, 2009

8:30-9:00 Registration

Session 3 What are the social, contextual and evolutionary causes of violence?

Chair Pierre Magistretti

9:00-9:45 Richard Wilkinson
The violence of inequality

9:45-10:20 Stefan Klusemann
Micro-situational antecedents of violent atrocity

10:20-10:55 Mark Broom
Balancing risks and rewards: the logic of violence

10:55-11:25 Coffee break

11:25-12:10 John Archer
Sexual selection as an explanation of human sex differences in aggression

12:10-12:45 Discussion - Alexander Butchart

LUNCH

Session 4 What works differently in the brain of violent individuals? What makes psychopaths different? Can we reverse, treat aggression?

Chair Andreas Meyer-Lindenberg

14:00-14:45 Kent Kiehl
Psychopathy, violence and brain

14:45-15:20 Sheilagh Hodgings
Getting the phenotypes right: the essential ingredient to understanding aetiological mechanisms and developing effective treatments

15:20-15:55 Joshua W. Buckholtz
Multimodal characterization of genetic risk mechanisms for impulsive aggression

15:55-16:30 Discussion - Olaf Blanke

16:30-17:00 Coffee break

17:00-18:30 Round Table: "TACKLING VIOLENCE"

Panelists

Hans-Peter Schmoll-Flockerzie

AHBasel Krisentintervention für Jugendliche, Basel

Stephen Thomas

Security Officer for UEFA and Assistant Chief Constable British Transport Police

Bruno Gravier

Head of the Prison Medicine and Psychiatry Service, CHUV, Lausanne

Gregoire Rubovszky

Head of Emergency Psychiatry Service, HCUGE, Geneva

Christopher Mikton

Technical Officer, Prevention of Violence Unit, WHO

Jakob Lund

Director of the SMART programs in Scandinavia, Art-of-Living

Marie-Claude Hofner

Violence Medical Unit - University Center of Legal Medicine Western Switzerland

19:00 Banquet - Departure Bus

FRIDAY, FEBRUARY 13th, 2009

8:30-9:00 Registration

Session 5 Are individuals 'made' violent? Does stress shape individual's aggression?

Chair Stephen J. Suomi

9:00-9:45 Francois Ansermet and Pierre Magistretti
Neuronal plasticity, homeostasis and violence

9:45-10:20 Inga D. Neumann
Abnormal social behaviour and aggression: Link to anxiety

10:20-10:55 Jaap M. Koolhaas
From aggression to violence in rats and mice: role of individual behavioral and neurobiological characteristics

10:55-11:25 Coffee break

11:25-12:00 Carmen Sandi
Stress as a generator of social imbalance

12:00-12:35 Discussion - Daniel Schechter

LUNCH

Session 6 Do people know how they would behave in an unexpected violent situation? How can virtual reality and modelling approaches help for treatment?

Chair Mel Slater

14:00-14:35 Mark Levine
Groups, bystanders and the informal regulation of violence

14:35-15:10 Mel Slater
Virtual reality in the study of extreme situations

15:10-15:45 Lee Alan Dugatkin
Winners, losers and bystanders: the structure of dominance hierarchies

15:45-16:15 Coffee break

16:15-17:00 Albert Rizzo
Reexposure to combat in virtual reality as a treatment for PTSD

17:00-17:35 Discussion - Philippe Cotter

17:35-17:45 Concluding Remarks

17:45 Farewell