THE SCIENCE OF TRUST

PAUL J. ZAK
Claremont Graduate University

CCST Oct 19, 2010
Figure 2: Trust is key in rebuilding investor confidence

How much do you trust business to do what is right?

Trust in U.S. business in general


Informed publics ages 35 to 64 in the U.S.; Responses 6-9 only on 1-9 scale; 9 = highest
## Most Trusted Professions

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Source: Gallup
Are Scientists Trusted?

How Much Do People Trust What Scientists Say?

Whom do you typically trust to provide accurate information about important issues in society?

- Scientists: 3.98 average
- Friends or family: 3.09
- Nongovernmental organizations: 3.09
- Citizen groups: 2.69
- Journalists: 2.57
- Companies: 1.78
- Elected officials: 1.76
- Religious authorities: 1.55

Source: Scientific American Oct. 2010
Is there a trust gap?

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Is there a trust gap?

South Korean stem cell scandal could sink deeper

By Elizabeth Weise

More now revealed scandal surrounding scientist

Citing Scandal, Marc Hauser Cancels Extension

Piltdown Man

The Bogus Bones Caper

Among them is the about the falsified

The Harvard Crimson

VoDoo Science

The Road from Foolishness to Fraud

Cold fusion

Organic transistors

The TalkOrigins Archive

Exploring the Creation/Evolution Controversy

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The banality of misconduct

NIH Public Access
Author Manuscript

Published in final edited form as:

Normal Misbehavior: Scientists Talk About the Ethics of Research

Raymond De Vries,
University of Michigan

Melissa S. Anderson, and
University of Minnesota

Brian C. Martinson
HealthPartners Research Foundation

Abstract

Those concerned with protecting the integrity of science generally focus on the serious but rare infractions of falsification, fabrication, and plagiarism (FFP). While the violations of FFP are clear threats to the quality of scientific work and public trust in science, are they the behaviors that researchers themselves find most troubling? Noticing that scientists seldom are asked to report their perceptions of the behaviors that pose problems for the enterprise of science, we conducted six focus groups with researchers from major research universities. A total of 51 scientists participated in our focus-group discussions, which lasted from 1.5 to 2 hours each. We found that while researchers were aware of the problems of FFP, in their eyes misconduct generally is associated with more mundane, everyday problems in the work environment. These more common problems fall into four categories: the meaning of data, the rules of science, life with colleagues, and the pressures of production in science.

Focus on the "normal misbehaviors" that are part of the ordinary life of researchers allows us to see the way the organization of science generates both compliance and deviance from ethical norms.
How Can Science be Trusted?

• Recent research from my lab shows that trust is chemical
• High trust organizations can be built and this is a leadership choice
• The recipe to build trust is PAD-TEAA
**Who Cares?**

- Distrust undercuts effective management because when trust is low, employees are less likely to understand a manager's goals.
- In 2009, 60 percent of employees reported that they needed to hear information three to five times before believing it.
- Only 17% of employees in 2009 trusted statements made by a CEO.
- Without trust, organizational goals will literally fall on deaf ears.
Trust is Chemical

• Experiments can be designed to measure trust and trustworthiness (reciprocation of trust) in the lab

• Neuroeconomics experiments do this by using money

• Money provides an objective measure of trust & trustworthiness
Trust is Chemical

• Oxytocin is a simple molecule made of 9 amino acids. A variant of it first appeared in fish 400M years ago. But oxytocin is uniquely mammalian.

• In monogamous mammals, oxytocin supports attachment to mates and maternal care for offspring.
A Social Dilemma

Subjects receive $10 when they show up and are randomly and anonymously matched in pairs.

Decision-maker 1 chooses some amount X of his/her $10 to send to decision-maker 2.

Decision-maker 2 receives $3X, then can send all, some, or none back to decision-maker 1.

Trustworthiness

Trust signal

Blood draws
• When someone trusts us, our brains release oxytocin which causes a sense of well-being and a desire to reciprocate even when this involves a direct monetary loss.
Trust

Causation

• Intranasal administration with oxytocin more than doubles the number of people trust a stranger with all of their money

• This response is emotional, not cognitive

Kosfeld et al. (2005)
What does Oxytocin Feel Like?

• Participants watched one of two 100sec videos

• Emotion condition: father and his 4 yr old son who has terminal brain cancer

• Control condition: same father and son at the zoo, no mention of cancer or death

• Blood draws before and immediately after viewing
WHAT DOES OXYTOCIN FEEL LIKE?

• The change in oxytocin correlated with the subjective experience of empathy
• Those who felt the most empathy were the most generous towards a stranger
• Generous people also gave the most to charity.
• Women show more: empathy, generosity, charity, and oxytocin release
INHIBITING OXYTOCIN

• Testosterone inhibits OT binding to its receptor
• 10g testosterone administration nearly doubled DHT levels
• Within-subjects design with blood draws to document change in testosterone
INHIBITING OXYTOCIN

• Testosterone decreased generosity by 27% compared to men themselves on placebo.

• Generosity declined linearly as testosterone increased.

• Costly punishment of others for being stingy rises with testosterone levels.
We are highly social creatures and have a physiology that permits us to determine who is likely trustworthy and who is not, and to reciprocate when trusted.

Oxytocin induces a temporary attachment to, or empathy for, a stranger.

The neural substrates of trustworthiness utilize oxytocin receptors, especially in the amygdala (Zak et al, 2006; Bumgartner et al, 2008).
The 5% of those I’ve studied have ODD. Psychologically they are similar to psychopaths.

Reiser seeks to appeal - says lawyer 'hates me'
Henry K. Lee, Chronicle Staff Writer
Wednesday, November 19, 2008

Hans Reiser, the computer programmer who admitted to strangling his estranged wife, is trying to appeal his conviction and sentence on the grounds of ineffective assistance from his lead attorney.

Reiser accused defense attorney William Du Bois of basing jury selection in part on Chinese astrology and said the lawyer had "oxytocin excess" because people who have too much of the hormone "enjoy betraying others."
DISORDERS

• Autism, Social Anxiety Disorder, Williams Syndrome, Alzheimer’s Disease, etc.
**IMPLICATIONS**

- Trust in scientists and scientific findings are vitally important to California’s economy.
- Understanding the chemical basis for trust can inform both scientists and policy-makers on how research is done: transparency, empathy, and autonomy are critical.
- Research should be presented to the public in a way that induces trust and accountability. People are curious and do not want to be dictated to. Involving citizens in public science can help with this.
ACKNOWLEDGEMENTS

Coauthors:
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Funding:

Visit CNS on the web:
WWW.NEuroECONOMICSTUDIES.ORG