Psychology-based Cryptology: Past Present and Future

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1. **A PARALLEL**

In unconditionally secure cryptography we proof security assuming we can privately extract random from nature.

In computational complexity we proof security assuming some computational problem is hard.

In quantum cryptography we assume correctness of the laws of quantum physics.

This topic is now studied too by people in physics.

In psychology-based cryptography we assume correctness of
psychology.

So, one could expect that information security will be studied by psychologist.
2. **Impact of the Parallel**

Need to know key research results from psychology, e.g., what is observed consciously or not, e.g., when observing a picture (e.g., with an optical illusion), dependents heavily whether one is male or female.

This may give rise to **gender-based cryptography**.

Other ideas:

- **fear** is a well known pedagogical tool (see e.g., Willis, Rousová, etc.). In cryptography that may lead to: **fear-based cryptography**.

- Erasing memory, in particular is now a hot research topic (thousands
of hits on Google Scholar). Combining this with today’s presentation by Patterson-Polychroniadou-Sibborn, this may lead to:

Erasable psychology-based cryptography

and

Un-erasable psychology-based cryptography
3. **Future**

You never have headaches! What might you have done?
3. **Future**

You never have headaches! What might you have done?

*Patient: I do not remember!*
3. Future

You never have headaches! What might you have done?

Patient: I do not remember!

Did you volunteer for some experiment?
You never have headaches! What might you have done?

Patient: I do not remember!

Did you volunteer for some experiment?

Patient: Now I remember:

I learned a secure lattice-based secret key.
You never have headaches! What might you have done?

Patient: I do not remember!

Did you volunteer for some experiment?

Patient: Now I remember:

I learned a secure lattice-based secret key.

Isn’t this thousands of bits, no surprise you have a headache!
What is the health impact of psychology-based cryptography?
4. **IMPACT**

What is the health impact of psychology-based cryptography?

So, now instead of seeing **NIST** standards for cryptography, we will see:

**FDA standards**
Although hypnoses was regarded as a dark art, practised at state fairs and the like, today it is a serious psychological tool.

It allows to block or enhance part of the memory!
Question (serious:) is psychology-based password secure against hypnotic attack?
6. **Past**

Earlier work in cryptography using the brain:

Y. G. Desmedt and S. Hou and J.-J. Quisquater

*Cerebral Cryptography*

Information Hiding, 1998