

# Monkey business or what is money talking about?

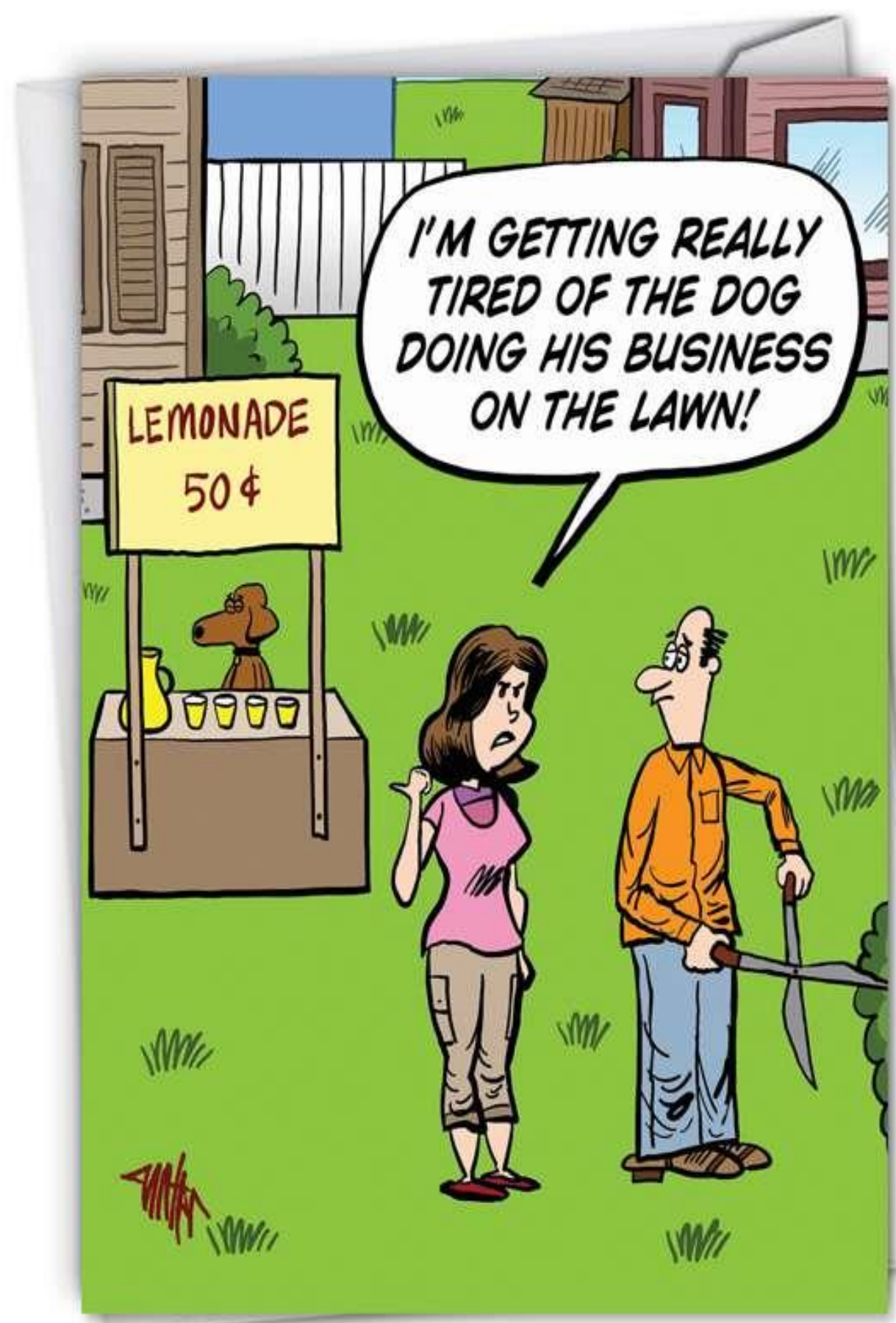
## An introduction to economical biosemiotics

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### Economical biosemiotics

**Dated statement:** “Nobody ever saw a dog make a fair and deliberate exchange of one bone for another with another dog. Nobody ever saw one animal by its gestures and natural cries signify to another, this is mine, that yours” **Adam Smith**

**New statement:** “Bacteria, ants, rats, pigeons, monkeys and other animals have sense and signs of private property, use money, make rational economic choices and do agricultural ‘businesses’



### Monkey business: empirical studies



Behavioral economist Keith Chen created environment for capuchin monkeys where they learnt how to use money (exchange silver discs for treats). Results show that monkeys are able to understand and use money as an abstract concept/values and have economical biases similar to human. Capuchin monkeys recognize the symbolic nature of *fiat currency* and do not reduce money as a concept to objects used for coins (in experiments they tried to use others object with similar shape as money). In Peirce's terminology, they understood money not just as the particular object ('sinsign') or general type embodiment ('qualisign') but as 'legisign'.



Dubner, S. J., & Levitt, S. D. (2005). Keith Chen's Monkey Research. *New York Times*, 5. 1-3.  
Lakshminaryanan, V., Keith Chen, M., & Santos, L. R. (2008). Endowment effect in capuchin monkeys. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 363(1511), 3837-3844.

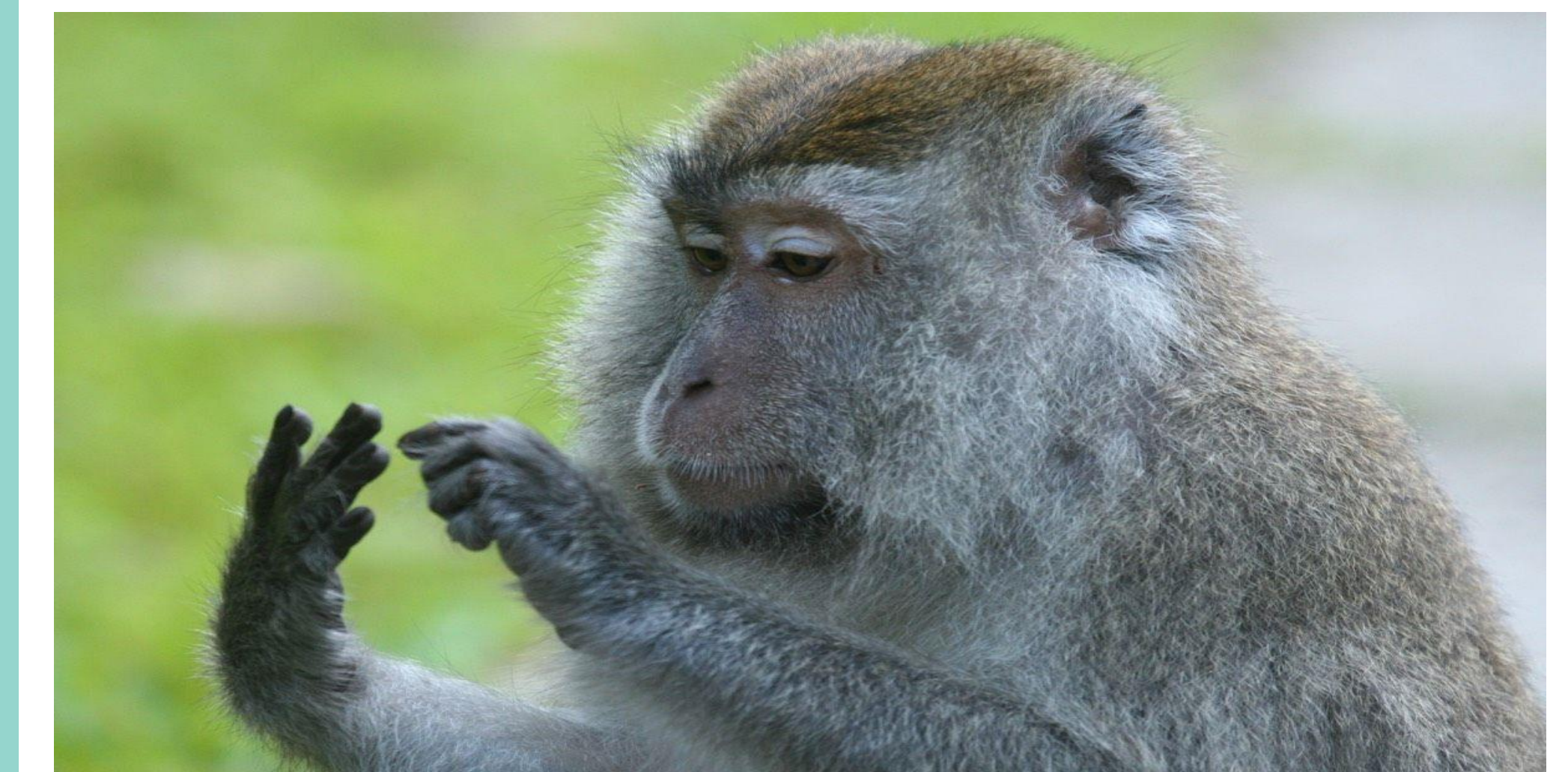
### Further topics for research

#### 1. Savings and mental time traveling:

Ability for saving for the future are common in nature and shows ability of animal for 'mental time travel' and anticipation (mental representation) of the future [3]. For example, squirrels and birds (scrub jay) can anticipate a future need for a specific food and store it for proper time. Studies of squirrel monkeys also have shown that monkeys can ignore immediate profit in the name of bigger, anticipated profit.



2. In the light of 'Mathematical Universe Hypothesis' it is also interesting to re-evaluate theoretically the evolutions of money from a barter economy to a digital economy, mergence of money and numbers.



### Biosemiotics of money: money is power

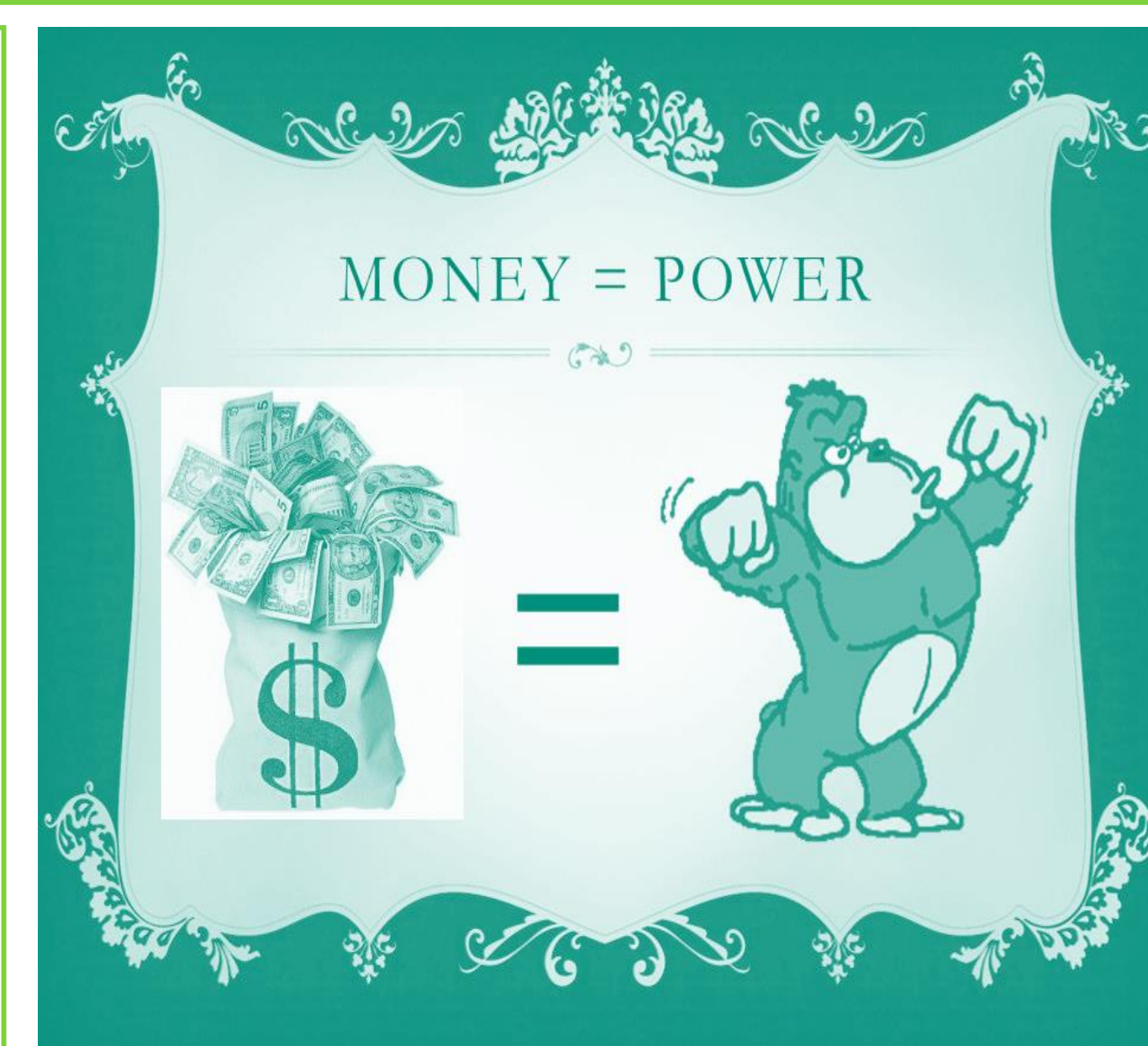
H. Spencer and others have shown that there is **functional isomorphism** between biological and social system (e.g. between cell, human body and society)

Brain – Government,  
Nerves – Communication systems,  
Blood vessels – Roads  
Immune system – Police etc.

**What is money? Money is power (ATP)**

Heraclitus once said: “All things are an exchange for fire, and fire for all things, as goods for gold and gold for goods”

Adenosine triphosphate (ATP) is universal ‘molecular unit of currency’ in organisms. Currency is universal unit of energy in societies



### Acknowledgments

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