Competition and Success in the Meme Pool: a Case Study on Quickmeme.com

Michele Coscia - **CID Harvard University** & **KDDLab ISTI CNR** - michele_coscia@hks.harvard.edu - www.michelecoscia.com
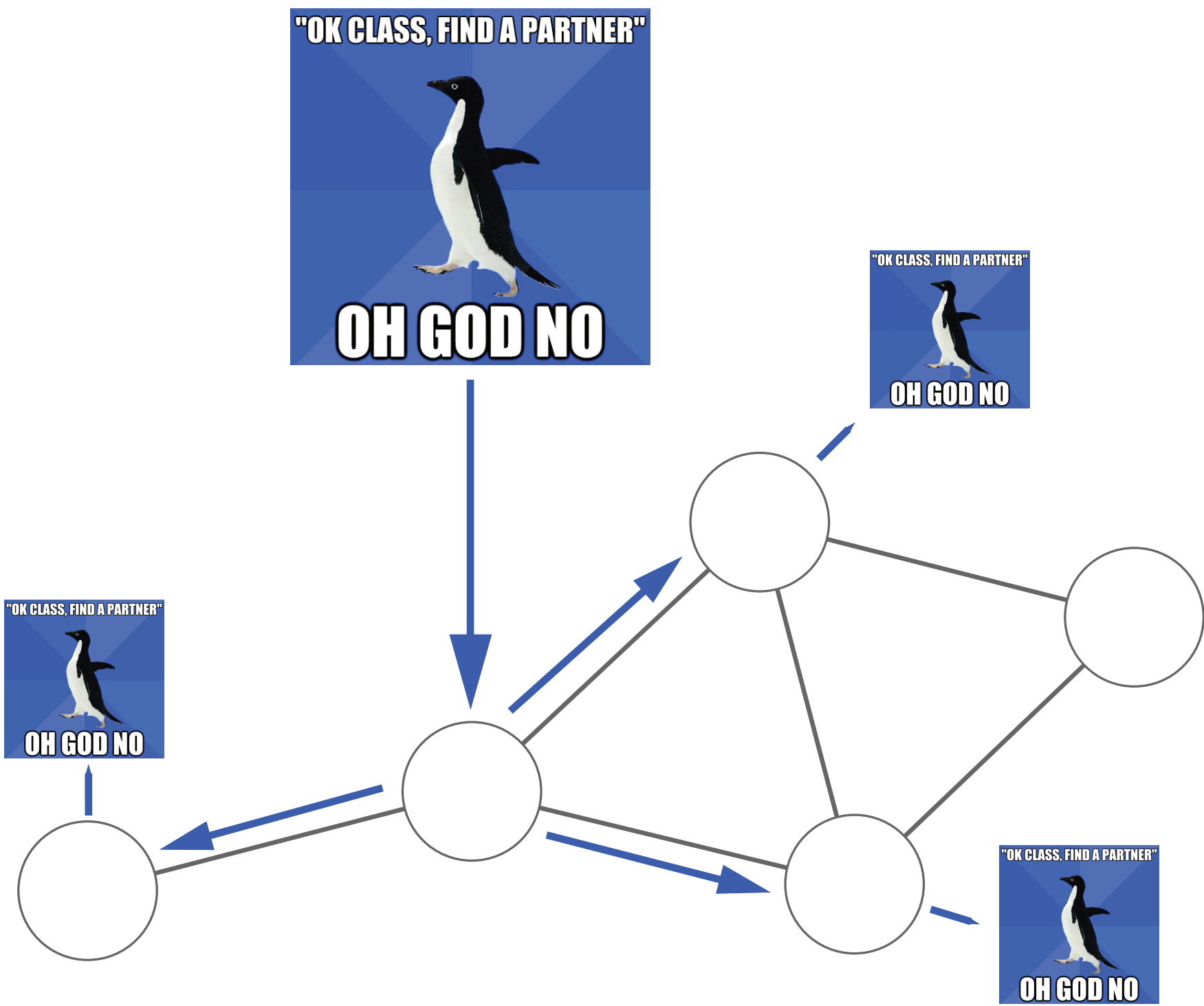
Meme (/?mi?ml; *meem*):
"An idea, behavior, or style that **spreads** from person to person within a culture." [1,2]

(among them: silly images about penguins who can't talk to women)

In most of meme studies the focus is on the **interactions** between people and the influence of the **topology of the network** itself in the meme spreading process [3].

In this work we want to **ignore the social effect** and focus on the **cultural dynamics** to describe **meme competition**, **collaboration** and, ultimately, **success** (see also [4]).
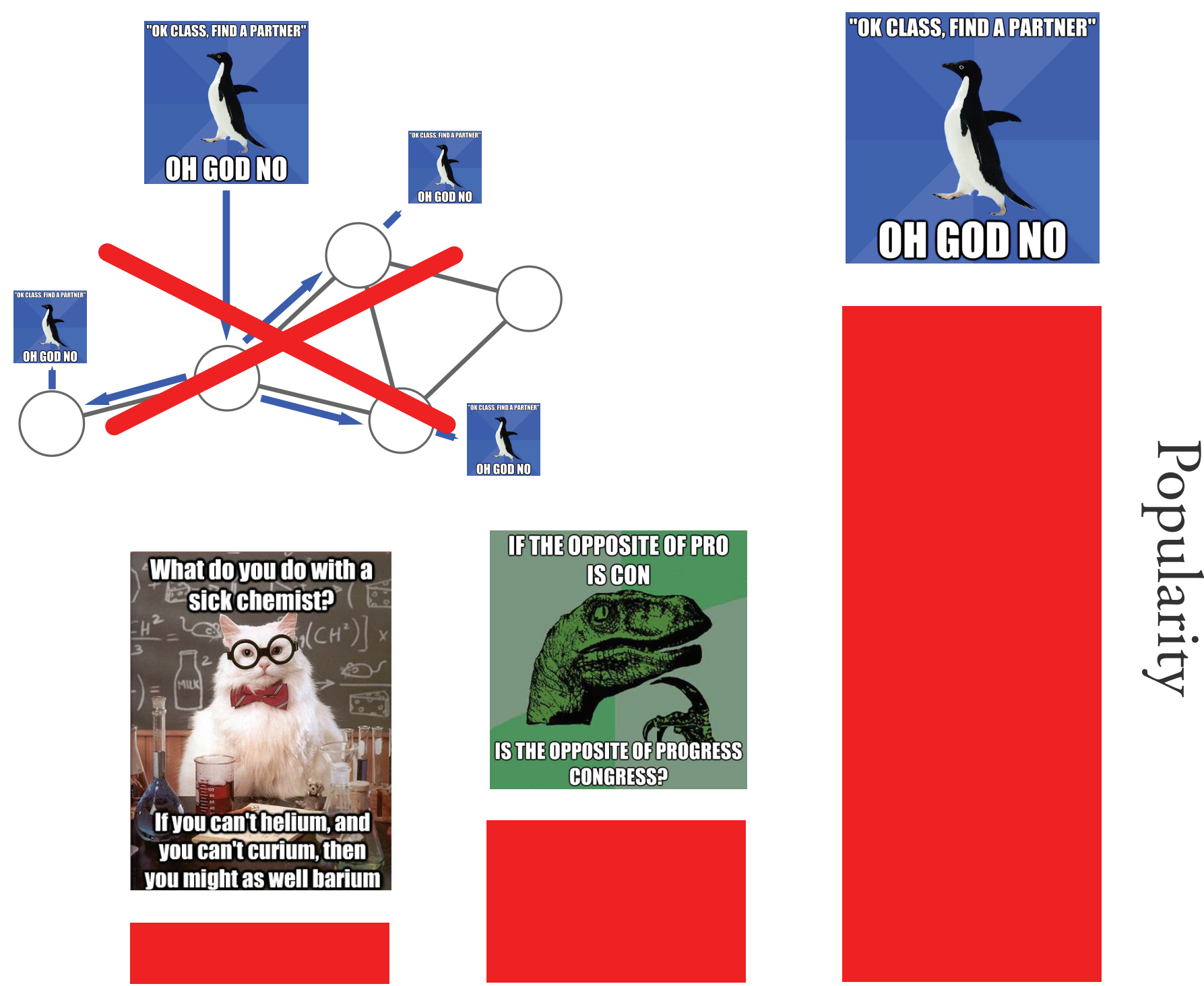
For each meme for each week **w(m)** is the amount of ratings of the meme (Figure a). The distribution of the ratings resembles a **power-law** (Figure b). To assess competition and collaboration, the $w(m_i)$ and $w(m_j)$ of memes i and j **are not directly comparable** (Figure c). We randomize the **Meme X Week** rating matrix, keeping the sums of **w(m)** constant over **m** and over **w** (rows and columns), obtaining the **expected matrix E**. Each cell of E, **e(w, m)**, is the **null expectation of w(m)**. The ratios between the expected and observed ratings, $\sigma(m) = w(m) / e(w, m)$, are now **comparable** (Figure d). If $\sigma(m) > 1$, then the meme is **over-expressed** w.r.t. the expectation; otherwise it is **under-expressed**.

(a) (b) (c) (d)
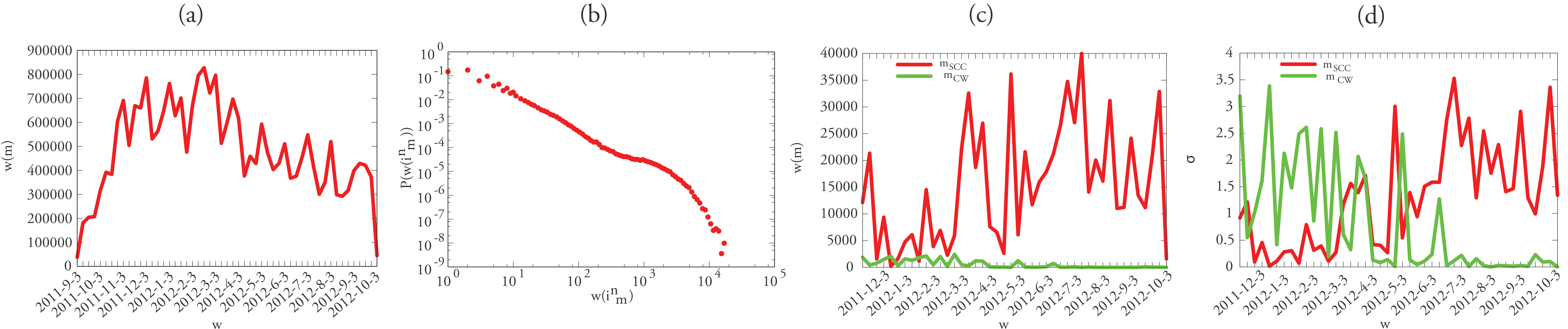
We assess collaboration and competition by systematically checking a series of **conditional probabilities**, for each pair of memes:

Competition:
- $p_{m_i}(\sigma(m_i) > 1) < p_{m_i}(\sigma(m_i) > 1 \mid \sigma(m_j) < 1)$;
- $p_{m_i}(\sigma(m_i) < 1) < p_{m_i}(\sigma(m_i) < 1 \mid \sigma(m_j) > 1)$;
- $p_{m_j}(\sigma(m_j) > 1) < p_{m_j}(\sigma(m_j) > 1 \mid \sigma(m_i) < 1)$;
- $p_{m_j}(\sigma(m_j) < 1) < p_{m_j}(\sigma(m_j) < 1 \mid \sigma(m_i) > 1)$.

Collaboration:
- $p_{m_i}(\sigma(m_i) > 1) < p_{m_i}(\sigma(m_i) > 1 \mid \sigma(m_j) > 1)$;
- $p_{m_i}(\sigma(m_i) < 1) < p_{m_i}(\sigma(m_i) < 1 \mid \sigma(m_j) < 1)$;
- $p_{m_j}(\sigma(m_j) > 1) < p_{m_j}(\sigma(m_j) > 1 \mid \sigma(m_i) > 1)$;
- $p_{m_j}(\sigma(m_j) < 1) < p_{m_j}(\sigma(m_j) < 1 \mid \sigma(m_i) < 1)$.

We found that **competition and collaboration are widespread in the meme pool**. On average, (Figure e) **each meme competes with 75 other memes** (some compete with 300 memes or more); (Figure f) **each meme collaborates with 154 other memes** (some collaborate with 300 memes or more). We are able to cluster collaborating memes into **meme organisms** (Figure g) where each meme collaborates with each other meme.

(e) (f) (g)
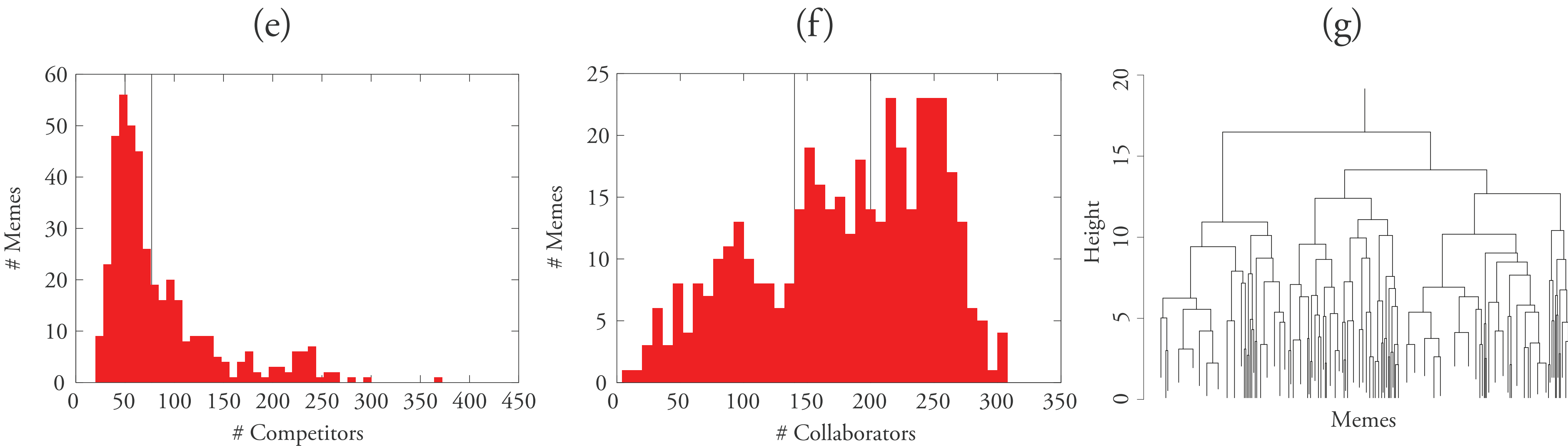
In the decision tree, the shares in the nodes represent the **success odds** of a meme. On the arrows, the characteristics of the memes. In general, **memes have a 35.47% probability of being successful**. If they don't have **popularity peaks**, the probability grows to **54.47%**. Of these, **highly competitive** memes are successful in **75%** of the cases, **80.3%** if they are part of an **organism**.
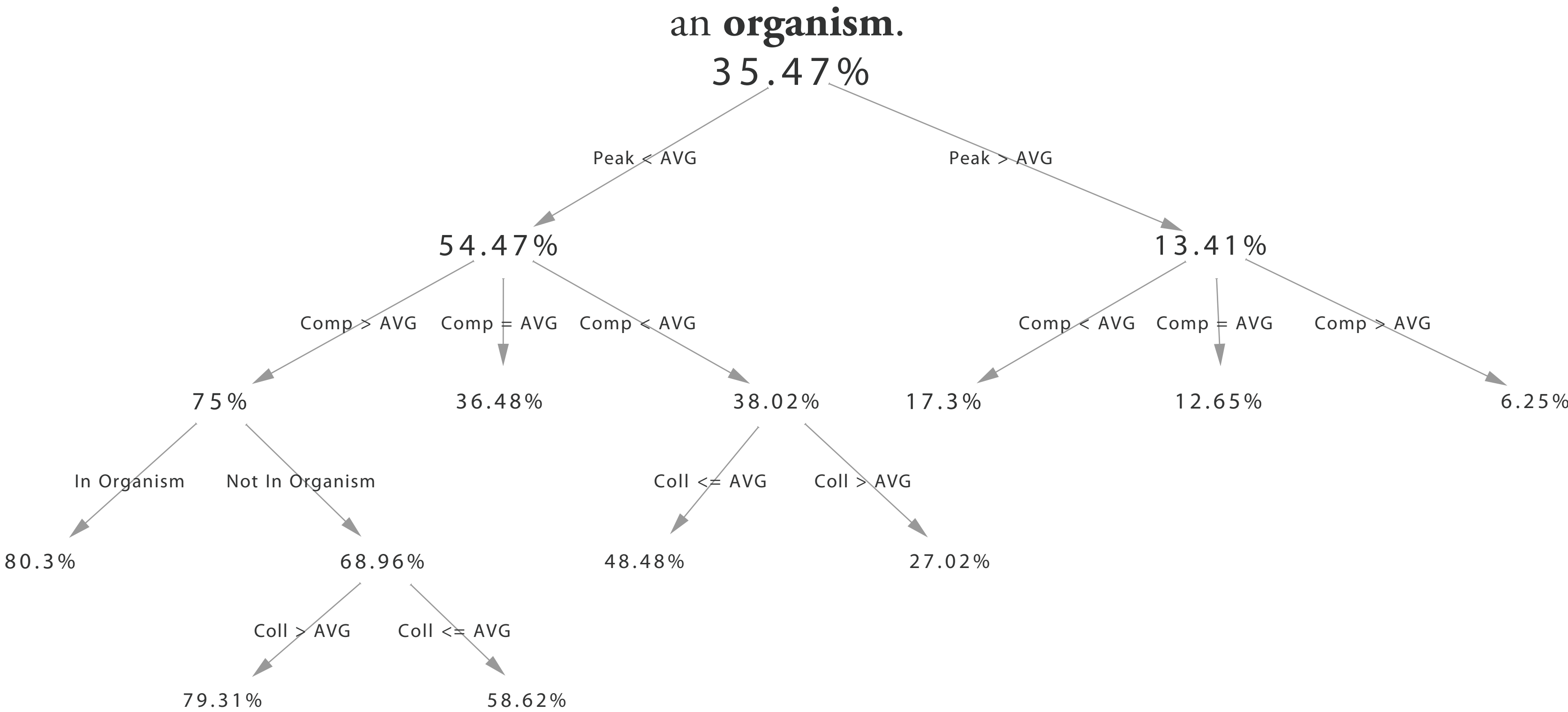
References:

[1] Dawkins, R. 1976. **The Selfish Gene**. Oxford University Press.
[2] Lynch, A. 1999. **Tought Contagion: How Belief Spreads Trough Society**. Basic Books.
[3] Kooti, F.; Yang, H.; Cha, M.; Gummadi, P. K.; and Mason, W. A. 2012. **The emergence of conventions in online social networks**. In ICWSM.
[4] Bauckhage, C. 2011. **Insights into internet memes**. In ICWSM.