Social Attention

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how do agendas get set?

content creation: a remarkable inversion

relatively few create
an information explosion
many consume

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Check out the Digg Dialogg with FCC Chairman Julius Genachowski!

WSJ Personal Technology columnist Walt Mossberg recently sat down with Julius Genachowski, FCC Chairman, and asked him your top questions. Watch the full Digg Dialogg now!

✕

92 diggs

House Votes To Extend Tax On Wealthy Estates -

washingtonpost.com — House votes to extend inheritance tax on wealthy estates, canceling one-year repeal in 2010........................ (Submitted by FI5HERMAN)

🖐 digg   💬 12 Comments   ➥ Share   ✖ Bury   Made popular **3 min ago**

Slate

102 diggs

2010 Toys Less Toxic, But "Green Baby" T-Shirt Packs Pb & Cl

greenerdesign.com — While the latest toy tests for HealthyStuff.org show some kid's products contain high levels of lead and other toxins, they also show the number of toxic toys being discovered has steadily declined over the years. Notable exceptions include "Green Baby" infant shirt, containing elevated levels of Lead and Chlorine. (Submitted by hbyrne)

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facebook

Statistics

People on Facebook

More than 400 million active users

50% of our active users log on to Facebook in any given day

Average user has 130 friends

People spend over 500 billion minutes per month on Facebook

Activity on Facebook

There are over 160 million objects that people interact with (pages, groups and events)

Average user is connected to 60 pages, groups and events

Average user creates 70 pieces of content each month

More than 25 billion pieces of content (web links, news stories, blog posts, notes, photo albums, etc.) shared each month.

Global Reach

More than 70 translations available on the site

About 70% of Facebook users are outside the United States

Over 300,000 users helped translate the site through the translations application

Twitter Stats (April 2010)

- 105,779,710 registered users.
- New users at the rate of 300,000 per day.
- 180 million unique visitors come to the site every month
- Tweets arriving at an average of 55 million tweets a day
- Around 600 million search queries per day.

- Edison Marketing survey : More than half of Twitter users surveyed said they follow brands – and this group is three times more likely to follow a brand on Twitter than they are to follow a brand on any other social network.

and a scarcity of attention

attention is the valuable resource

where ever attention flows, money will follow (Kevin Kelly).

almost anything else except attention can be manufactured as a commodity.

premium brands are only premium because they garner a surplus of attention.

attention

attention as a social phenomenon

measured by the intensity of signals that relate to a particular idea, theory, product, research program, movie, book, etc.

Questions:

how do competitive sites/brands/ideas successfully attract attention?

what is the role that novelty and popularity play in eliciting attention?

how to maximize value when accessing information

no problem

attention – the network dimension

an example of information flows inside a large social network

a study of15 million recommendations from amazon.com

(a) Medical book   (b) Japanese graphic novel

Figure 1: Examples of two product recommendation networks: (a) First aid study guide *First Aid for the USMLE Step*, (b) Japanese graphic novel (manga) *Oh My Goddess!: Mara Strikes Back.*
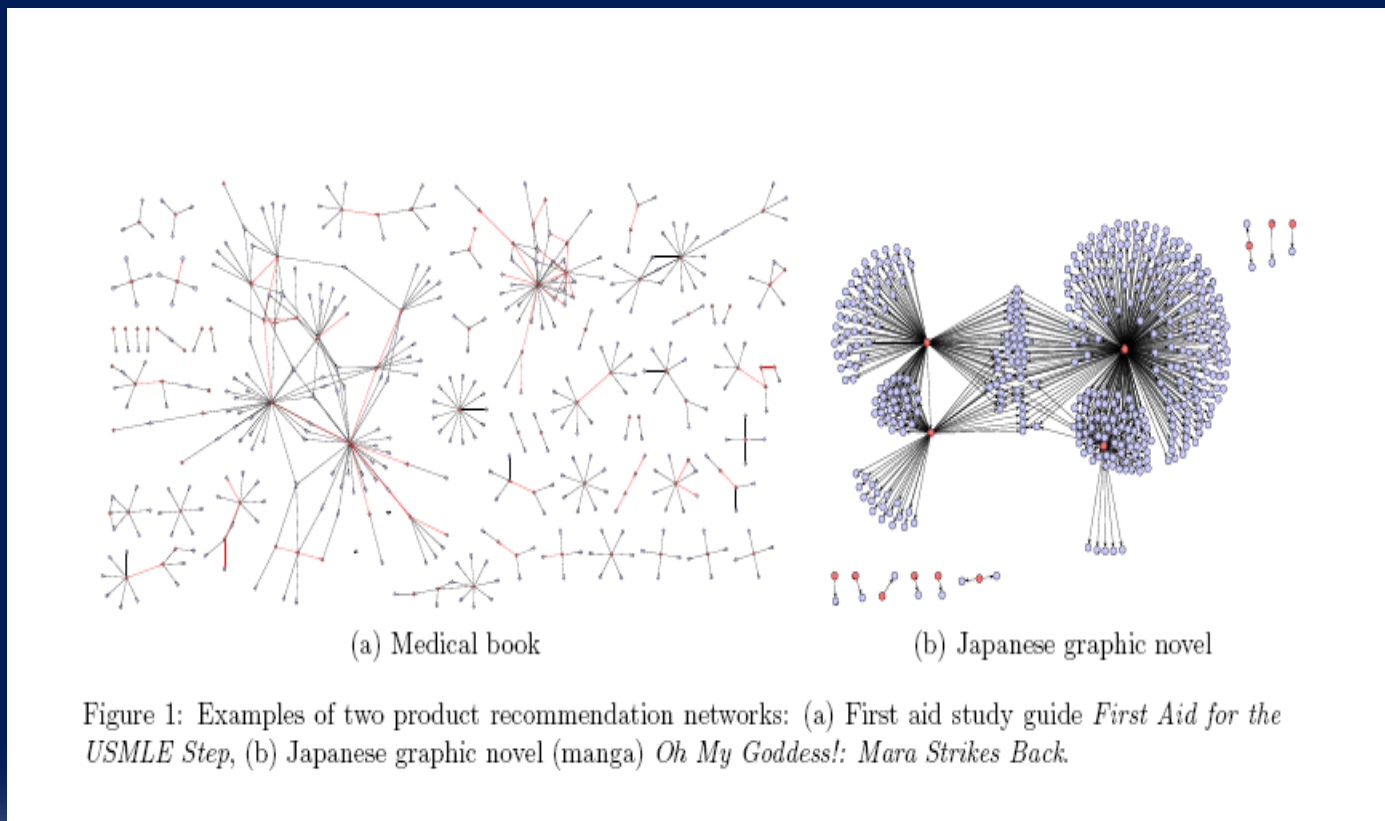
J. Lefkovec, L. Adamic and B. A. Huberman, ACM Transactions on the Web, Vol. 1, 5 (2007)

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how the network allocates attention

the allocation of attention among
items is universal (digg, youtube, etc)
and given by the lognormal
distribution

1 million users of digg.com

distribution of digg numbers
of 29684 stories
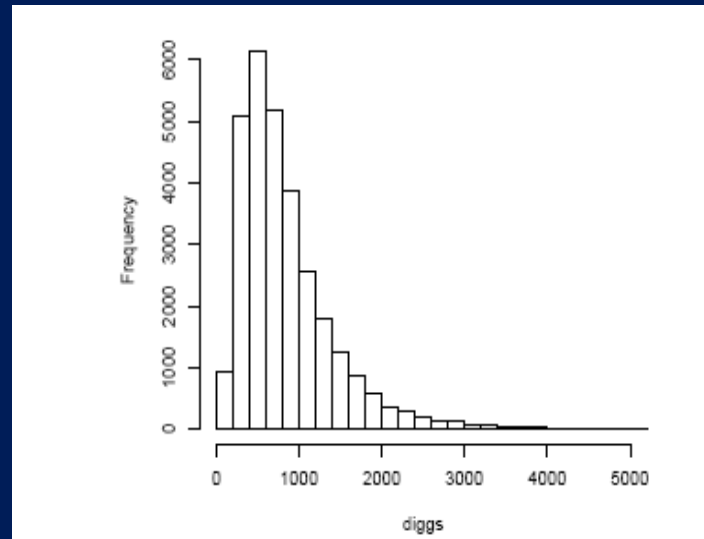
lognormal, as predicted

F. Wu and B. Huberman, "Novelty and collective attention," *Proc. Natl. Acad. USA, Vol.105, 17599 (2007)*

attention - the temporal dimension

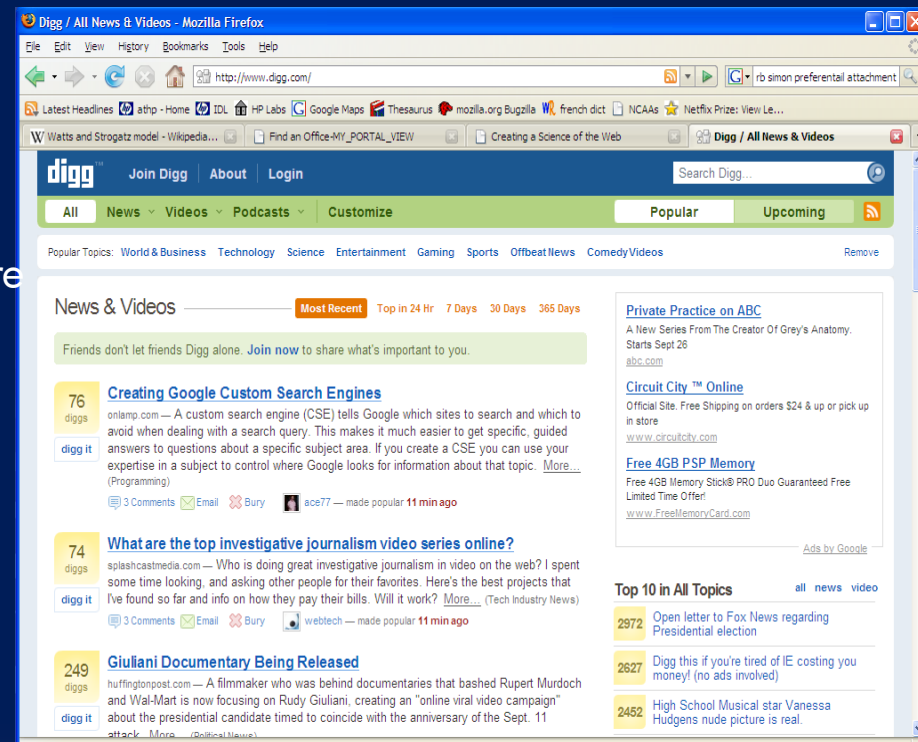- we share with others what captures our attention

- and when it fades we search for novel experiences

how does novelty interact with collective attention?

in a nonlinear but predictable way

The rate a which people digg a story decays

in universal fashion, in ways that we can measure

novelty decays in predictable ways

Digg
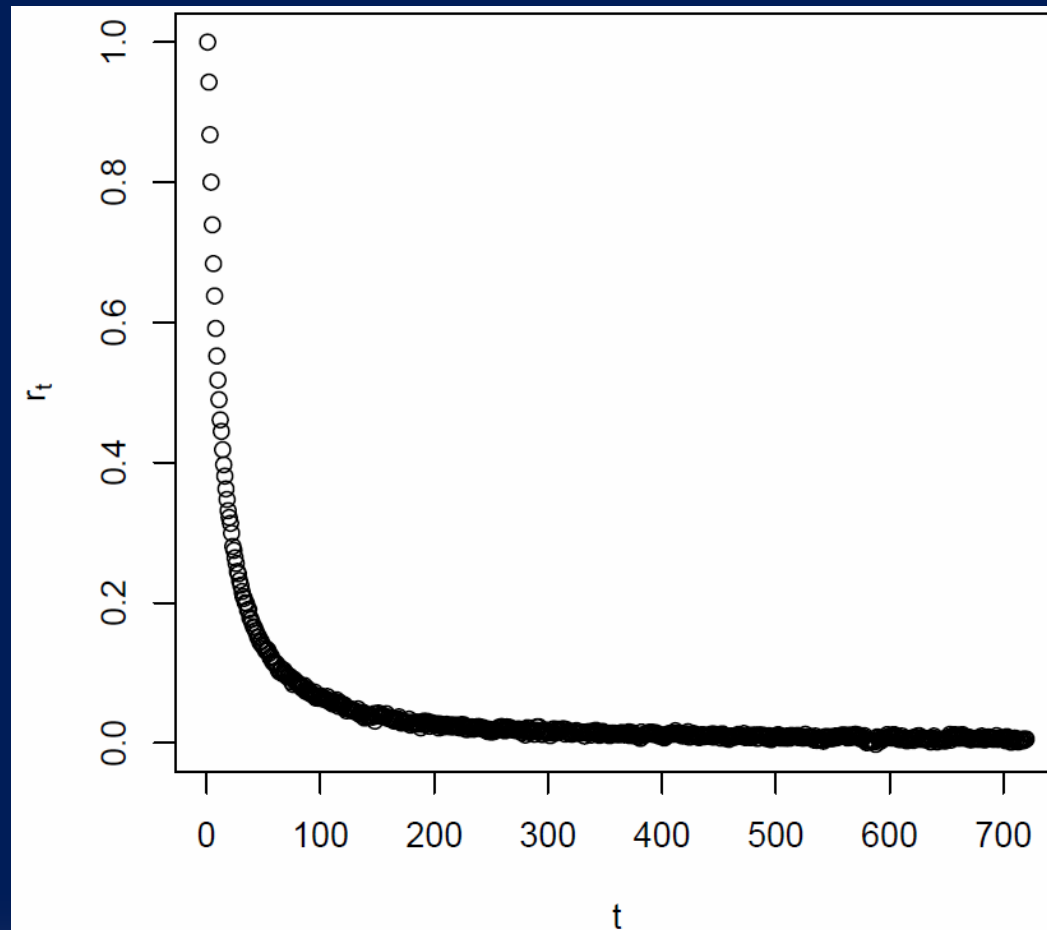
$$N_t = (1 + r(t)\xi_t)N_{t-1}$$

$$r(t) \sim \exp[-0.4t^{0.4}]$$

attention half-life : 69minutes
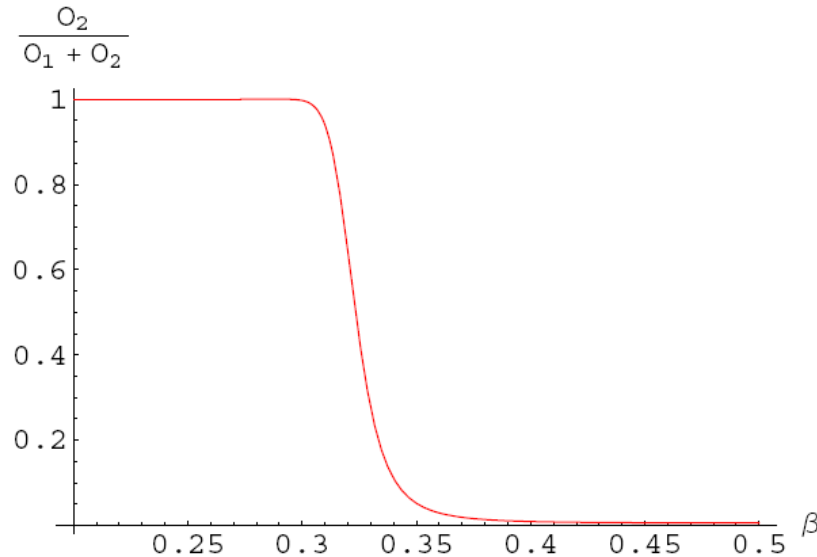
predicting the popularity of online content
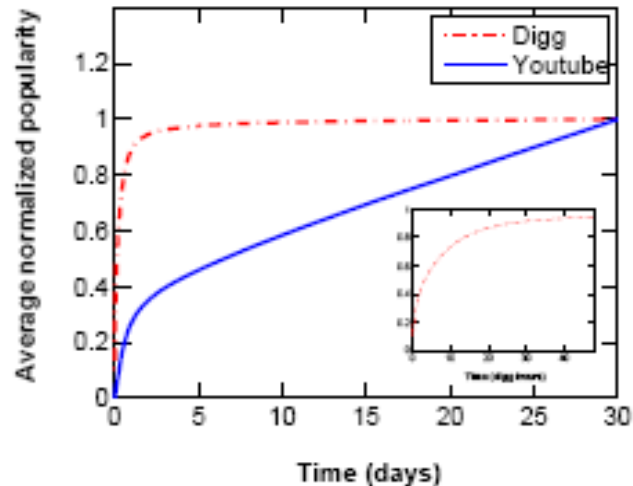
Figure 10: Average normalized popularities of submissions for Youtube and Digg by the popularity at day 30. The inset shows the same for the first 48 digg hours of Digg submissions.

from lognormal distribution of attention *and*

the rate at which people access content

G. Szabo and B. A. Huberman, to appear: *Communications of the ACM, 2009*

drivers of attention: popularity versus novelty

$$r_t = e^{-\alpha t \beta}$$

Figure 6: The relative performance $O_2/(O_1+O_2)$ as a function of β, for fixed $\alpha = .4$.

O_1---novelty

O_2---popularity

the larger beta the faster novelty fades

F. Wu and B. Huberman, Proceedings of the ACM e-commerce conf. 2008

seeking attention

an insightful experiment

B. A. Huberman, C. Loch and A. Onculer, *Social Psychology Quarterly*, Vol. 67, 103 (2004).

a study of 10 million videos submitted by .5 million users to Youtube

results:

1. productivity exhibits strong positive dependence on attention

2. uploaders compare themselves to others when having low productivity

3. and to themselves to themselves above a threshold

thus attention is the currency that makes it a private good

B. A. Huberman, D. M. Romero and F. Wu, *[arxiv](#) 0809.3030*
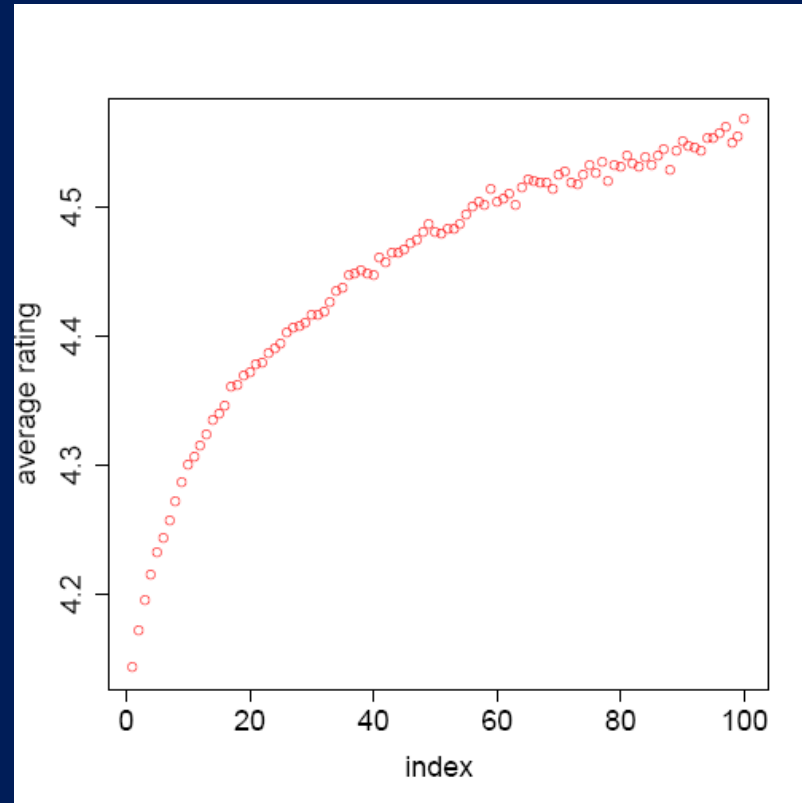
sgekting attention

Question 1: of the millions of videos uploaded to Youtube, how likely are any of these to achieve a great level of attention?

and since "persistence is strongly correlated with success"

Question 2: how does persistent uploading increase the chances of success?
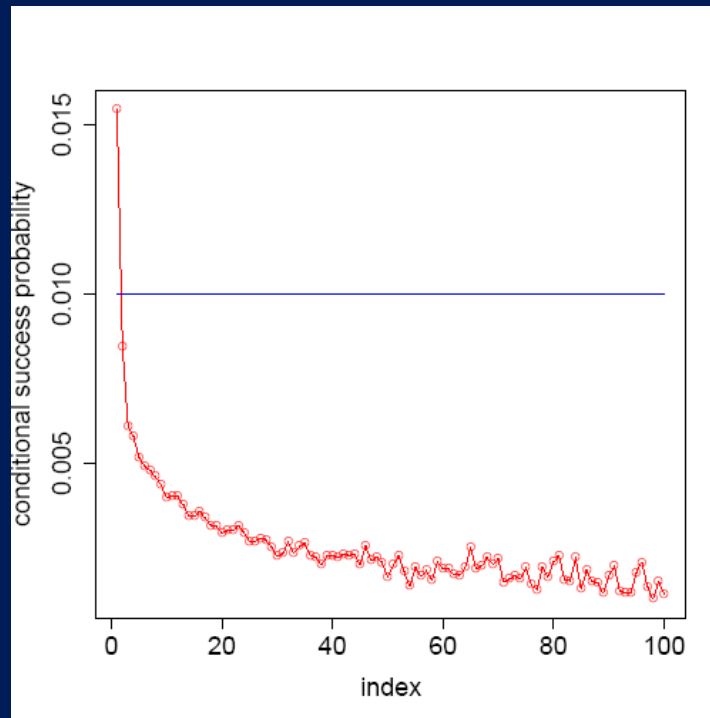
persistence increases quality

10 million video uploads to Youtube

but not the likelihood of success

$$h(k) = \frac{\text{number of producers who failed in the } k-1 \text{ video and succeded with the } k' \text{th}}{\text{number of producers who failed in the } k-1 \text{ video and still uploaded the } k' \text{th}}$$

h(k)

red: conditional success probability of Youtube producers.
blue : conditional success probability for a lottery with 0.01 success
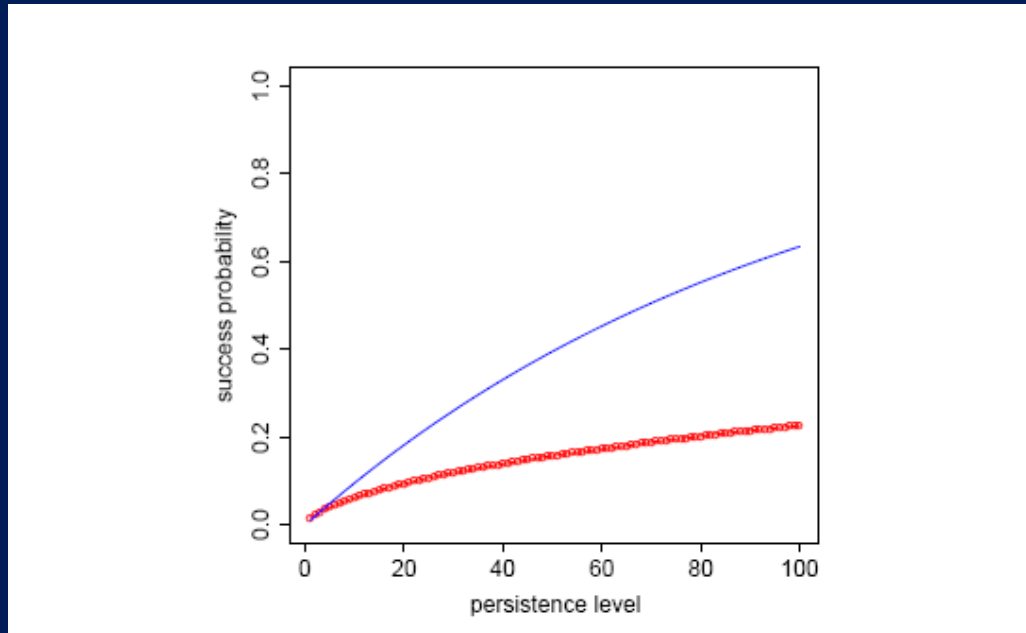
persistence and success

sucess probability for Youtube after k submissions

$$p(k) = 1 - \prod_{i=1}^{k}(1 - h(i))$$

success probability for a lottery with 0.01 chances after k trials

$$p(k) = 1 - 0.99^k$$

the persistence paradox

red: producers uploading to Youtube

blue: producers participating in a lottery with 0.01 chances

competing for attention

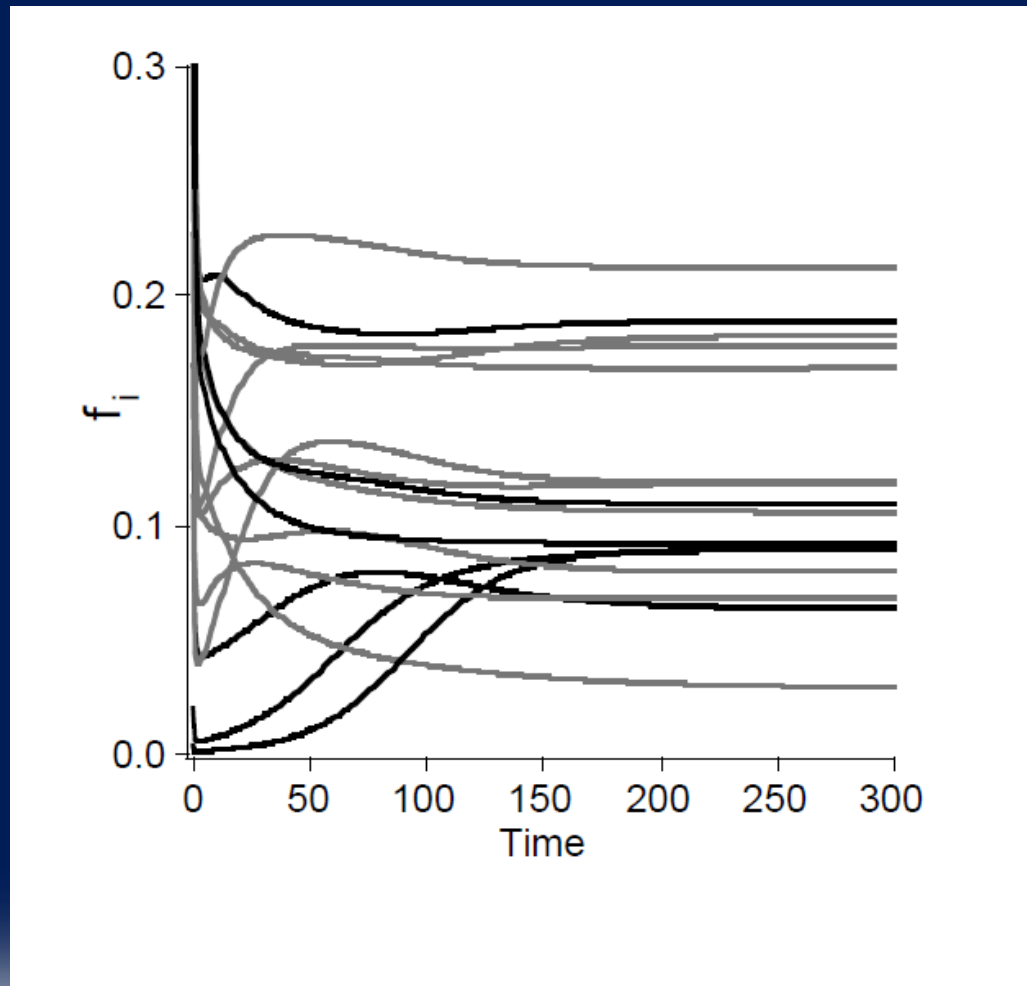$$\frac{df_i}{dt} = \alpha_i \cdot f_i(\beta_i - f_i) - \sum_{i \neq j} \gamma_{ij} f_i f_j$$

d

α_i = the rate a which attention is allocated to site i

γ_{ij} denotes the competition between two items or links for the attention of a user.

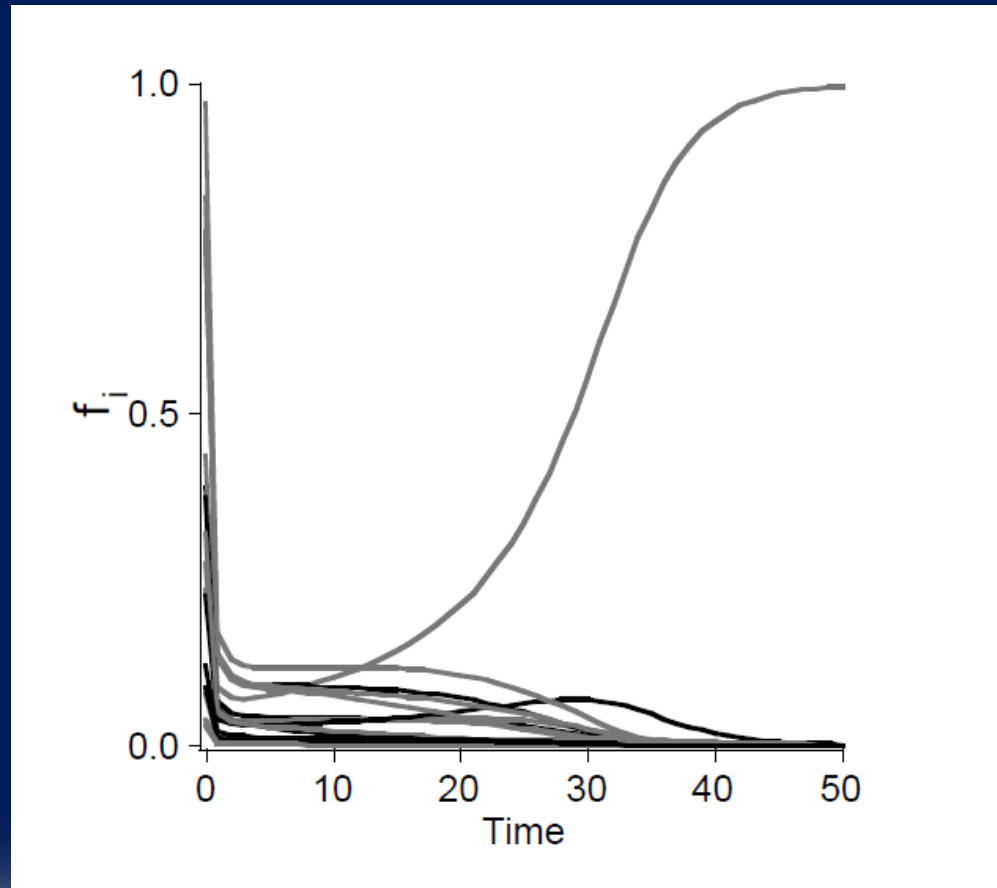The larger it is, the less likely a user will attend to both items
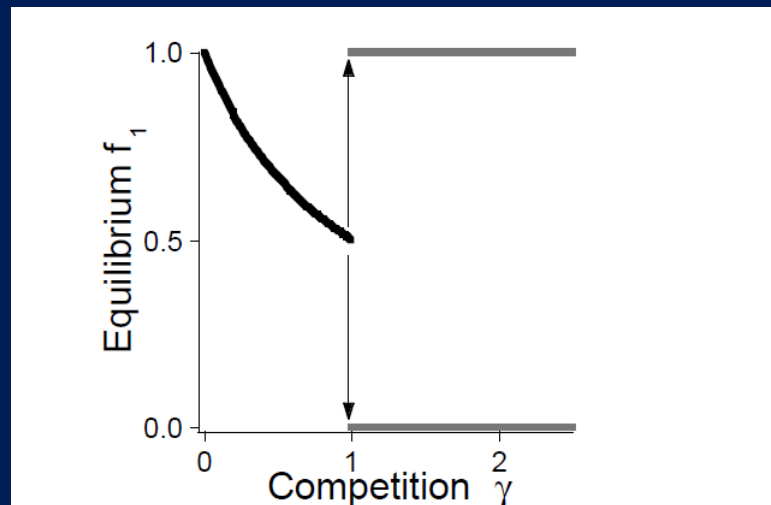
dynamics of attention
γ=0.5

dynamics of attention
strong competition for attention γ=1.5

dynamics of attention

Thank you!

for more details visit

http://www.hpl.hp.com/research/scl