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# Understanding Video-Ad Consumption on YouTube

A Measurement Study on User Behavior, Popularity, and Content Properties

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Federal University of Minas Gerais - Brazil

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# Background Concepts

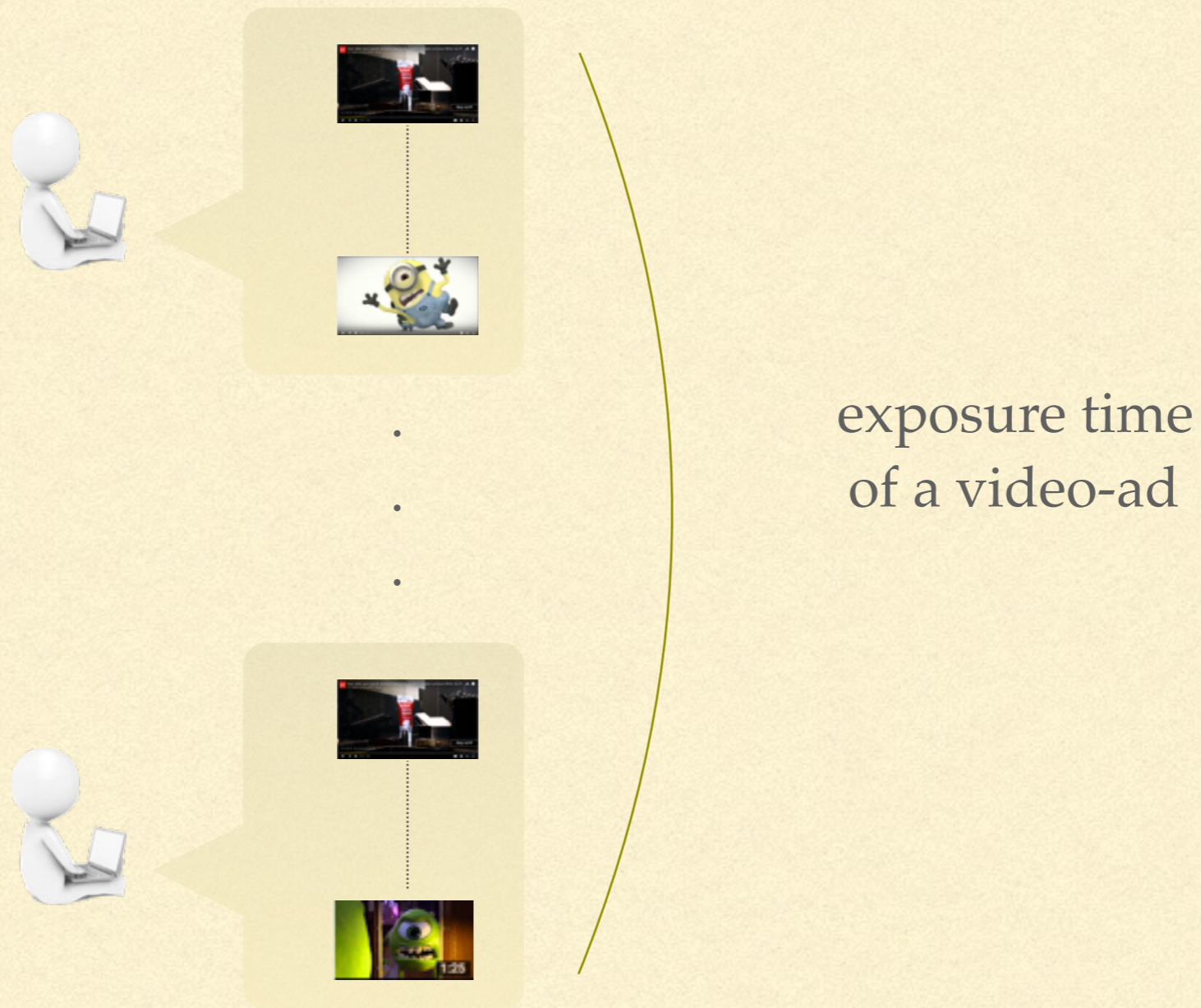
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# Background Concepts

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# Research Questions

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How do users consume video-ads?

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How do users consume video-ads?

How does video-ad popularity evolve over time?

What are the relationships between a video-ad and the video-contents with which it is associated?

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# Data Collection and Cleaning

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## Campus dataset

logs of HTTP requests  
from a campus network

\* heuristic to associate  
video-ad to video-content  
(reverse engineering from traffic logs)

## Global dataset

YouTube public API  
HTML content

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**user behavior**

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**user behavior**

## Global dataset

YouTube public API  
HTML content

**global properties of video-  
ad consumption**

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# Overview of our Datasets

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99 thousand video-ad exhibitions

58 thousand unique video-contents

5 thousand unique video-ads

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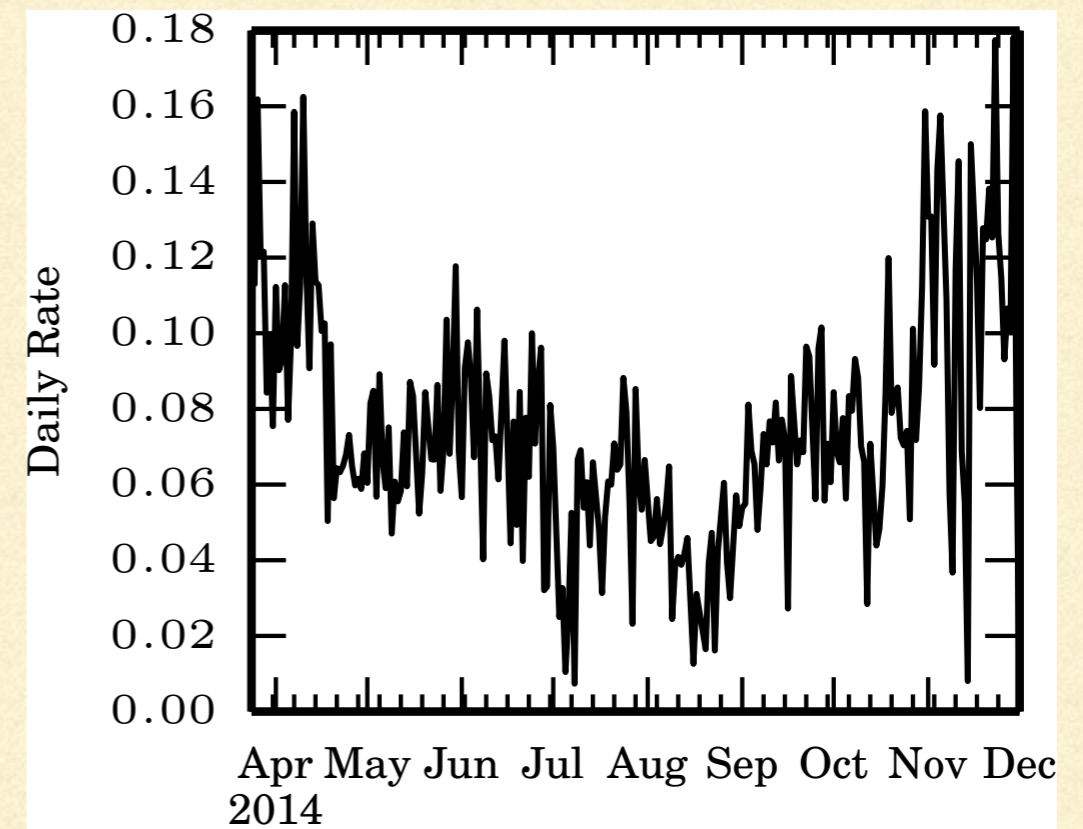
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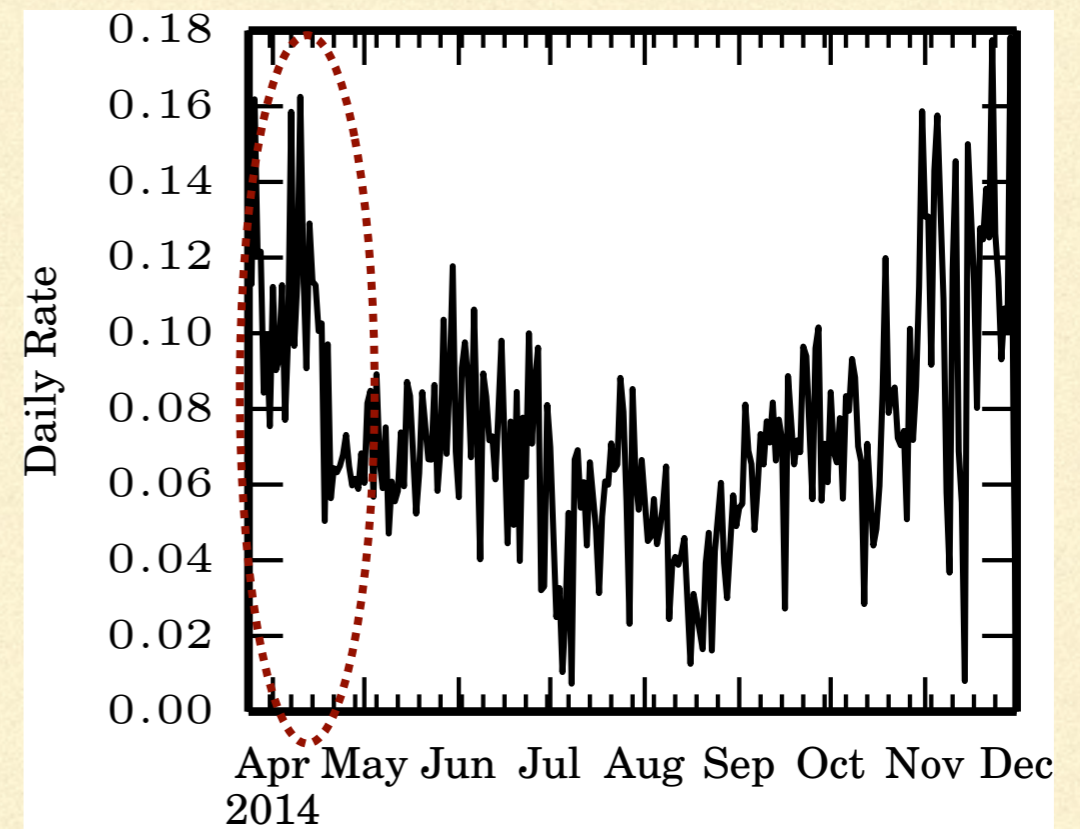
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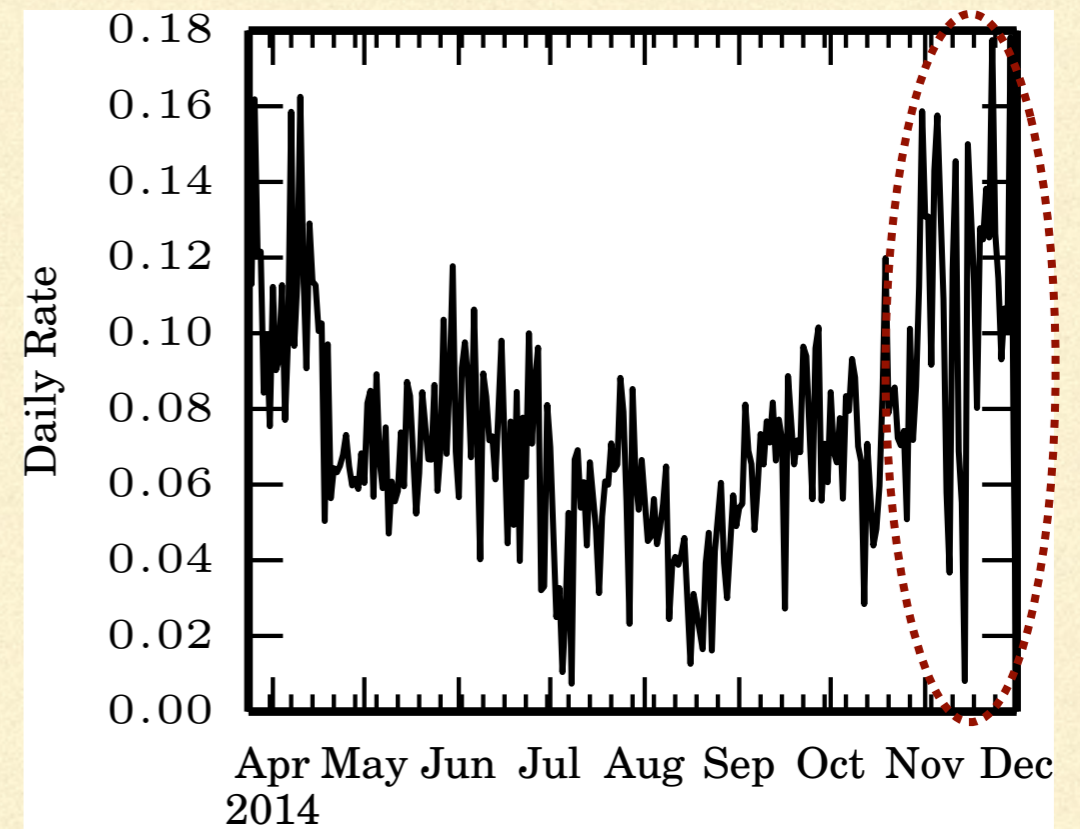
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How do users consume video-ads?

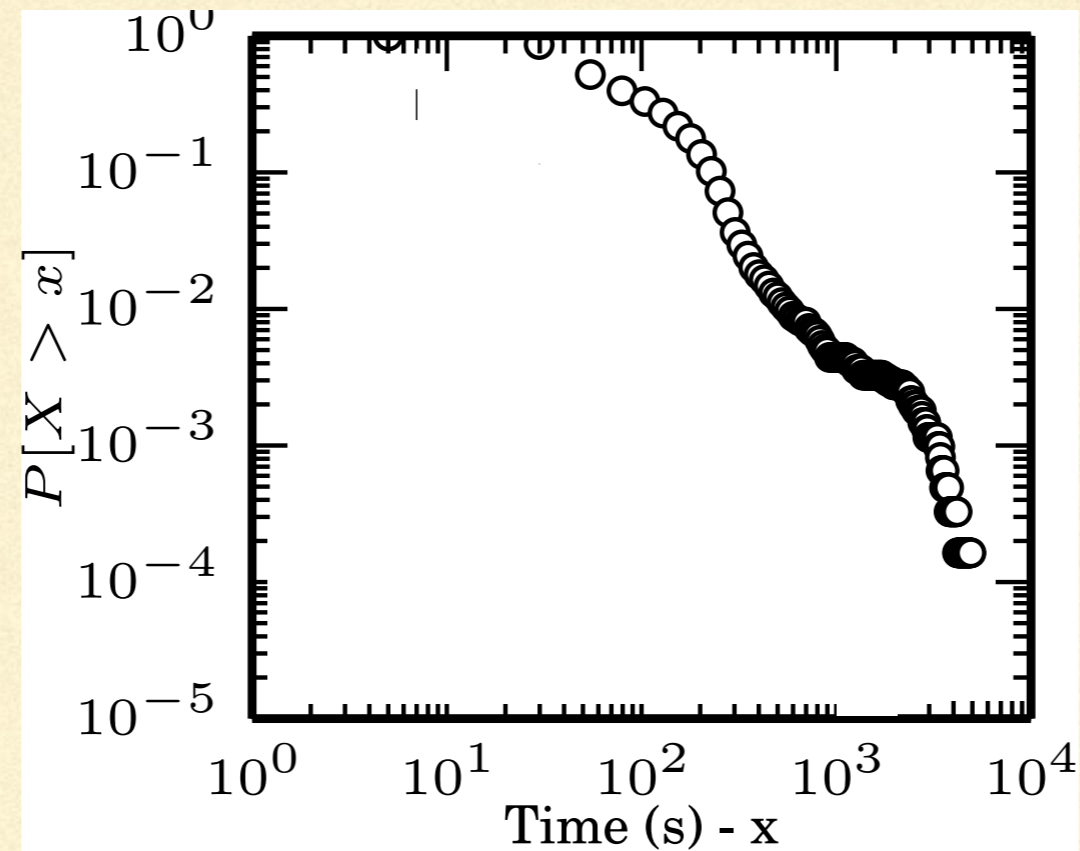
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Video-ad durations vary greatly  
across all video-ads

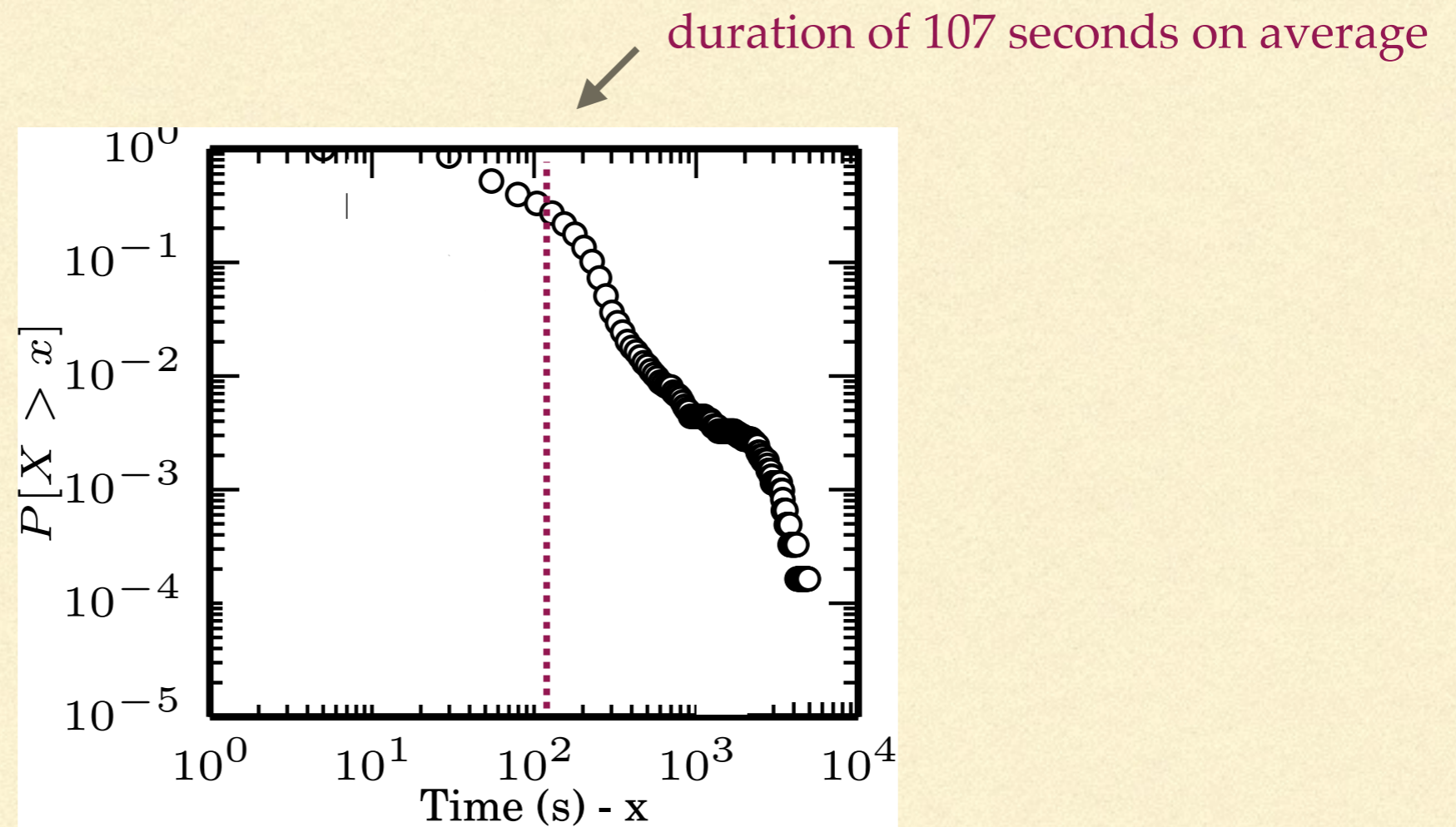
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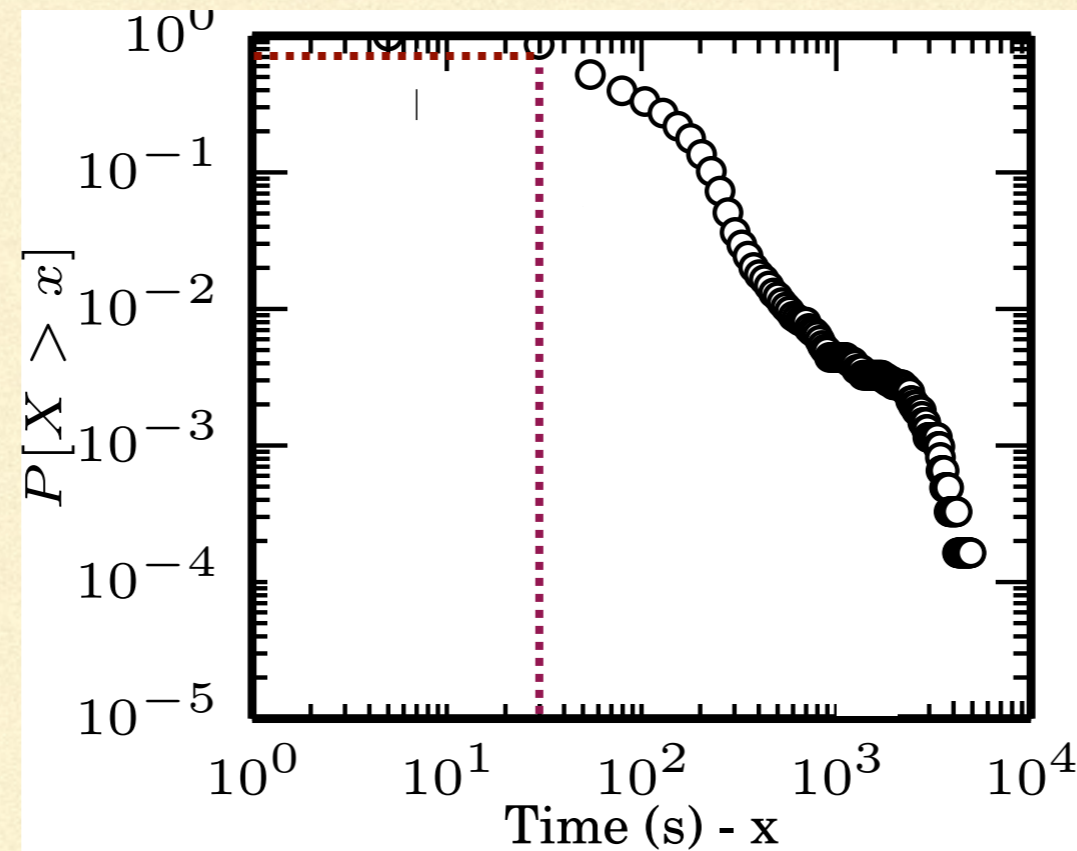


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Video-ad durations vary greatly  
across all video-ads

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14% of video-ads below 30 seconds

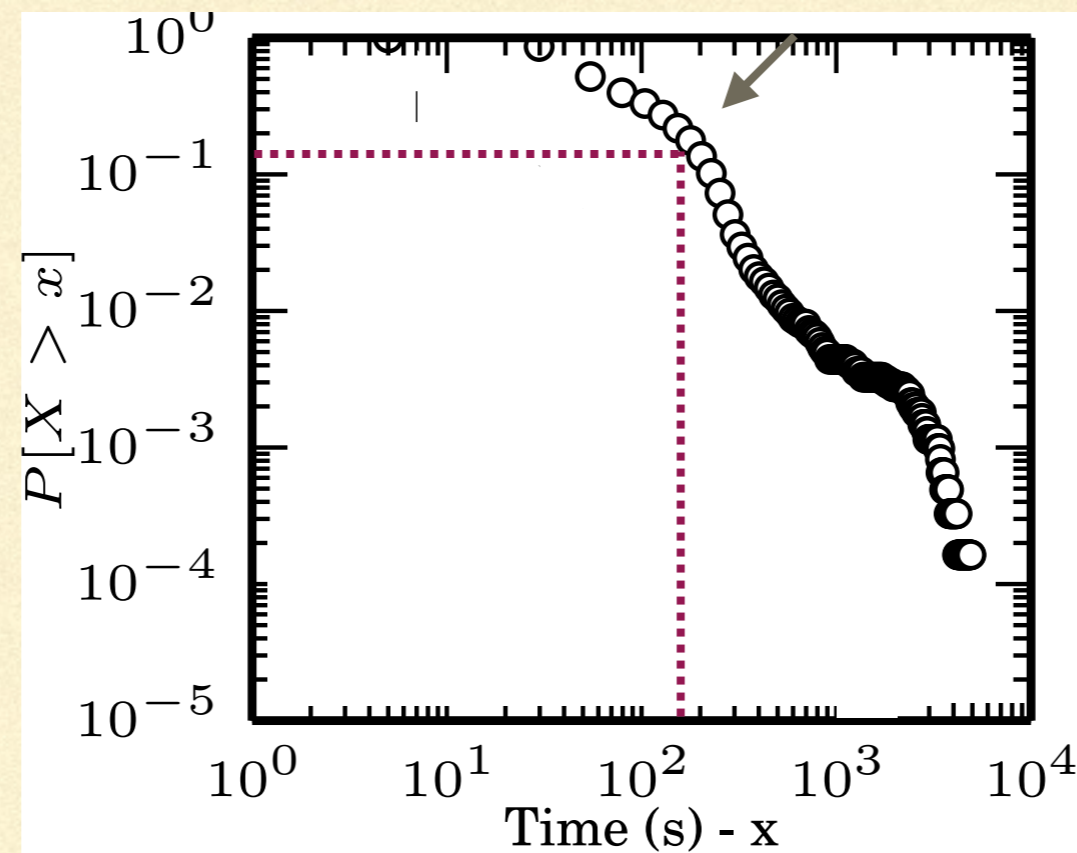


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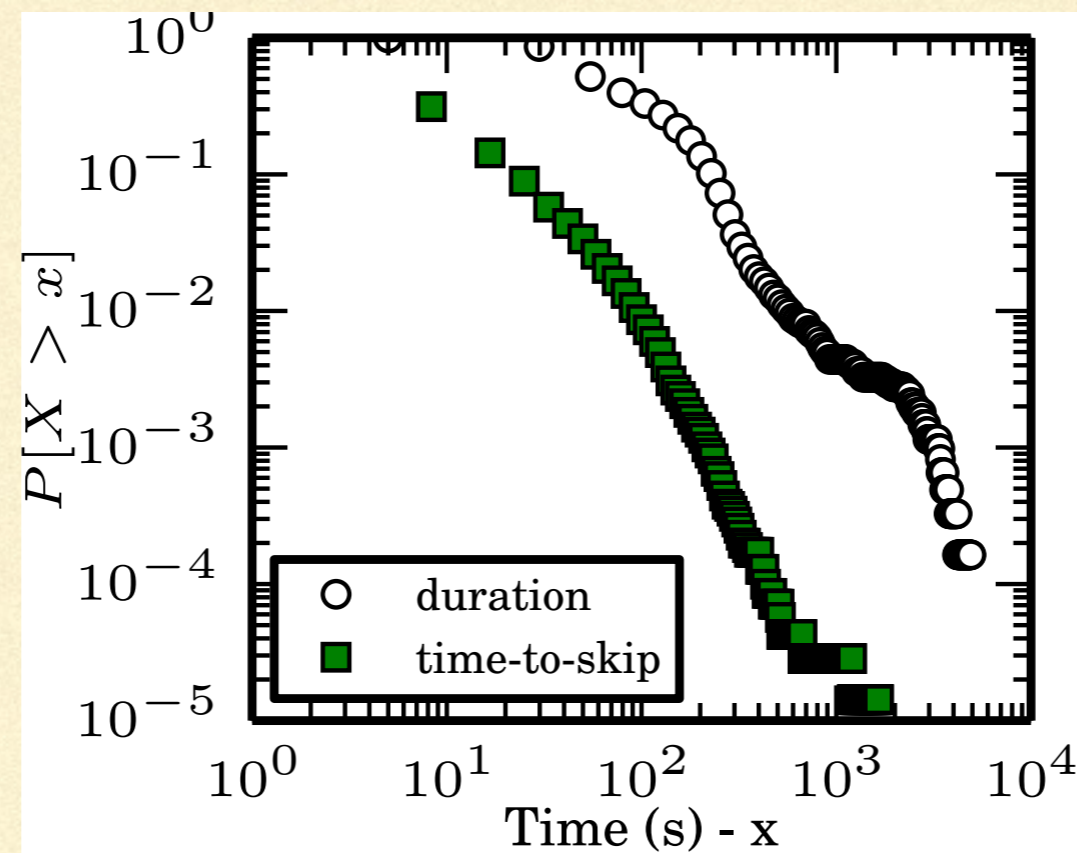
31% of video-ads above 2 minutes



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A considerable fraction of all video-ad exhibitions are streamed in full

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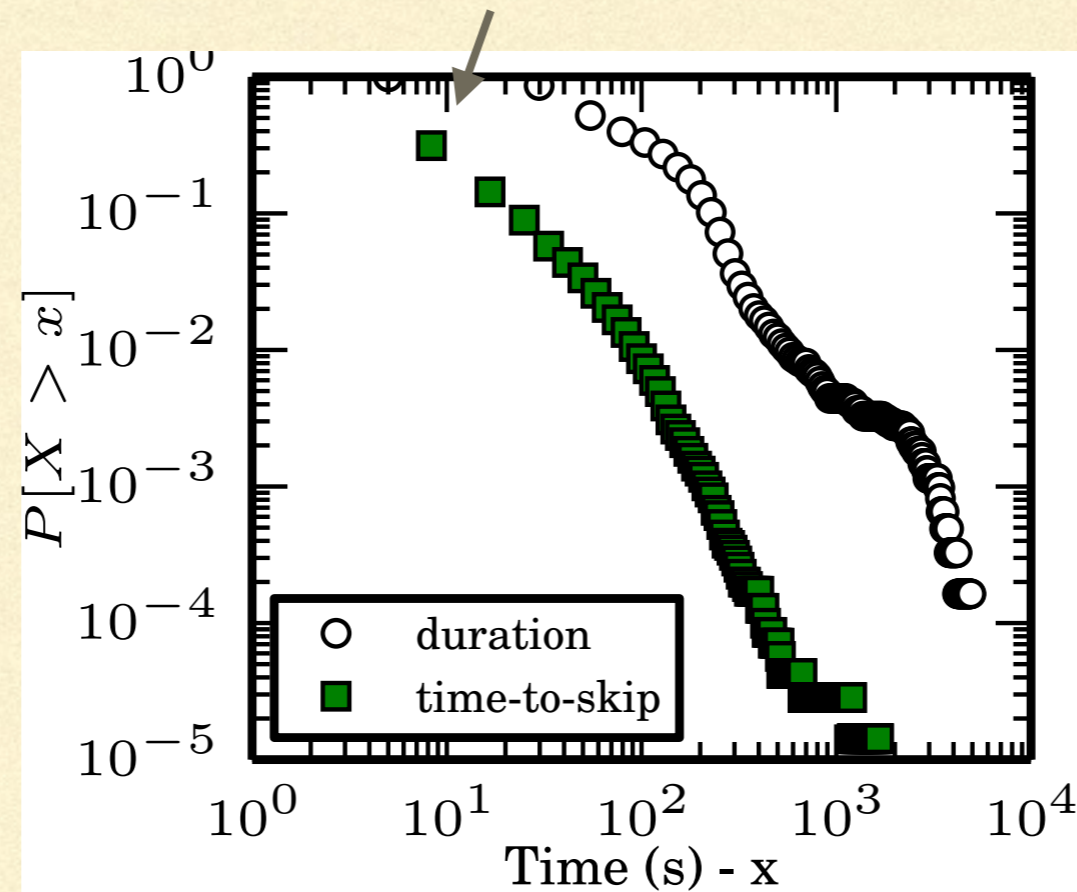


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A considerable fraction of all video-ad exhibitions are streamed in full

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only video-ad exhibitions skipped by the user (71%)

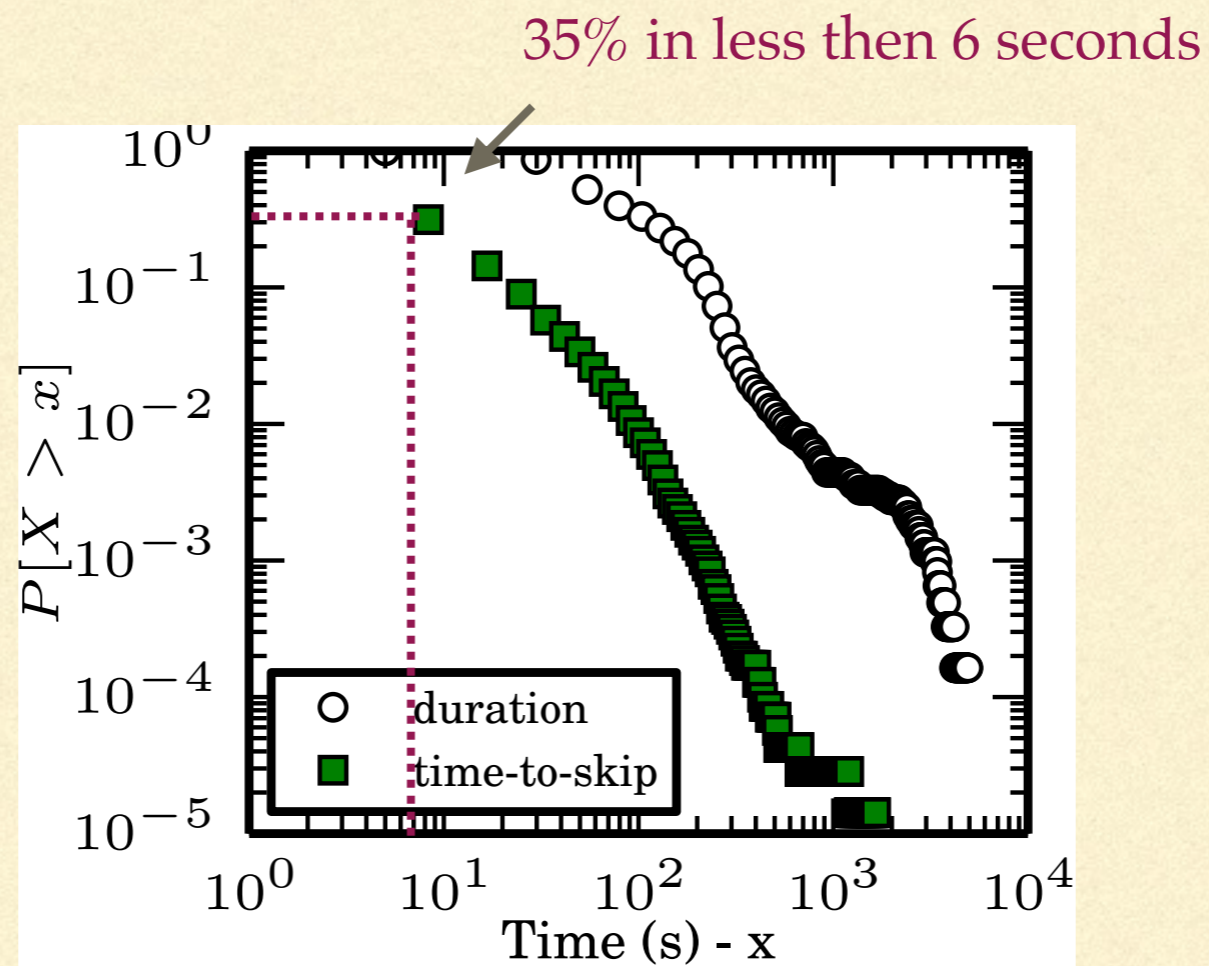


\* 29% were  
streamed in full

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Users often skip video-ads as soon as they are allowed

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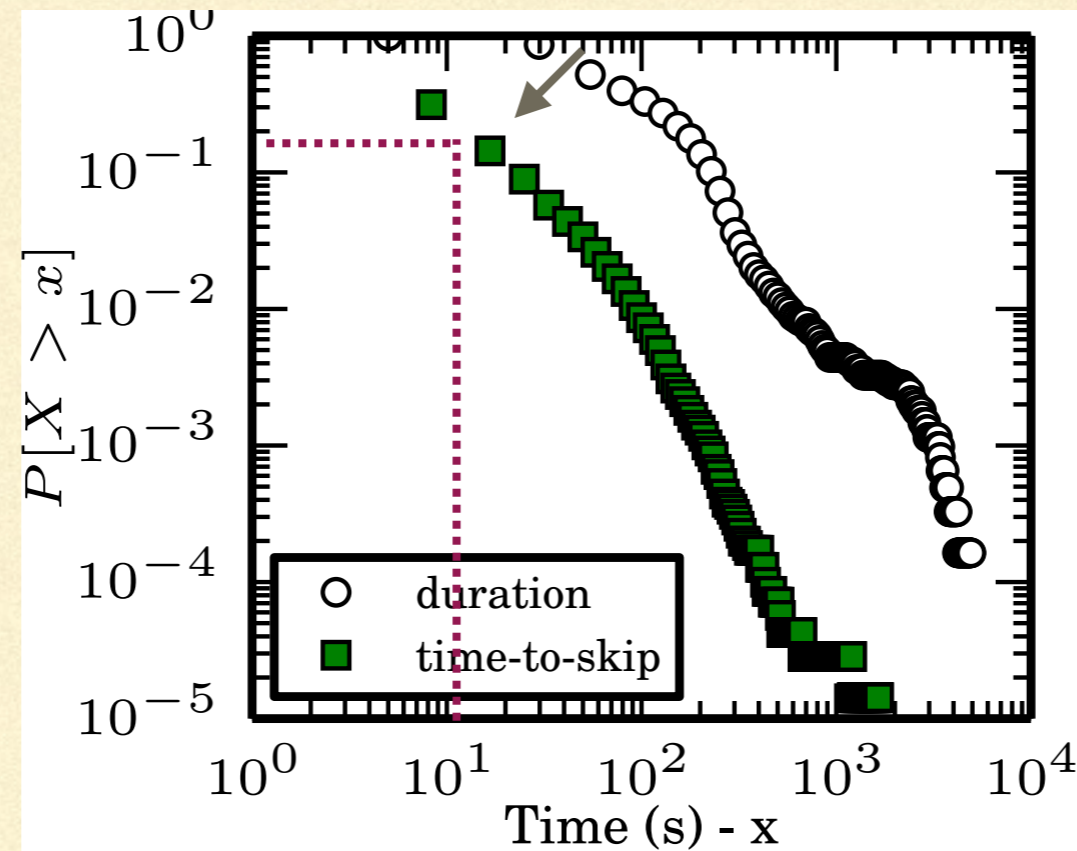


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Users often skip video-ads as soon as they are allowed

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25% in more than 10 seconds





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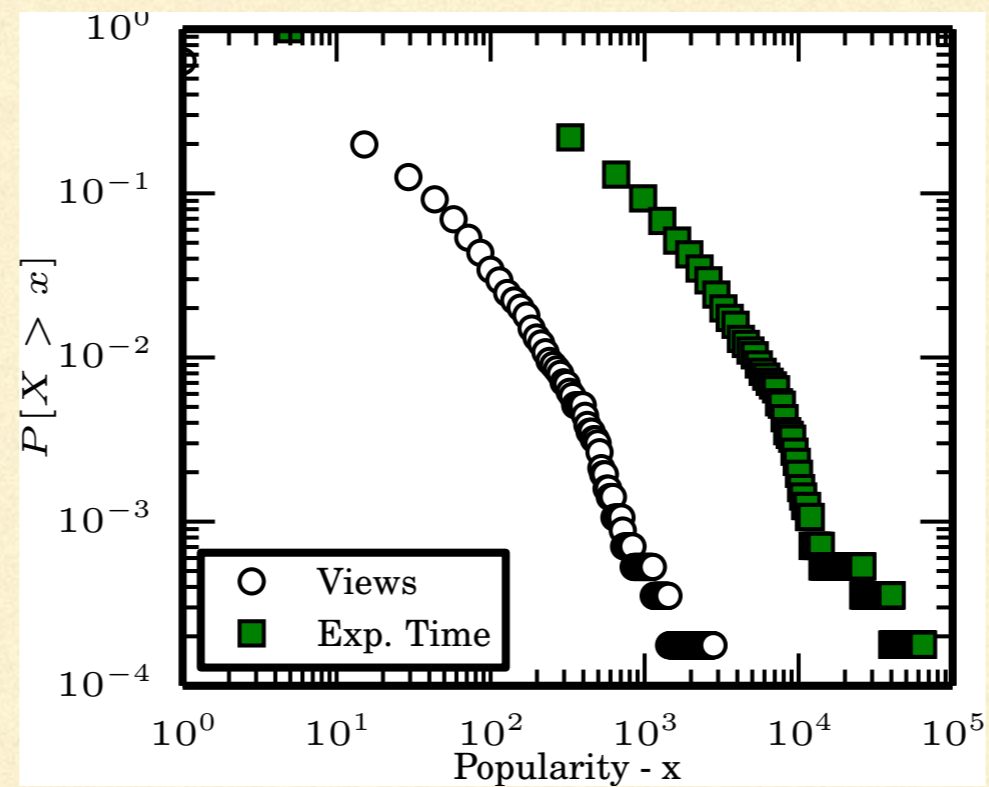
How does video-ad popularity  
evolve over time?

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Most video-ads are exhibited  
only a handful of times

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Local (campus network)

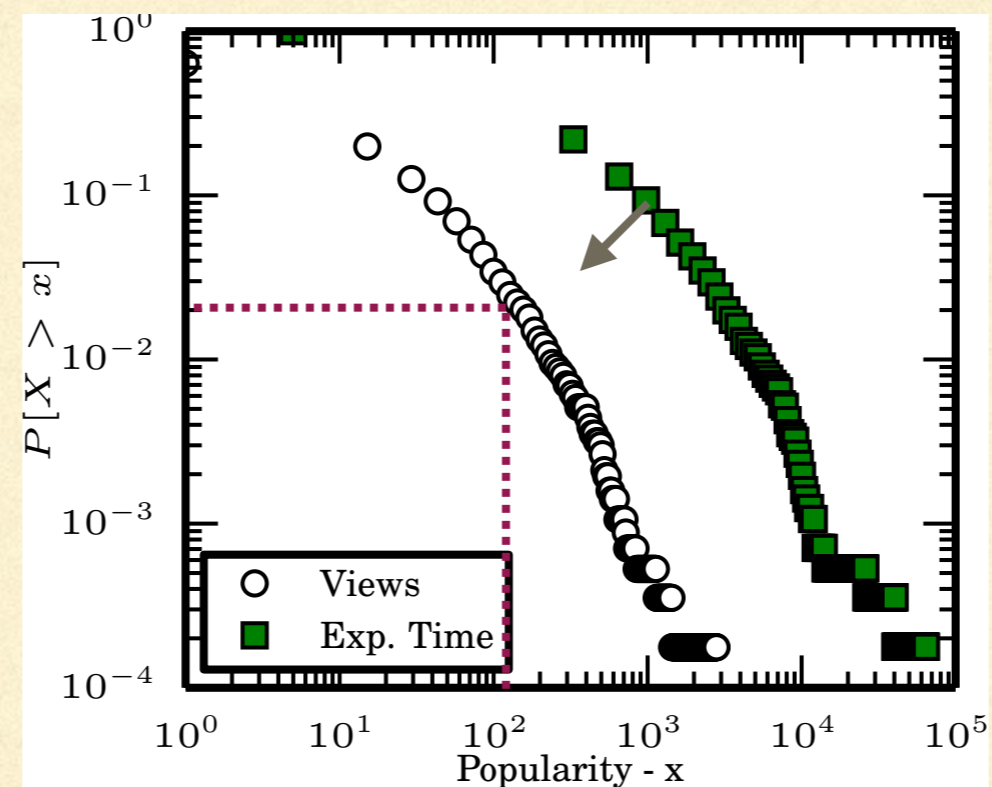
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Most video-ads are exhibited only a handful of times

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3% displayed for more than a 100 times



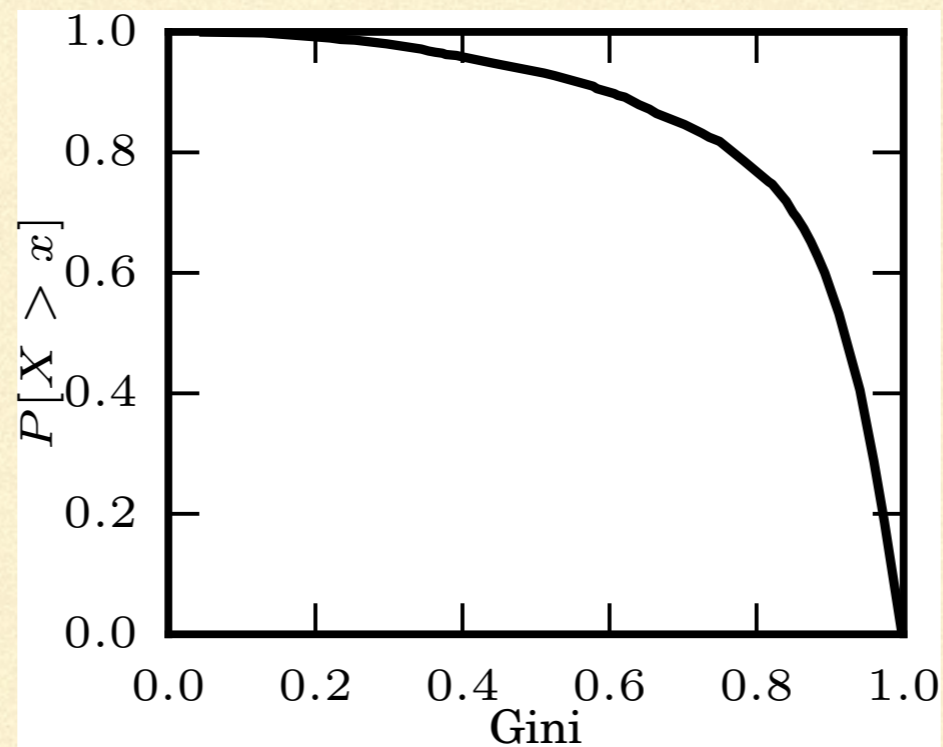
Local (campus network)

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Most video-ads have their popularity evolution concentrated on a few days

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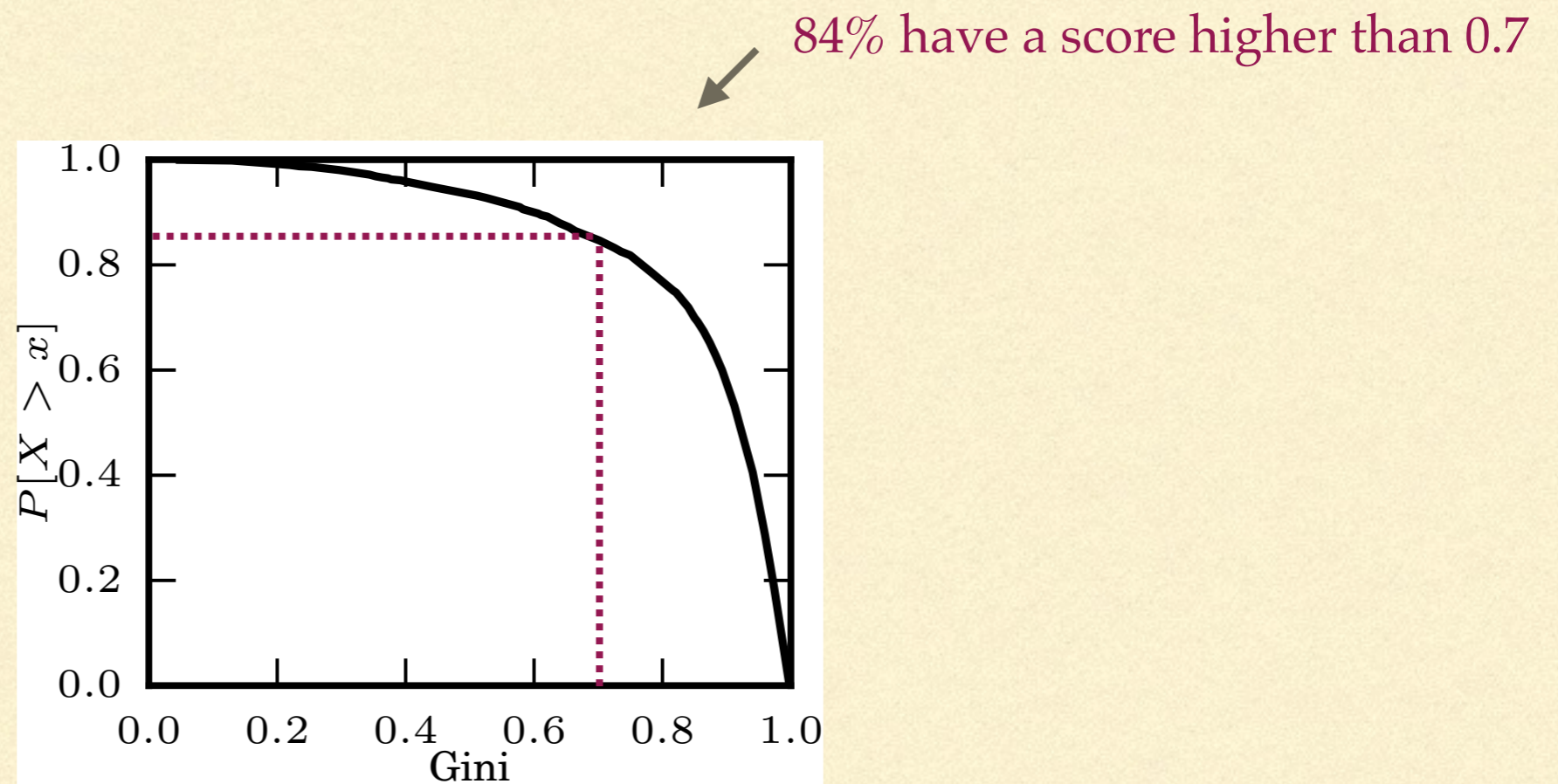
Global (YouTube)

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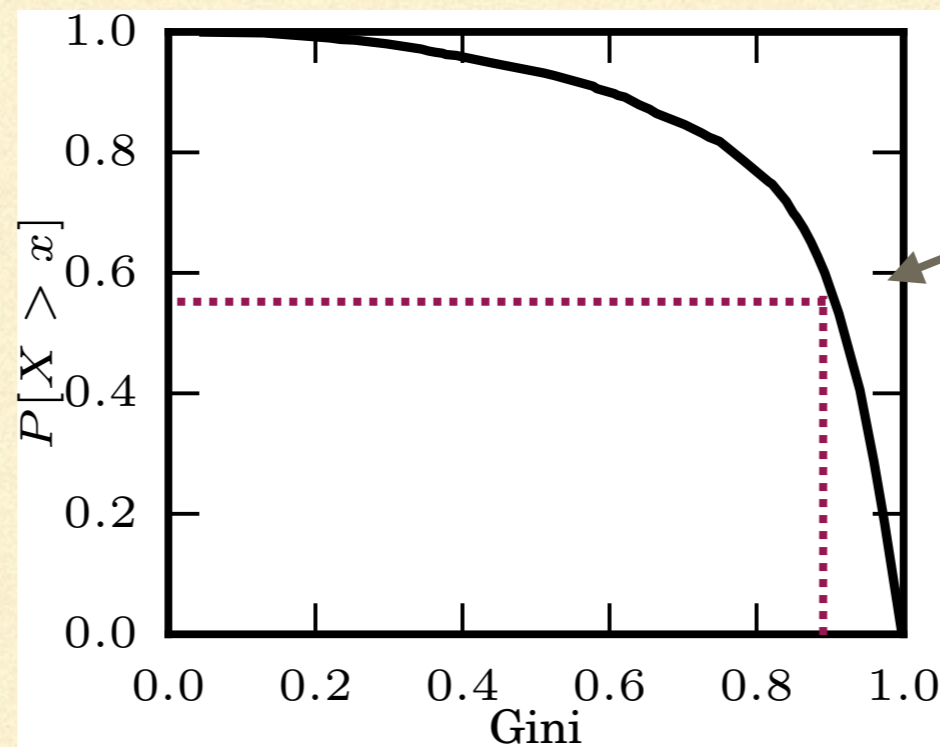
Global (YouTube)

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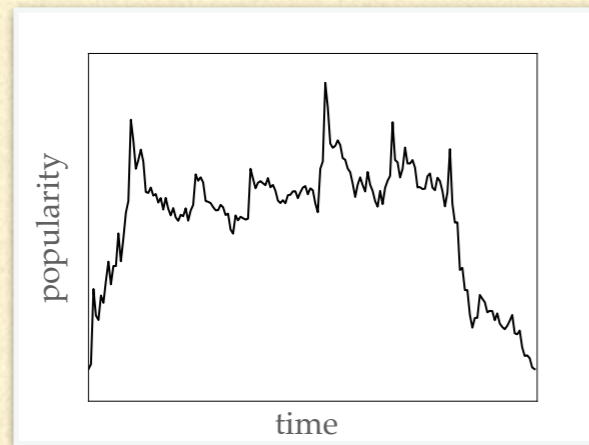


57% have a score higher than 0.9

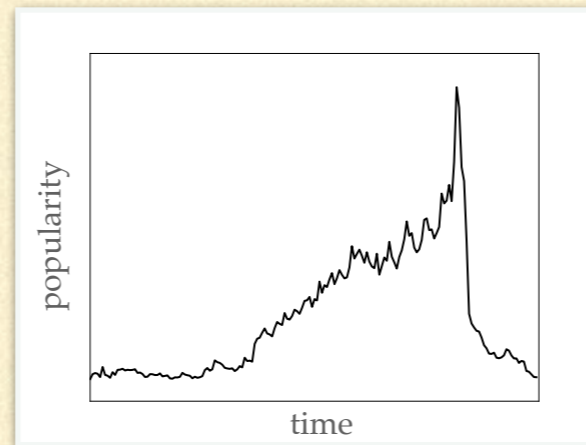
Global (YouTube)

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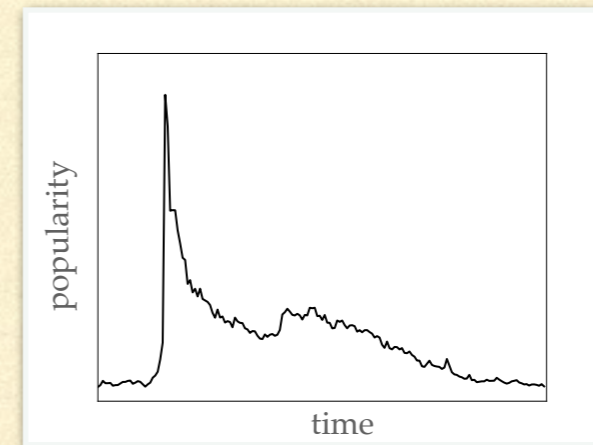
# Profiles of popularity evolution



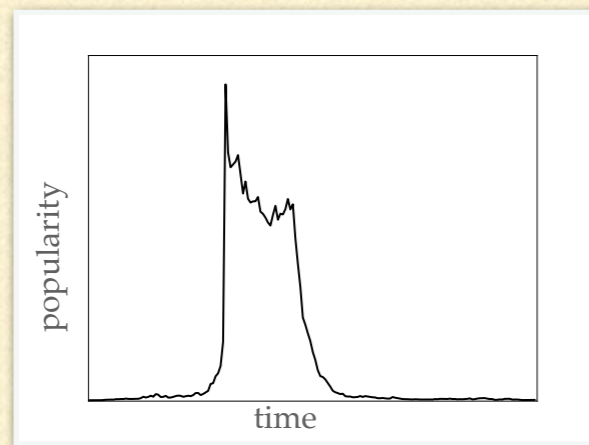
4.2% of video-ads  
1,486,175 views (average)



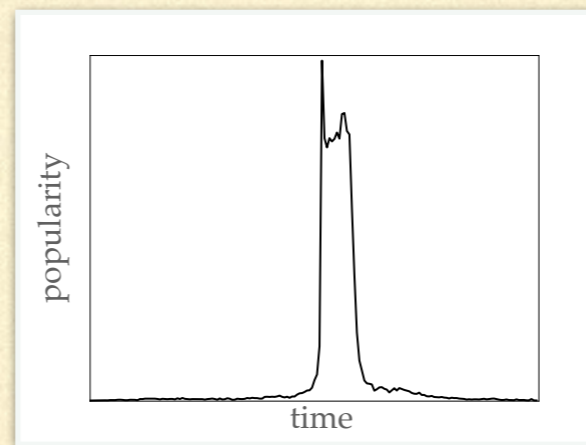
6.6% of video-ads  
1,869,906 views (average)



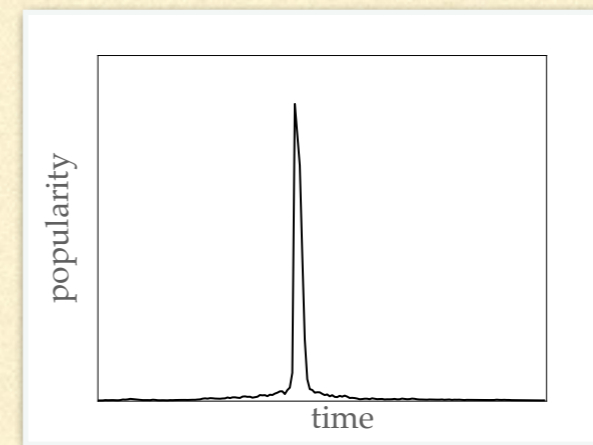
6.7% of video-ads  
4,882,094 views (average)



18% of video-ads  
1,789,798 views (average)



29% of video-ads  
1,451,894 views (average)



37% of video-ads  
984,175 views (average)

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What are the relationships between a video-ad and the video-contents with which it is associated?

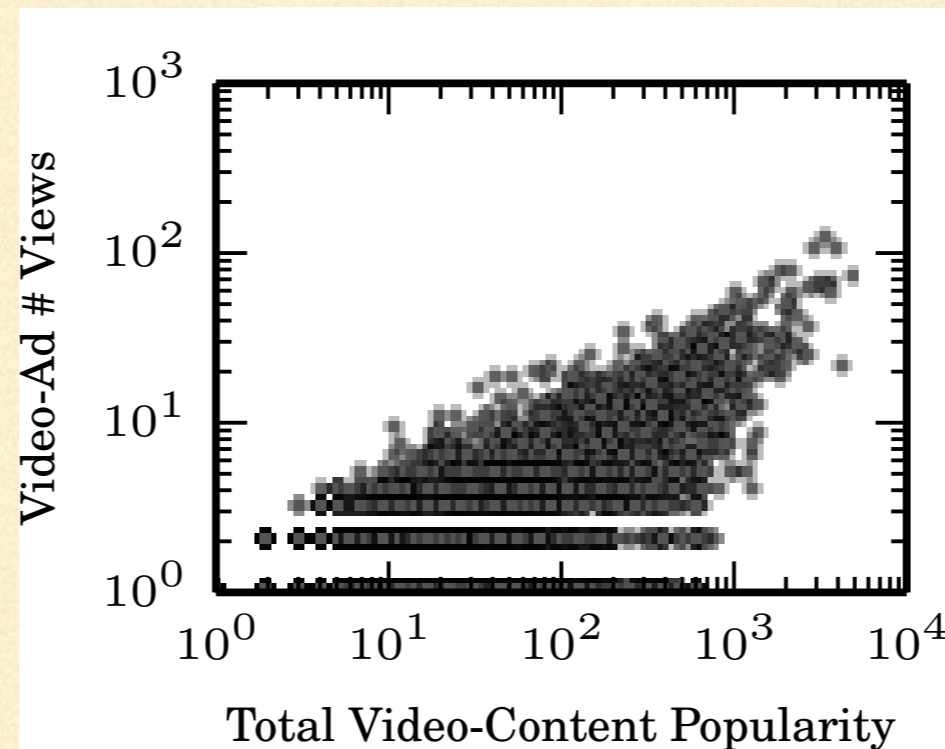
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There is a strong correlation between video-ad popularity and video-content popularity

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Pearson = 0.71

Spearman = 0.68

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# Most video-ad to video-content pairings are dissimilar in terms of textual content

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- We use title and description associated with each video
- Content of each video represented as a bag of words:

$$t_v = \langle w_{T_v,1}, w_{T_v,2}, \dots, w_{T_v,|V|} \rangle$$

- Heuristics as weighting factors:

Binary

Term frequency (TF)

Inverse document frequency (IDF)

TF\*IDF

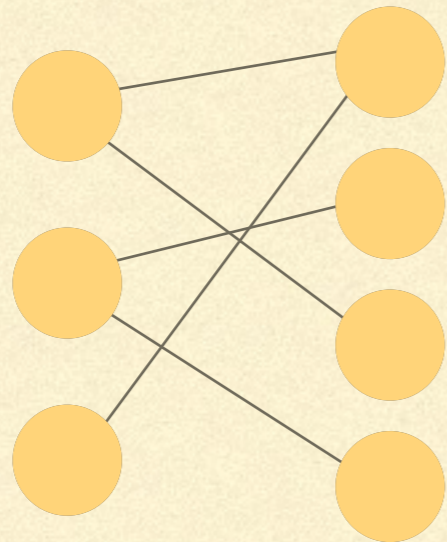
- Similarity is estimated by the cosine difference of two vectors
-

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Most video-ad to video-content pairings  
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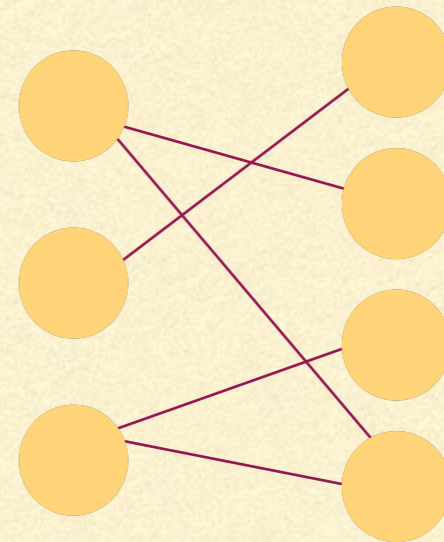
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video-ad    video-content



real pairings

video-ad    video-content



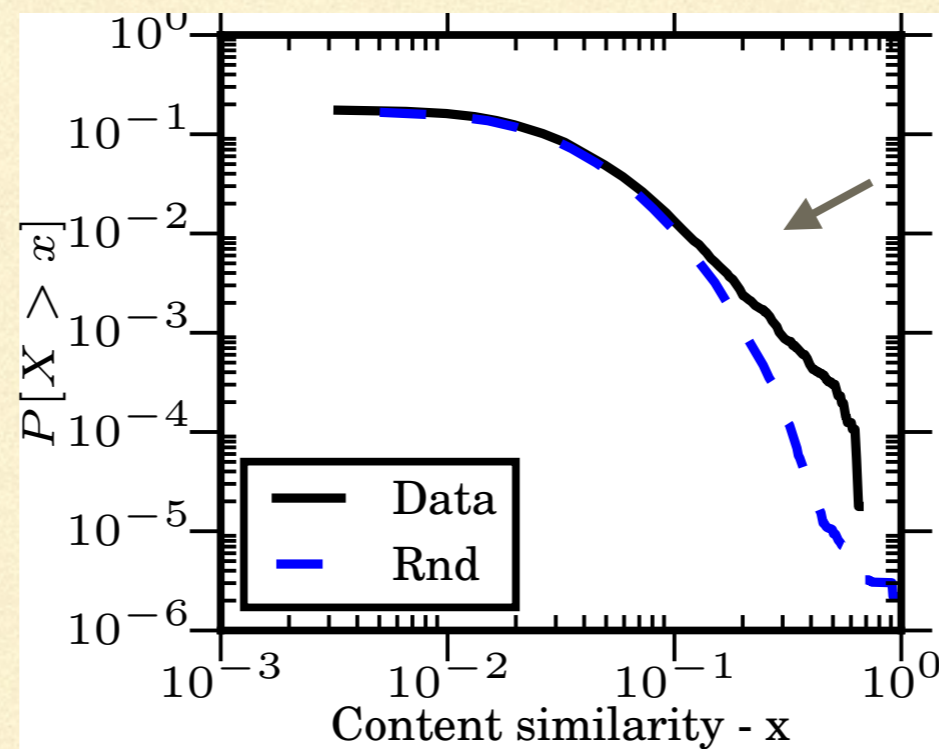
random pairings

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Most video-ad to video-content pairings  
are dissimilar in terms of textual content

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two curves are  
very similar

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# Conclusions and Future Work

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## **RQ1: How do users consume video-ads?**

- users often skip video-ad exhibitions as early as they are allowed
- a considerable fraction of all video-ads are exhibited in full

## **RQ2: How does video-ad popularity evolve over time?**

- most video-ads are exhibited only a handful of times
  - most video-ads have their popularity evolution concentrated in few days
  - video-ads usually peak very early in their lifetimes
-

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# Conclusions and Future Work

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**RQ3: What are the relationships (if any) between a video-ad and the video-contents with which it is associated?**

- video-ad to video-content pairings are (in most cases) dissimilar in terms of textual content

## **Future Work**

- further analysis of content similarity
  - user experiment
-

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# Questions?

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