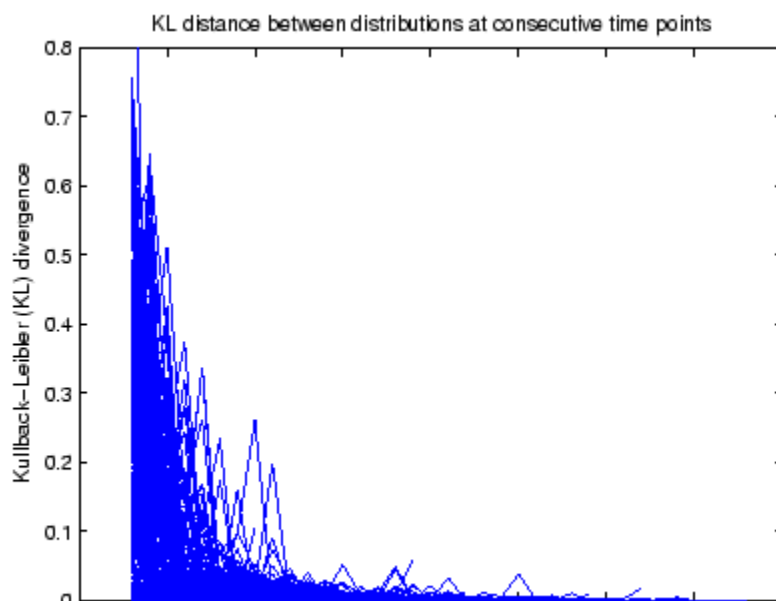
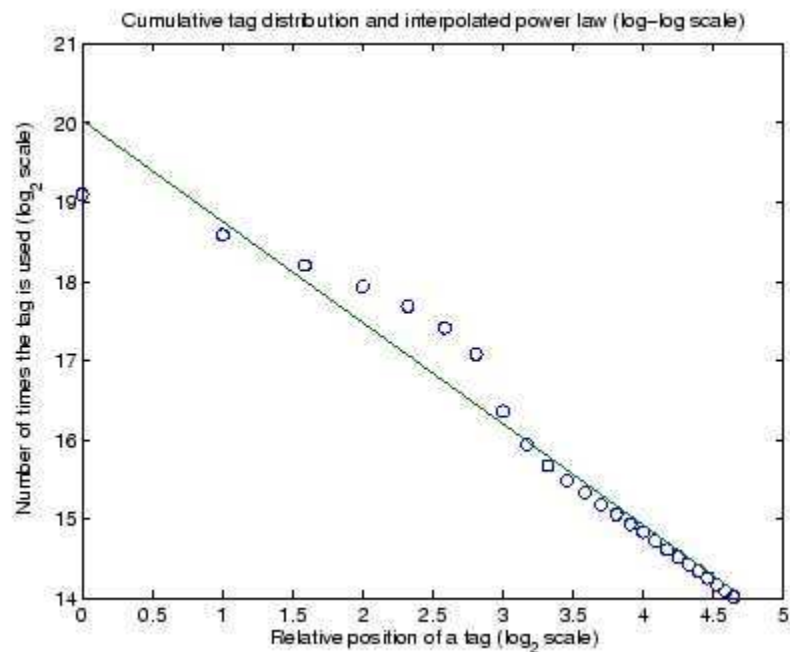


# Introduction: Power-Law Emergence

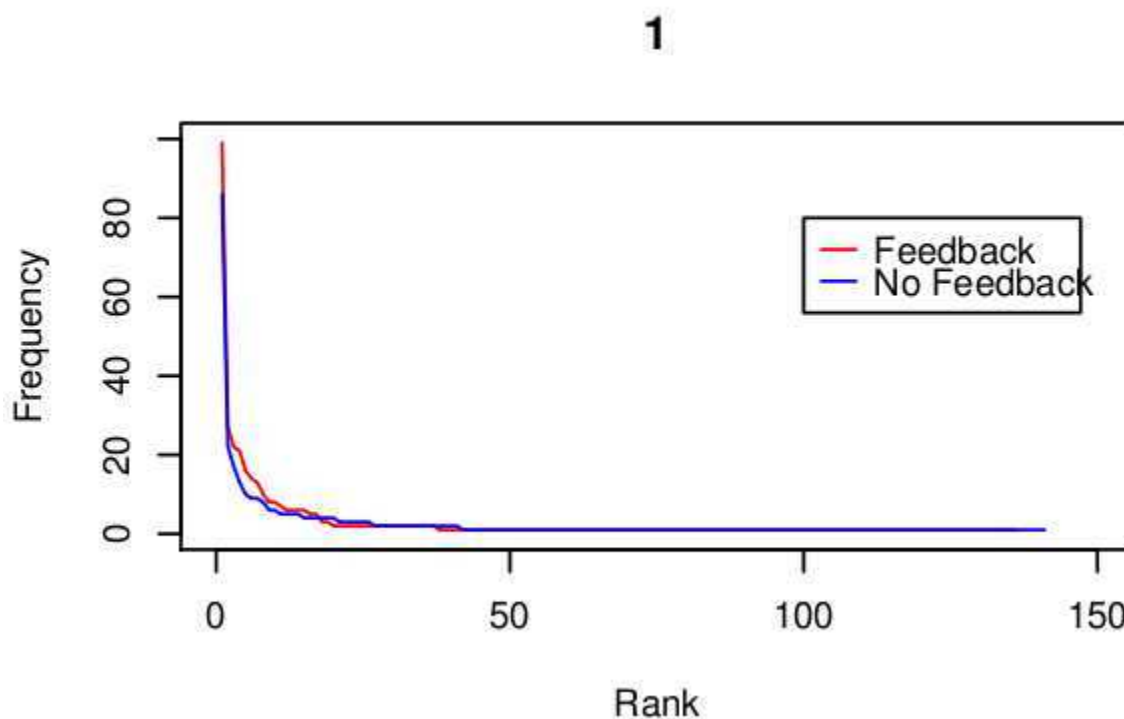
In Halpin, Robu, and Shepard, we showed using Kulback-Leibler (KL) divergence that not only do tags form a power law distribution, but that the distribution forms **very quickly**. Take the KL Divergence between every two consecutive points in time of the distribution, stabilization is when distribution goes to zero.



Information-Theoretic Models of Tagging  
Dagstuhl Seminar, Germany, Sept. 21st 2008



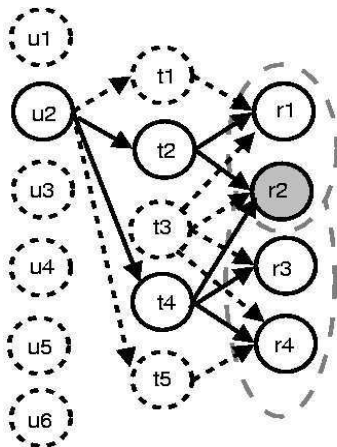
# Et tu Feedback?



Originally hypothesized that the "bump" in the data could be caused by a preferential attachment mechanism. However, in an experiment that tested both feedback and no-feedback conditions over tagging (300 subjects) shows that the power-law distribution arises **regardless of any feedback effect** (Bollen and Halpin, in preparation).

# Tags and Information Theory

Would an information-theoretic analysis of tags that leads to a power-law without feedback? Perhaps just an idealized **information retrieval** paradigm, with each group of tags having an entropy assigned to it?



A tag applied to every relevant resource would retrieve every document, and so have an  $I$  of 0 while a tag that selects a single relevant resource would have an information ( $I$ ) of 1. If users selected an ideal encoding with every choice, a power-law could result.

USERS TAGS RESOURCES

Applications of similar models to social networks, with aim of surveying, discovering, and finding patterns in social networks?

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