

# Evaluating and Improving Navigability of Wikipedia

A Comparative Study of Eight Language Editions

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University of Koblenz-Landau

# Usage Scenarios for Wikipedia



- Visitor goals are diverse
- not all goals are satisfiable by search queries
  - research of one or multiple related topics
  - search for something on the tip of one's tongue
  - discovery (serendipity)
- some users prefer navigation
- 30% of clicks referred internally

# User Attention on Wikipedia

- Users generally have a restricted view of the Web
- areas close to top and left receive disproportional attention
- English Wikipedia:
  - links at the top receive 30-50% of clicks
- How does this affect navigability?

## Joseph Gordon-Levitt

From Wikipedia, the free encyclopedia

**Joseph Leonard Gordon-Levitt**<sup>[1]</sup> (/ˌdʒɒsəfˈleɪnərdˈɡɔːrdənˈleɪvɪt/; born February 17, 1981)<sup>[2]</sup><sup>[3]</sup><sup>[4]</sup> is an American actor and filmmaker. As a child actor, he appeared in the films *A River Runs Through It*, *Angels in the Outfield* and *10 Things I Hate About You*, and as Tommy Solomon in the TV series *3rd Rock from the Sun*. He took a break from acting to study at Columbia University, but dropped out in 2004 to pursue acting again. He has since starred in *500 Days of Summer*, *Inception*, *Hesher*, *50/50*, *Premium Rush*, *The Dark Knight Rises*, *Brick*, *Looper*, *The Lookout*, *Manic*, *Lincoln*, *Mysterious Skin* and *G.I. Joe: The Rise of Cobra*.

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### Contents [hide]

- 1 Early life
- 2 Career
  - 2.1 Early acting work
  - 2.2 Later acting work
  - 2.3 Directing and producing
    - 2.3.1 HitRecord
- 3 Personal life
- 4 Filmography
  - 4.1 Film
  - 4.2 Television
  - 4.3 Video games
- 5 See also
- 6 References
- 7 External links

**Joseph Gordon-Levitt**



Gordon-Levitt at the London Film Festival screening of *Don Jon*, November 2013

**Born** Joseph Leonard Gordon-Levitt  
February 17, 1981 (age 35)  
Los Angeles, California, U.S.

**Education** Van Nuys High School  
Columbia University

**Occupation** Actor · filmmaker · production company owner

**Years active** 1988–present

**Spouse(s)** Tasha McCauley (m. 2014)

**Children** 1

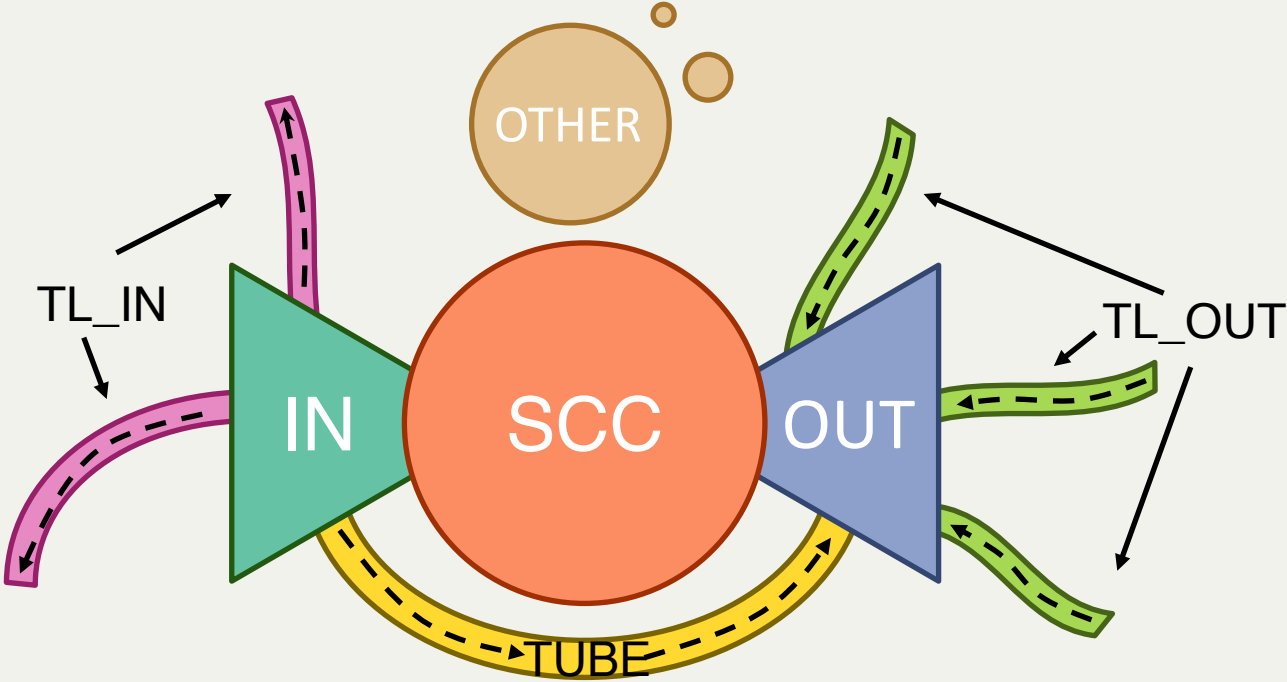
**Relatives** Michael Gordon (grandfather)

### Early life

Gordon-Levitt was born in Los Angeles, California,<sup>[1]</sup> and was raised in its Sherman Oaks neighborhood.<sup>[7]</sup> He is Jewish, from a family that is "not strictly religious."<sup>[8]</sup><sup>[9]</sup> His parents were among the founders of the Progressive Jewish Alliance.<sup>[10]</sup><sup>[11]</sup><sup>[12]</sup> His father, Dennis Levitt, was once the news director for the Pacifica Radio station, KPFK-FM.<sup>[13]</sup><sup>[14]</sup> His mother, Jane Gordon, ran for the United States Congress in California during the 1970s for the Peace and Freedom Party; she met Dennis Levitt while she was working as the program guide editor for KPFK-FM.<sup>[13]</sup> Gordon-Levitt's maternal grandfather, Michael Gordon, was a Hollywood film director between the 1940s and 1970s, and directed the 1959 Doris Day/Rock Hudson film *Pillow Talk*.<sup>[13]</sup> Gordon-Levitt attended Van Nuys High School and graduated with honors in 1999.<sup>[15]</sup>

# State of Navigability on Wikipedia

# Bow Tie Analysis



# Navigational View: Entire Article

## Joseph Gordon-Levitt

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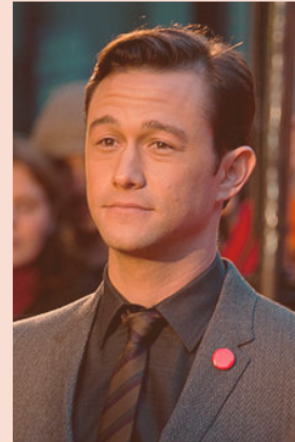
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  - Early acting work
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  - Directing and producing
    - HitRecord
- Personal life

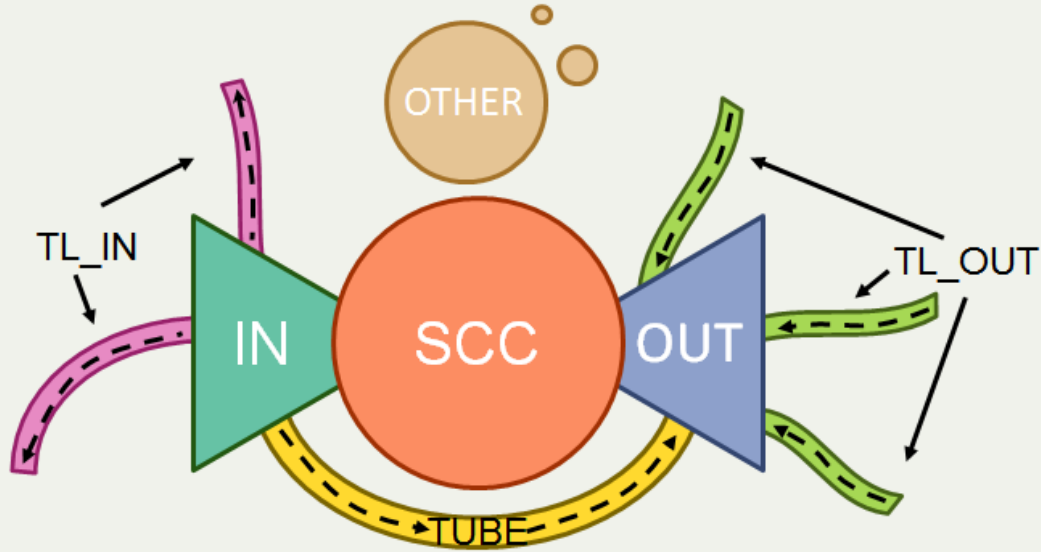
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English Wikipedia

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IN



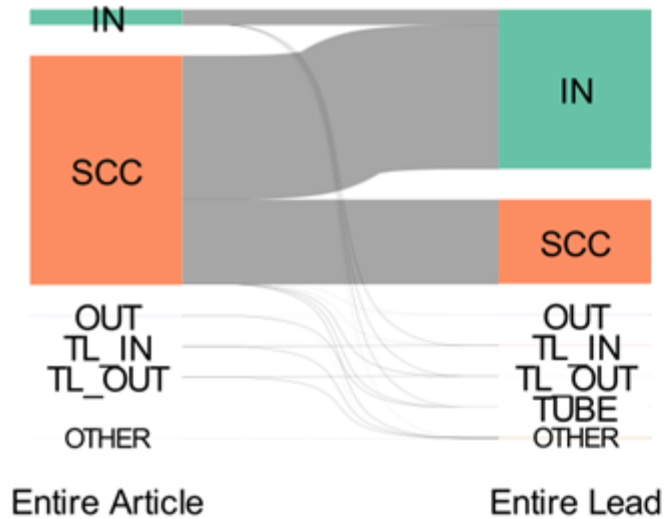
OUT  
TL\_IN  
TL\_OUT

OTHER

Entire Article

English Wikipedia

# Bow Tie Analysis



English Wikipedia

# Navigational Views: First Lead Paragraph

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Joseph Gordon-Levitt



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[https://en.wikipedia.org/wiki/Joseph\\_Gordon-Levitt](https://en.wikipedia.org/wiki/Joseph_Gordon-Levitt)

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[The Walk](#) - [The Night Before](#) - [Don Jon](#) - [Michael Gordon](#)

### Joseph Gordon-Levitt - IMDb

[www.imdb.com/name/nm0330687/](http://www.imdb.com/name/nm0330687/)

Joseph Gordon-Levitt, Actor: *Inception*. Joseph Leonard Gordon-Levitt was born February 17, 1981 in Los Angeles, California, to Jane Gordon and Dennis Levitt ...

### Joseph Gordon-Levitt - Biography - IMDb

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Joseph Leonard Gordon-Levitt was born February 17, 1981 in Los Angeles, California, to Jane Gordon and Dennis Levitt. Joseph was raised in a Jewish ...

### Joseph Gordon-Levitt - Facebook

<https://www.facebook.com/JoeGordonLevitt>

Joseph Gordon-Levitt. 6141907 likes · 81437 talking about this. Ladies and gents, welcome to my official facebook page. And now, a bit about me: I...

### Joseph Gordon-Levitt - Rotten Tomatoes

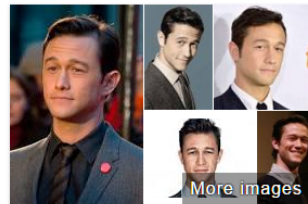
[www.rottentomatoes.com/celebrity/joseph\\_gordonlevitt/](http://www.rottentomatoes.com/celebrity/joseph_gordonlevitt/)

Joseph Gordon-Levitt Celebrity Profile - Check out the latest Joseph Gordon-Levitt photo gallery, biography, pics, pictures, interviews, news, forums and blogs at ...

### Joseph Gordon-Levitt - Film Actor, Television Actor ...

[www.biography.com/people/joseph-gordon-levitt-20882411](http://www.biography.com/people/joseph-gordon-levitt-20882411)

Actor Joseph Gordon-Levitt had a part on the TV series *3rd Rock From the Sun*, and later performed in hit films like *(500) Days of Summer*, *Inception* and *The ...*



More images

## Joseph Gordon-Levitt

Actor

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**Born:** February 17, 1981 (age 35), Los Angeles, California, United States

**Height:** 1.76 m

**Spouse:** Tasha McCauley (m. 2014)

**Siblings:** Daniel Gordon-Levitt

**TV shows:** *3rd Rock from the Sun*, *Roseanne*, *Dark Shadows*, *The Powers That Be*

# Navigational View: Infobox

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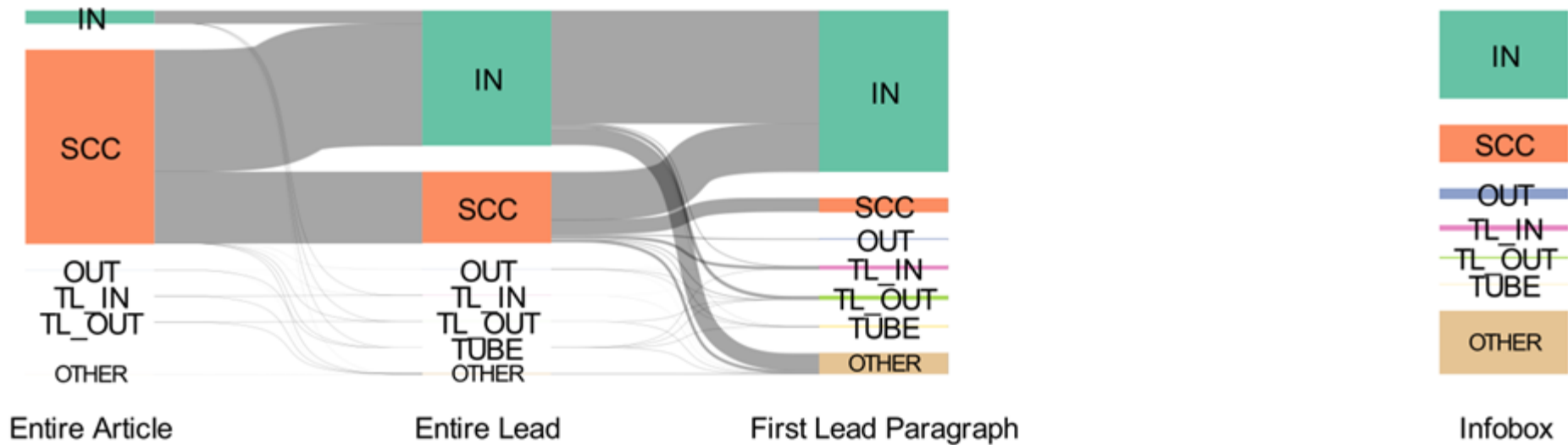
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English Wikipedia

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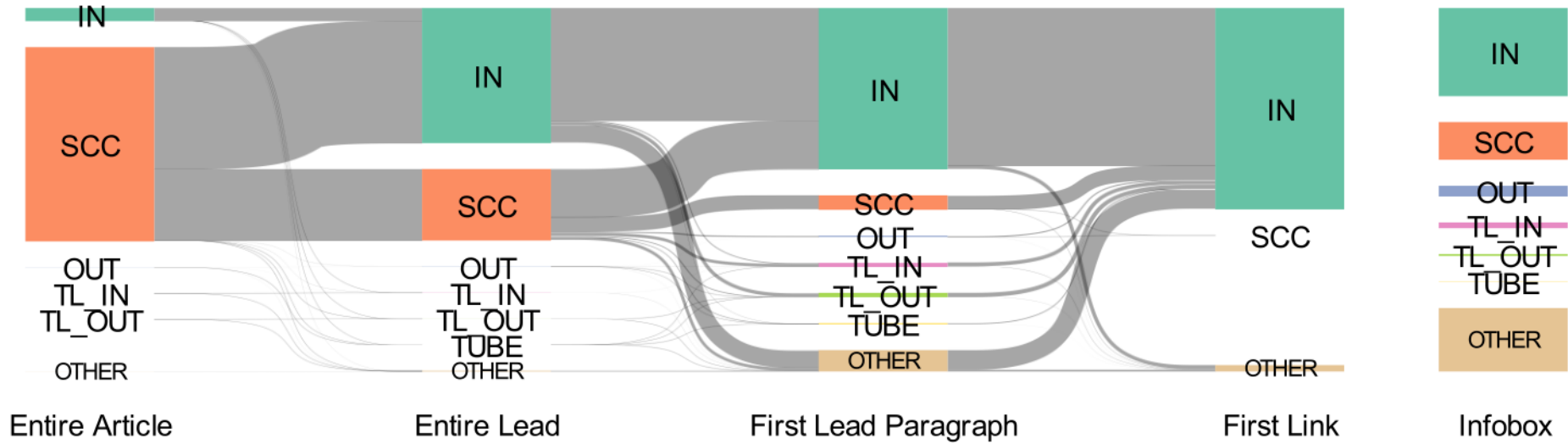
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English Wikipedia



# First Link Networks



WIKIPEDIA  
The Free Encyclopedia

- Main page
- Contents
- Featured content
- Current events
- Random article
- Donate to Wikipedia
- Wikipedia store

## Interaction

- Help
- About Wikipedia
- Community portal
- Recent changes
- Contact page

## Tools

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## Wikipedia:Getting to Philosophy

From Wikipedia, the free encyclopedia



This [essay](#) contains the [advice](#) or opinions of one or more Wikipedia contributors. Essays are *not* [Wikipedia policies](#) or [guidelines](#). Some essays represent widespread norms; others only represent minority viewpoints.

**Clicking on the first lowercase link in the main text of a Wikipedia article, and then repeating the process for subsequent articles, usually eventually gets one to the Philosophy article.** As of May 26, 2011, 94.52% of all articles in Wikipedia lead eventually to the article [Philosophy](#). The remaining 100,000 (approx.) links to an article with no wikilinks or with links to pages that do not exist, or get stuck in loops (all three are equally probable).<sup>[1]</sup> The median link chain length to reach philosophy is 23. It takes 14 clicks to get to [Philosophy](#) from this page.

There have been some theories on this phenomenon, with the most prevalent being the tendency for Wikipedia pages to move up a "classification chain." According to this theory, the [Wikipedia Manual of](#)



# First Link Networks

Language	<i>IN</i> Component	Article titles (translated)
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English		
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German		
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French		
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Spanish		
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Russian		
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Italian		
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Japanese		
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Dutch		
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# First Link Networks

Language	<i>IN</i> Component	Article titles (translated)
English	97.0%	<b>Philosophy (92.1%)</b> , Existence, Ontology, Reality
German	95.8%	<b>Philosophy (95.8%)</b> , World, Totality
French	85.0%	<b>Philosophy (68.8%)</b> , Linguistics, Discipline (academia), Knowledge, Ancient Greek, Knowledge, Notion (philosophy), Greek language, Feature (linguistics), Isogloss, Centum and satem languages, Hellenic languages
Spanish	87.8%	<b>Psychology (87.7%)</b> , Profession, Activity, Specialization
Russian	73.7%	<b>Philosophy (58.9%)</b> , Mathematics, Science, Cognition, Object (philosophy), Set theory, Method (philosophy), Systematization, Objectivity (philosophy)
Italian	73.2%	<b>Science (39.0%)</b> , Knowledge, Biology, Psychology, Psyche (psychology), Tissue (biology), Central nervous system, Brain, Nervous system, Awareness
Japanese	82.3%	<b>Person (82.3%)</b> , Interpersonal relationship
Dutch	67.0%	<b>Knowledge (67.0%)</b> , Know-how

# State of Navigability

- *Entire Article:*
  - large SCC
  - almost all articles reachable
- *Entire Lead:*
  - a third of articles mutually reachable
  - one-way structure
- *First Lead Paragraph & Infobox:*
  - very small SCC
  - navigability severely impeded
- Similar results for all of the eight largest Wikipedia versions

# Potential Explanations

- Number of outlinks
  - correlation with SCC size of  $\rho = 0.74$  for the *entire article* view only
- Number of edits
  - correlation with SCC size of  $\rho = 0.83$  for the *first lead paragraph* view only
  - the more edits, the more attention to the beginning

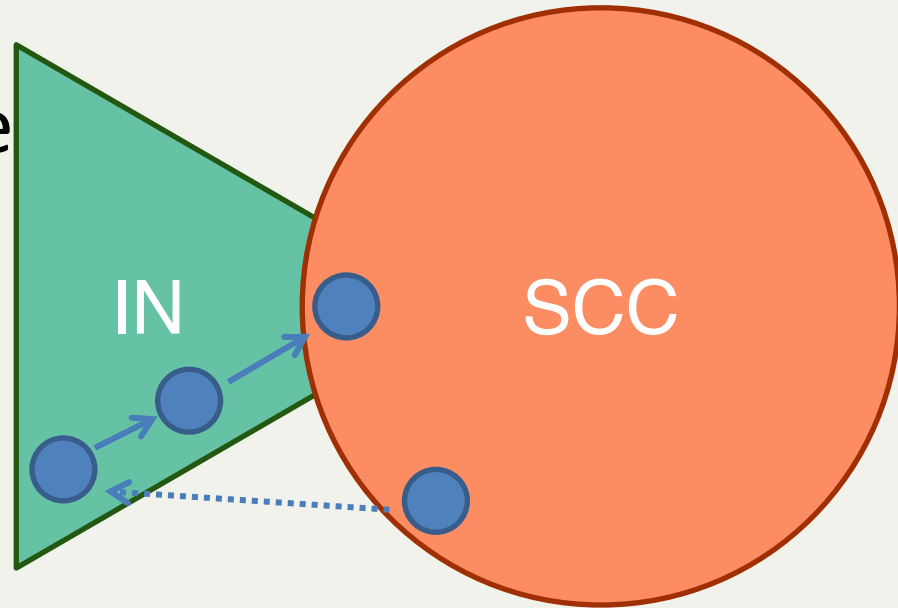
# Link Recommendations

# Motivation

- goal: increasing the SCC size
- requires two links
- focus on the IN component

# Ranking of Links

- adding a link potentially adds several nodes to the SCC
- 1) rank by number of nodes
- 2) rank by sum of view counts





# Identifying Links

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Joseph Gordon-Levitt, Actor: *Inception*. Joseph Leonard Gordon-Levitt was born February 17, 1981 in Los Angeles, California, to Jane Gordon and Dennis Levitt ...

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[www.imdb.com/name/nm0330687/bio/](http://www.imdb.com/name/nm0330687/bio/)

Joseph Leonard Gordon-Levitt was born February 17, 1981 in Los Angeles, California, to Jane Gordon and Dennis Levitt. Joseph was raised in a Jewish ...

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Joseph Gordon-Levitt · 6141907 likes · 81437 talking about this. Ladies and gents, welcome to my official facebook page. And now, a bit about me: I...

### Joseph Gordon-Levitt - Rotten Tomatoes

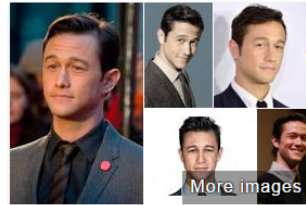
[www.rottentomatoes.com/celebrity/joseph\\_gordonlevitt/](http://www.rottentomatoes.com/celebrity/joseph_gordonlevitt/)

Joseph Gordon-Levitt Celebrity Profile - Check out the latest Joseph Gordon-Levitt photo gallery, biography, pics, pictures, interviews, news, forums and blogs at ...

### Joseph Gordon-Levitt - Film Actor, Television Actor ...

[www.biography.com/people/joseph-gordon-levitt-20882411](http://www.biography.com/people/joseph-gordon-levitt-20882411)

Actor Joseph Gordon-Levitt had a part on the TV series *3rd Rock From the Sun*, and later performed in hit films like *(500) Days of Summer*, *Inception* and *The ...*



More images

## Joseph Gordon-Levitt

Actor

Joseph Leonard Gordon-Levitt is an American actor and filmmaker. As a child actor, he appeared in the films *A River Runs Through It*, *Angels in the Outfield* and *10 Things I Hate About You*, and as Tommy Solomon in the TV series *3rd Rock from the Sun*. [Wikipedia](#)

**Born:** February 17, 1981 (age 35), Los Angeles, California, United States

**Height:** 1.76 m

**Spouse:** Tasha McCauley (m. 2014)

**Siblings:** Daniel Gordon-Levitt

**TV shows:** *3rd Rock from the Sun*, *Roseanne*, *Dark Shadows*, *The Powers That Be*

# Identifying Links

## Joseph Gordon-Levitt

From Wikipedia, the free encyclopedia

**Joseph Leonard Gordon-Levitt**<sup>[1]</sup> (/dʒɔːsəfˈleɪnədɡɔːrdənˈleɪvɪt/; born February 17, 1981)<sup>[2][3][4]</sup> is an American actor and filmmaker. As a child actor, he appeared in the films *A River Runs Through It*, *Angels in the Outfield* and *10 Things I Hate About You*, and as Tommy Solomon in the TV series *3rd Rock from the Sun*. He took a break from acting to study at Columbia University, but dropped out in 2004 to pursue acting again. He has since starred in *500 Days of Summer*, *Inception*, *Hesher*, *50/50*, *Premium Rush*, *The Dark Knight Rises*, *Brick*, *Looper*, *The Lookout*, *Manic*, *Lincoln*, *Mysterious Skin* and *G.I. Joe: The Rise of Cobra*.

He also founded the online production company **hitRECORD**,<sup>[5]</sup> which has hosted his own **42M** **HitRecord on TV**, since January 2014. In 2014, Gordon-Levitt made his feature film directing and screenwriting debut with **28M** *10 Feet Under*, a comedy film in which he also stars. He previously directed and edited two other films, *10 Feet Under* and *28M* *10 Feet Under*, both of which were released in 2010: *Morgan M. Morgansen's Date with Destiny* and *Morgan and Destiny's Eleventeenth Date: The Zeppelin Zoo*. He starred as **2M** *Philippe Petit* in the film *Edward Snowden*, which he also directed and co-wrote. He also starred as **28M** *Edward Snowden* in the film *Snowden*, which he also directed and co-wrote. He also starred as **43M** *Edward Snowden* in the film *Snowden*, which he also directed and co-wrote. He also starred as **39M** *Edward Snowden* in the film *Snowden*, which he also directed and co-wrote.

### Content

- 1 Early life
- 2 Career
  - 2.1 Early acting work
  - 2.2 Later acting work
  - 2.3 Directing and producing
    - 2.3.1 HitRecord
- 3 Personal life

### Joseph Gordon-Levitt



Gordon-Levitt at the London Film Festival screening of *Don Jon*, November 2013

**Born** Joseph Leonard Gordon-Levitt  
February 17, 1981 (age 35)  
Los Angeles, California, U.S.

**Education** Van Nuys High School  
Columbia University

**Occupation** Actor · filmmaker · production company owner



Joseph Gordon-Levitt



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[https://en.wikipedia.org/wiki/Joseph\\_Gordon-Levitt](https://en.wikipedia.org/wiki/Joseph_Gordon-Levitt)

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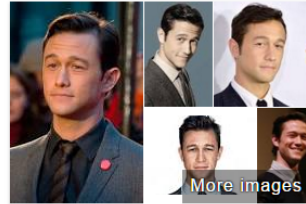
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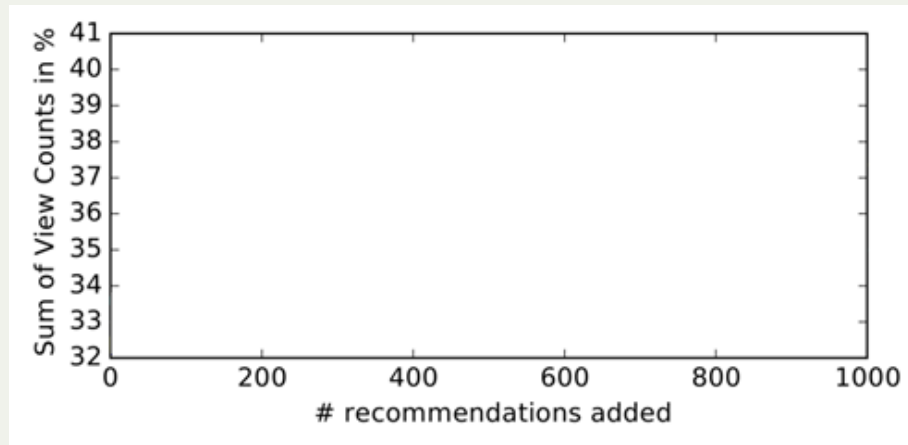
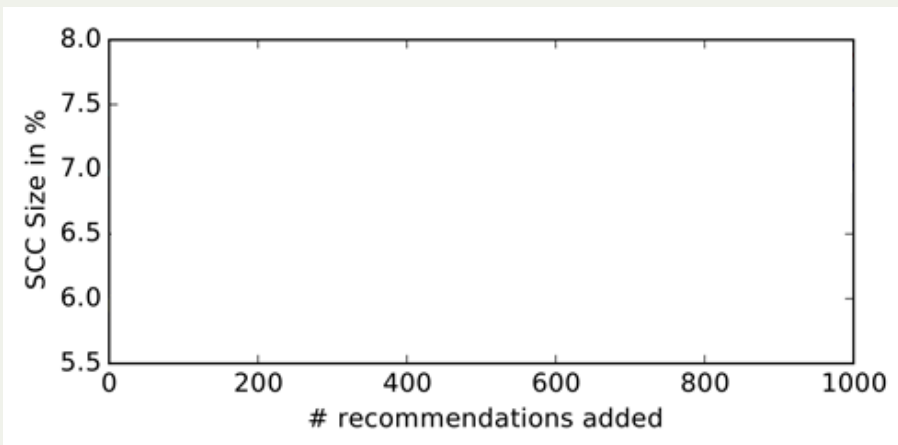
**TV shows:** *3rd Rock from the Sun*, *Roseanne*, *Dark Shadows*, *The Powers That Be*

# Approach

- select links from a less restricted view
- Goals:
  - suggest link recommendations to editors
  - show effects based on SCC size and view counts

# Demonstration

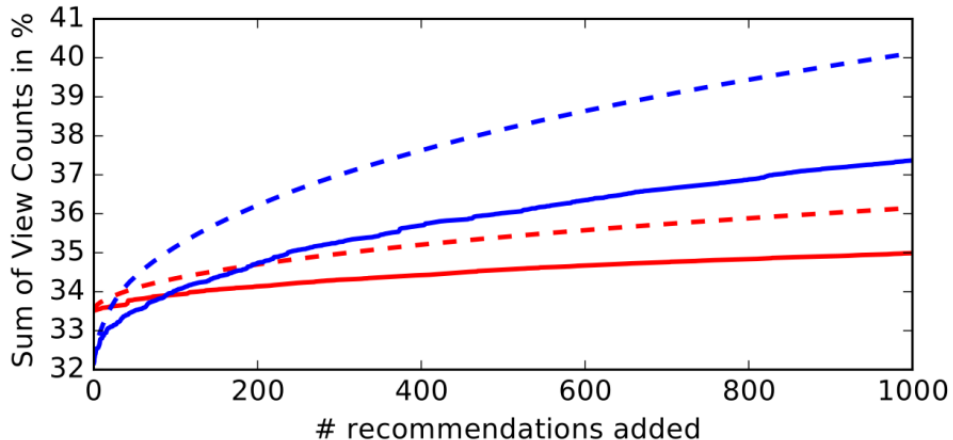
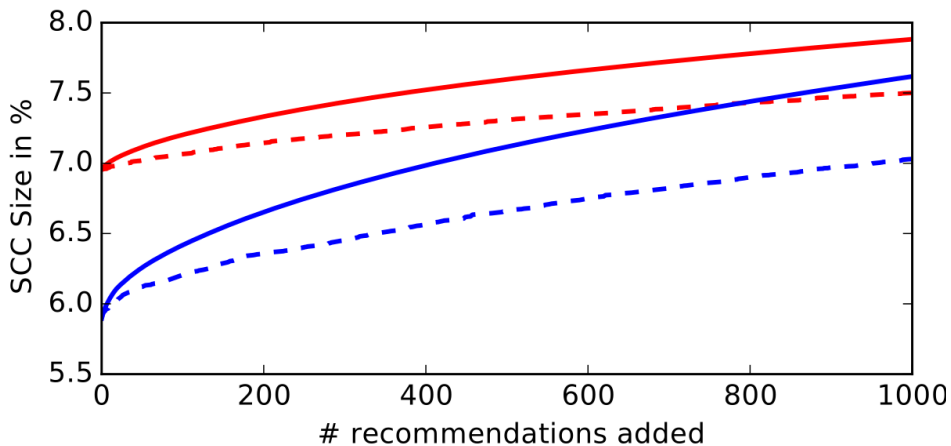
- we introduce 1000 recommendations



—	German (SCC-based)	- -	German (VC-based)
—	English (SCC-based)	- -	English (VC-based)

# Demonstration

- we introduce 1000 recommendations



Wrap Up

# Wrap Up

- Navigability is important for Wikipedia
- State of navigability on Wikipedia:
  - very well-connected for entire article
  - substantial drawbacks for restricted views
- navigability can be improved by editing or moving links

# Future Work

- Learn more about the types of articles
  - Both recommenders and recommendees
- Make information available to Wikipedia editors



# Evaluating and Improving Navigability of Wikipedia

A Comparative Study of Eight Language Editions

Daniel Lamprecht | KTI, Graz University of Technology

Dimitar Dimitrov | GESIS - Leibniz Institute for the Social Sciences

Denis Helic | KTI, Graz University of Technology

Markus Strohmaier | GESIS - Leibniz Institute for the Social Sciences  
University of Koblenz-Landau