

# Bonding vs. Bridging Social Capital: A Case Study in Twitter



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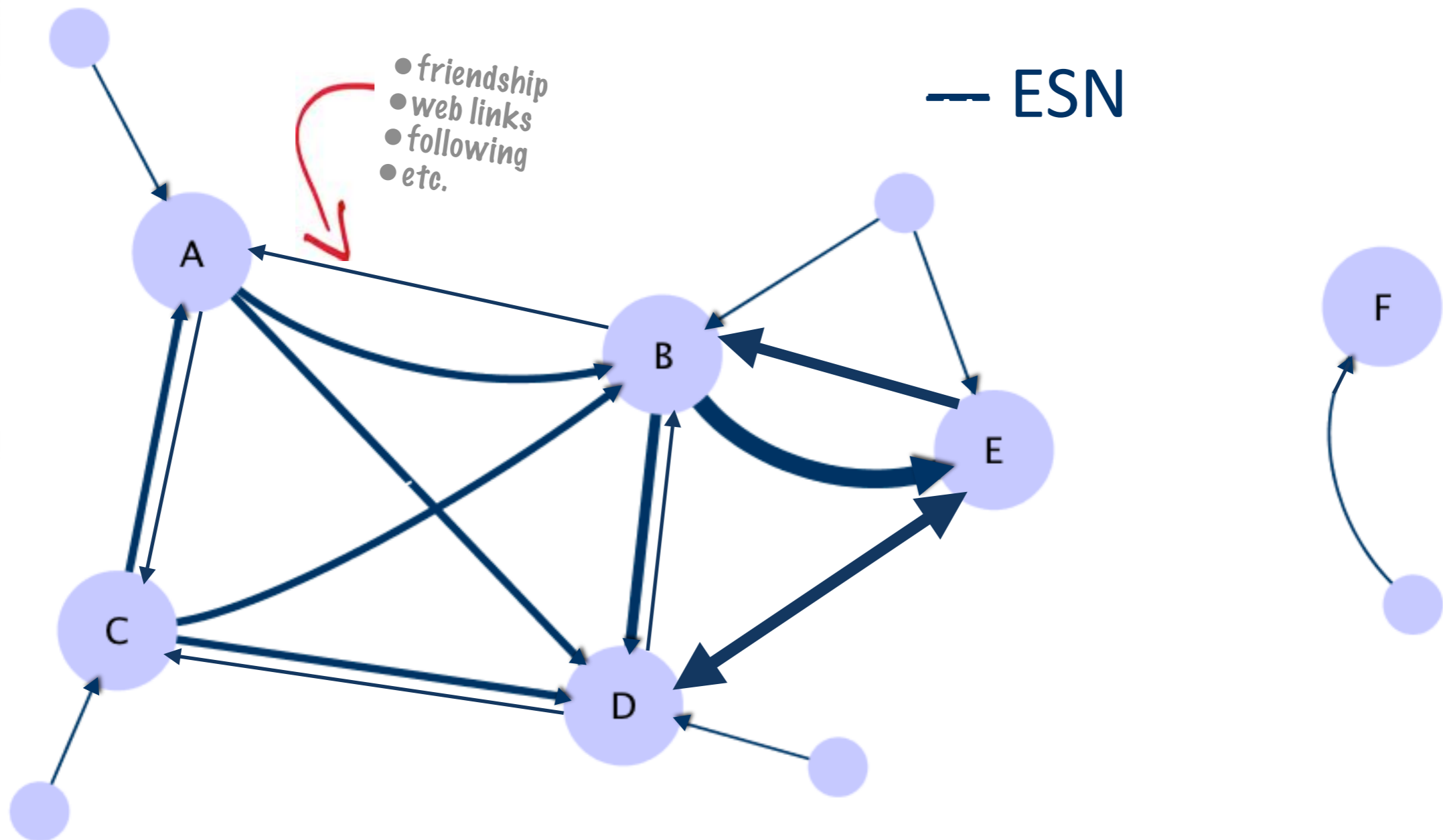


# Introduction

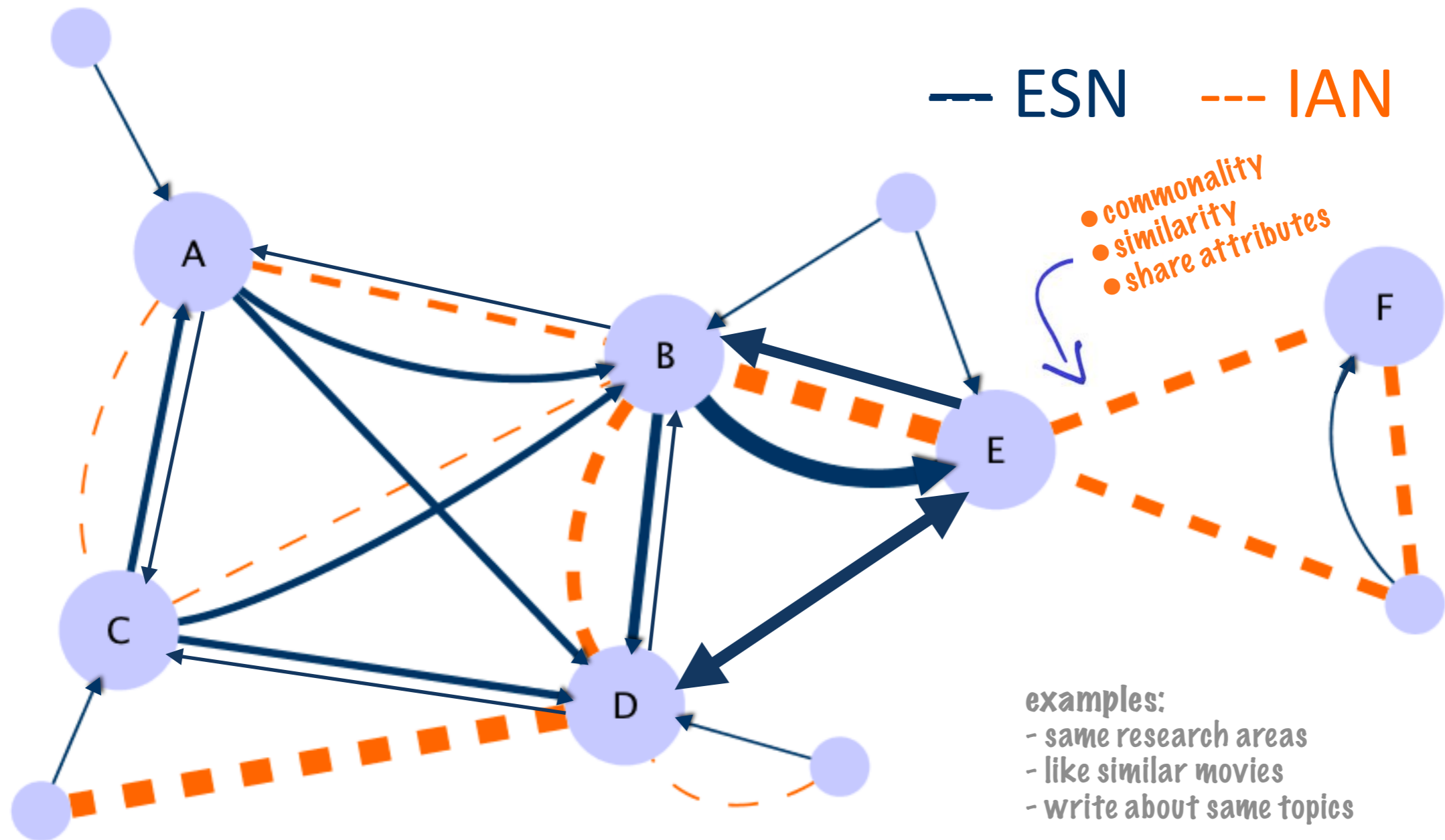
- 📌 Social Capital - leverage our online social networks
  - 📌 Developing a framework
  - 📌 Allows for quantification and theories to be tested
- 📌 This paper focuses on:
  - 📌 “Bonding is more likely to occur than bridging” - Lin 01
  - 📌 “Closure is the most obvious force” - Burt 05
  - 📌 Homophily principle: “Birds of a feather flock together”  
Smith-Lovin 87                      “Similarity begets friendship”



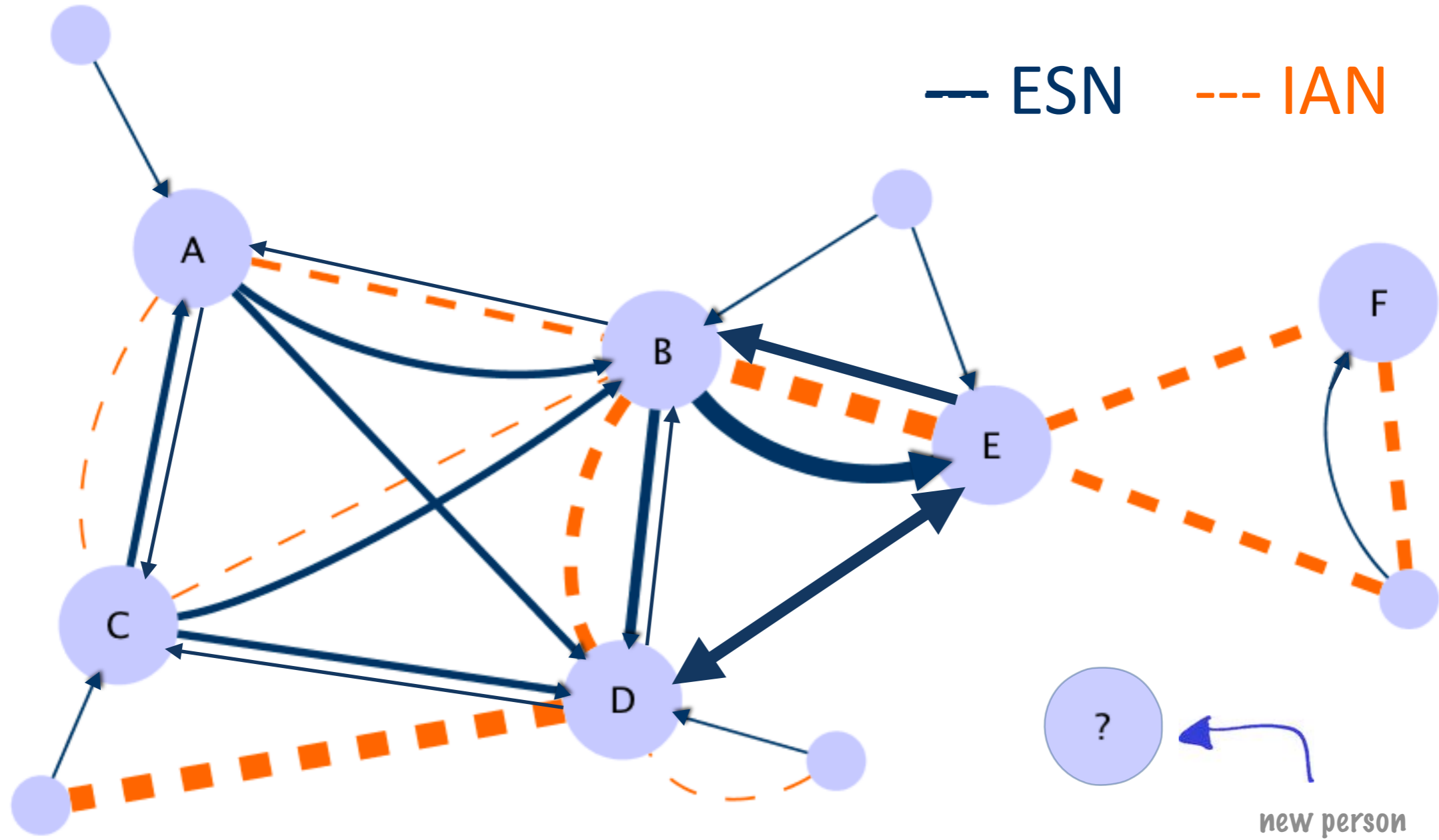
# Motivation



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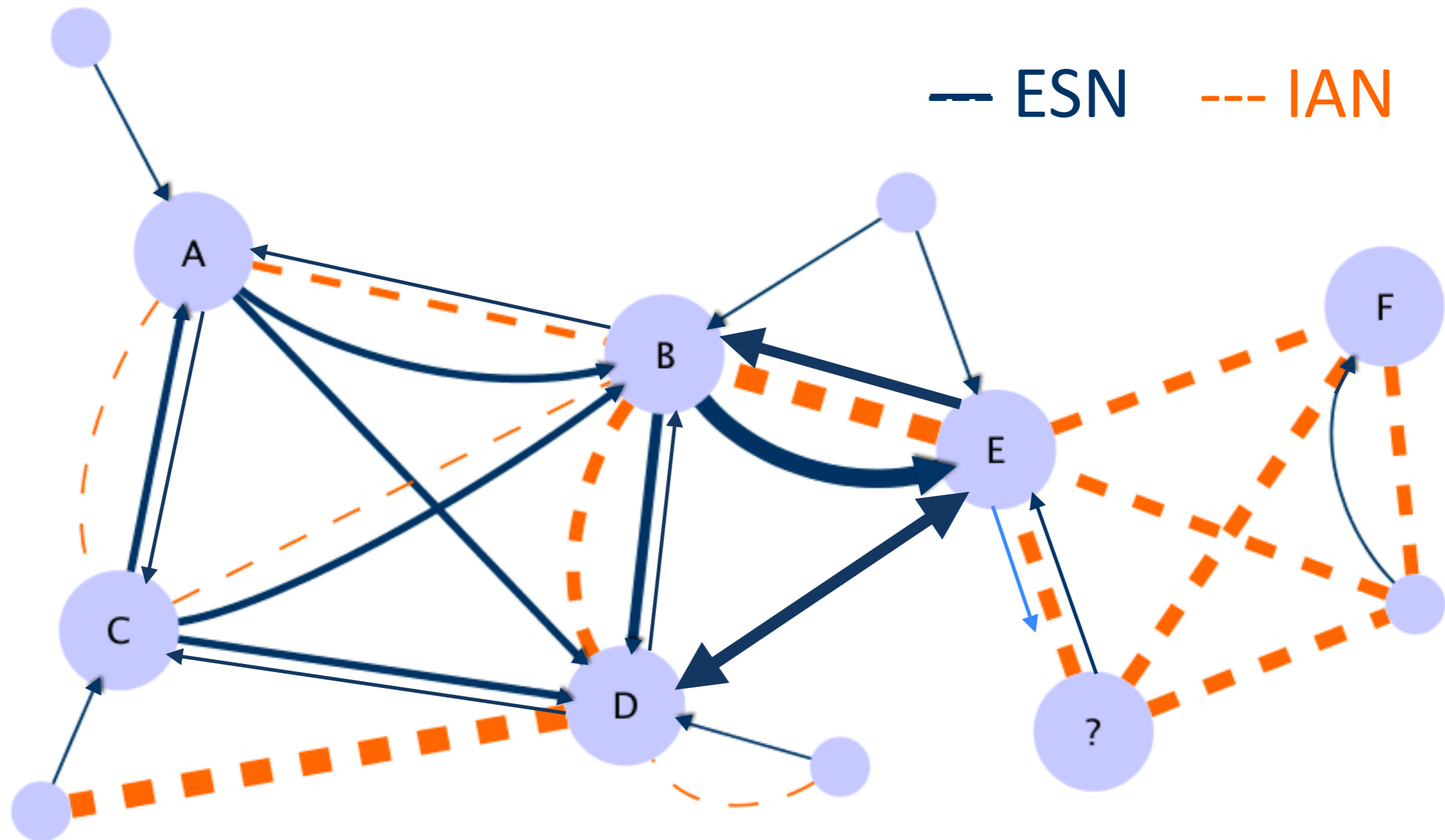


# Motivation





# Motivation



# Bonding & Bridging

Potential

$$pb(i) = \sum_{j \in N, j \neq i} s_{ij}^{IAN}$$

$$pbr(i) = \sum_{j \in N, j \neq i} (1 - s_{ij}^{IAN})$$

Realized

$$b(i) = \sum_{j \in N, j \neq i} s_{ij}^{IAN} s_{ji}^{ESN}$$

$$br(i) = \sum_{j \in N, j \neq i} (1 - s_{ij}^{IAN}) s_{ji}^{ESN}$$



# Hypothesis

*Following users with whom the most affinities are shared (i.e., attempting to bond) produces more follow-backs (i.e., bonding) than other following strategies.*



# Twitter Basics - Profile

The screenshot shows a Twitter profile for 'smithworx'. The profile picture is a man with glasses. The name is 'smithworx'. The bio is 'social capital guru, web startup and new venture man, phd candidate, founder @webstartupgroup'. The statistics are 493 following, 621 followers, and 19 listed. The tweets section shows four tweets, with the first one highlighted in green. The following section shows a grid of profile pictures.

**twitter** Home Profile Find People Settings Help Sign out

 **smithworx** *link >*

*profile description >*

Name Matt Smith  
Location Utah  
Web <http://m.smithworx.com>  
Bio social capital guru, web startup and new venture man, phd candidate, founder @webstartupgroup

**493** **621** **19**  
following followers listed *stats >*

**That's you!** Lists ▾

Your lists: [dml](#) *my tweets (reverse chronological order)*

**WebStartupGroup** StartupNews: The Rules of Extreme Programming <http://bit.ly/cQp1yl>  
about 2 hours ago via twtsimple  
Retweeted by you

**emilam** Hey Instructure BYU is reassessing blackboard this month. Can you please win their love  
about 5 hours ago via TweetDeck  
Retweeted by you

Preparing my presentation for the Spring Research Conference this weekend.  
about 6 hours ago via web

**@mlefrandt** I sent you a couple emails last week --- no worries. I'm glad to hear that lots is going on with the social startup scene.  
about 22 hours ago via web in reply to mlefrandt


**Tweets** 1,200

**Favorites**

**Following**



[View all...](#)

 **RSS feed of smithworx's tweets**



# Experimental Setup



- Let  $\mathcal{A}$  be the set of new Twitter accounts ( $|\mathcal{A}|=9$ ), each is...
  - Assigned a following strategy (e.g., *bonding*, *bridging*, *random*)
  - Behaves identically (except for their following strategy)
- Let  $\mathcal{U}$  be the set of sampled Twitter users to follow ( $|\mathcal{U}|=5000$ )
  - Tweeted “data mining” or “social networks” in Sept. '09
- Test if *bonding* strategy produces more follow-backs
  - Compare stats for each strategy (all accounts in  $\mathcal{A}$ )



# Experimental Setup - Profile

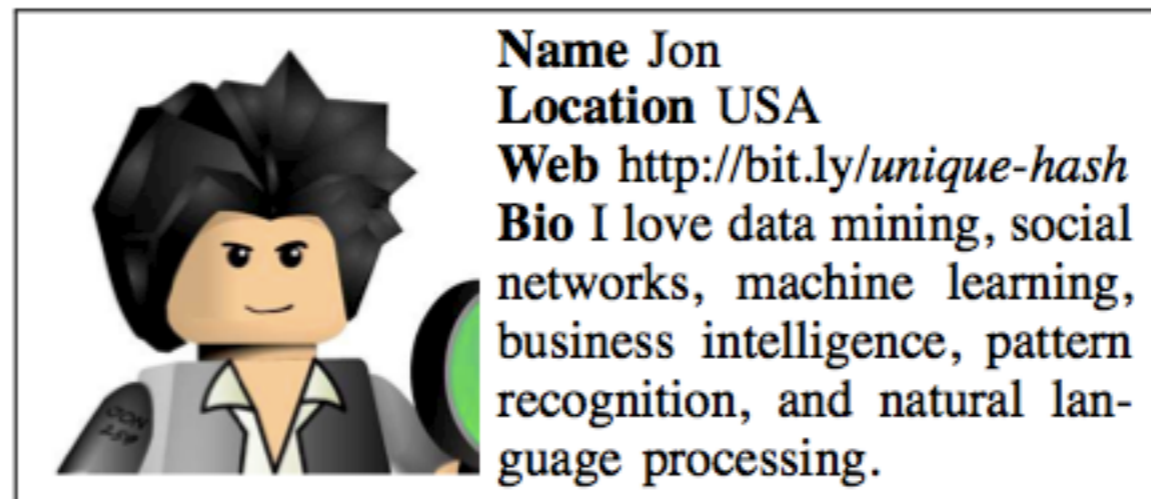


Fig. 1. Twitter profile information for each account in  $\mathcal{A}$ .

All Accounts Created To Be  
Approximately Identical

# Experimental Setup - Strategies

📌 (A) bonding



📌 (B) bridging



📌 (C) median affinities

📌 (D) random

📌 (E) min. following/ers diff.

📌 (F) max. following/ers diff.

📌 (G) median num. followers

📌 (H) min. num. followers



# Experimental Setup - Selection

$u$ :  
Pool of 5000



Begin Selection...

$a$ :



# Experimental Setup - Selection

$u$ :



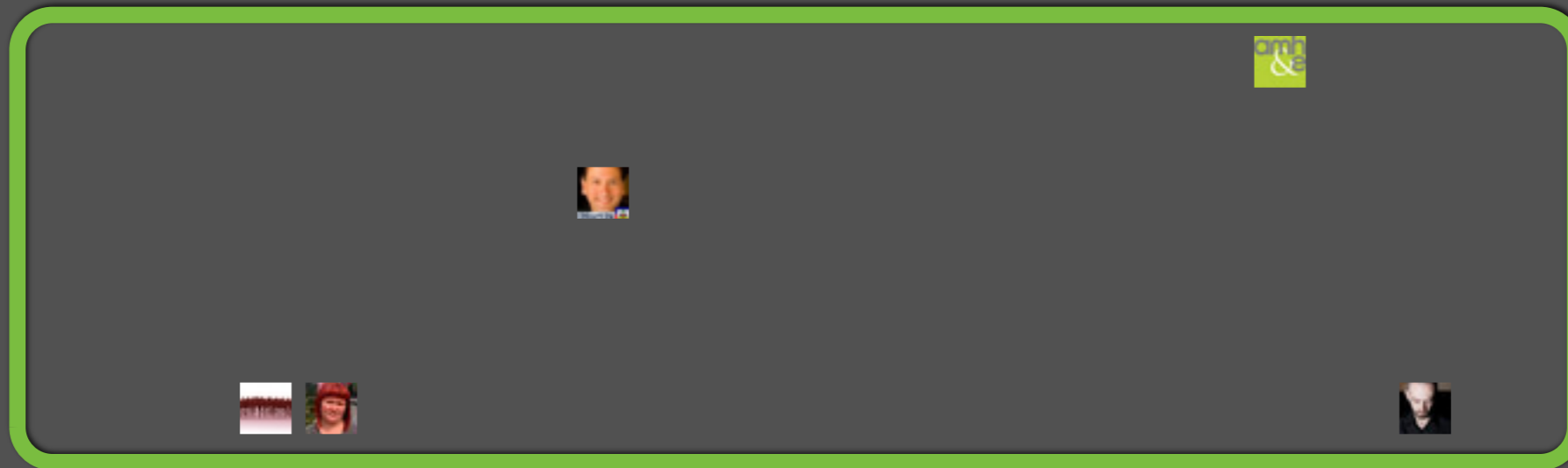
Continue Selection...

$a$ :



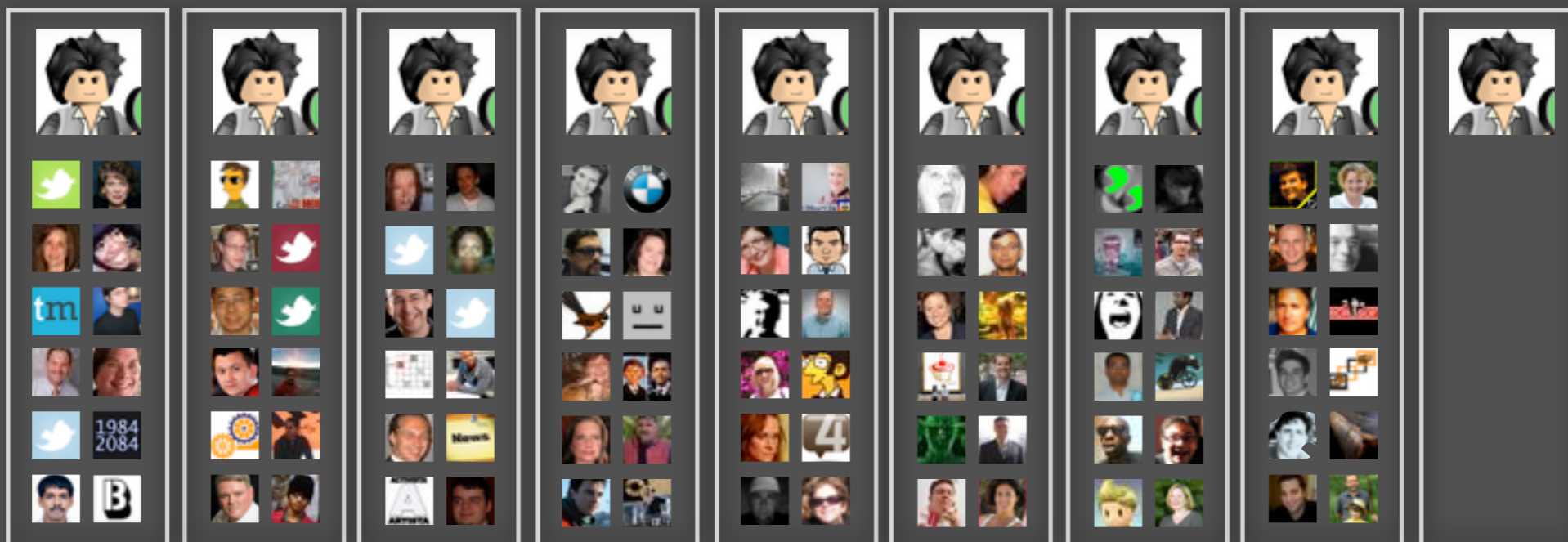
# Experimental Setup - Selection

$u$ :



Stop When Each Account  
is Following 500 Users

$a$ :



# Experimental Setup





Results

# Experimental Results

rank <sub>fb</sub>	strategy	following	↓ follow-backs	followers	rejects	churn
1	<i>bonding</i> (A)	500	158 (32%)	202 (40%)	12	127
2	<i>random</i> (D)	500	118 (24%)	154 (31%)	20	103
3	<i>median affinities</i> (C)	500	99 (20%)	123 (25%)	25	93
4	<i>bridging</i> (B)	500	99 (20%)	120 (24%)	25	91
5	<i>min. following/ers diff.</i> (E)	500	87 (17%)	99 (20%)	50	55
6	<i>max. following/ers diff.</i> (F)	500	84 (17%)	172 (34%)	12	324
7	<i>median num. followers</i> (G)	500	63 (13%)	86 (17%)	31	51
8	<i>min. num. followers</i> (H)	500	33 (07%)	42 (08%)	79	29
9	<i>follow nobody</i> (I)	0	0 (—%)	3 (—%)	0	24



# Results - Followback-to-Following

strategy	significantly different
(A) <i>bonding</i>	B, C, E, F, G, H
(B) <i>bridging</i>	A, H
(C) <i>median affinities</i>	A, G, H
(D) <i>random</i>	G, H
(E) <i>min. following/ers diff.</i>	A, H
(F) <i>max. following/ers diff.</i>	A, H
(G) <i>median num. followers</i>	A, D, C
(H) <i>min. num. followers</i>	A, B, C, D, E, F

TABLE III  
FOLLOWBACKS-TO-FOLLOWING: PAIRWISE PROPORTION TEST  
RESULTS. ( $\alpha = 0.01$ , BONFERRONI CORRECTED  $p$ -VALUES)



# Results - Followbacks Retained

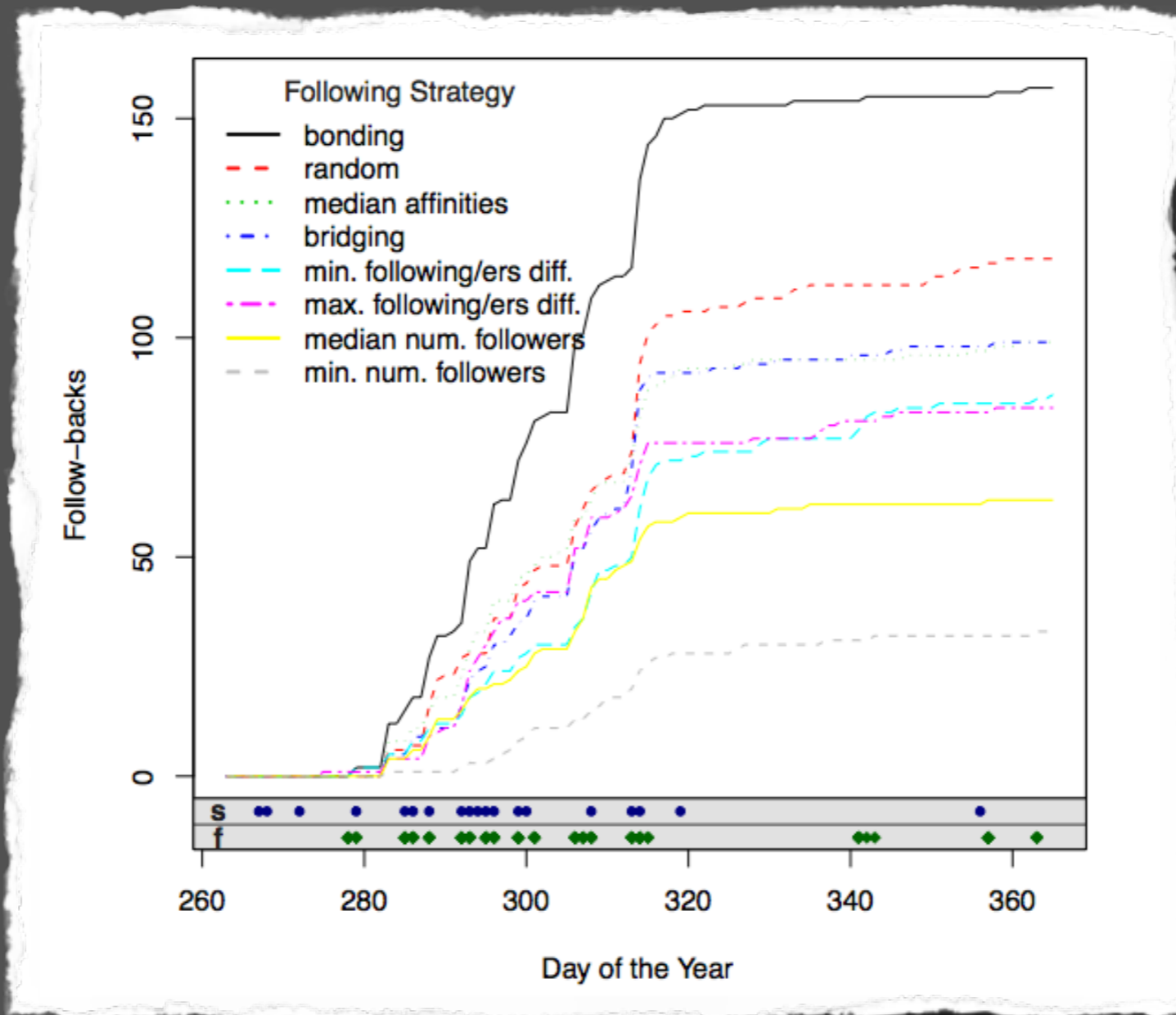


Fig. 2. **Follow-backs Over Time:** Follow-backs obtained by accounts in  $\mathcal{A}$  throughout the duration of the study. Days in which following rounds occurred (i.e., accounts in  $\mathcal{A}$  followed users in  $\mathcal{U}$ ) are marked in the row labeled **f**. Days that new status updates were posted to the accounts in  $\mathcal{A}$  are marked in the row labeled **s**.

# Bonding Results

$rank_b$	strategy	↓ bonding
1	<i>bonding</i> (A)	10%
2	<i>max. following/ers diff.</i> (F)	3%
3	<i>follow nobody</i> (I)	3%
4	<i>random</i> (D)	2%
5	<i>bridging</i> (B)	2%
6	<i>min. following/ers diff.</i> (E)	2%
7	<i>median num. followers</i> (G)	2%
8	<i>median affinities</i> (C)	1%
9	<i>min. num. followers</i> (H)	1%

TABLE V

**SOCIAL CAPITAL RESULTS:** EACH OF THE NINE ACCOUNTS ARE LISTED BY *strategy* AND RANKED BY THE PROPORTION OF BONDING SOCIAL CAPITAL THEY ACCRUED (I.E.,  $b(i)/sc(i)$ ), DENOTED  $rank_b$ . STRATEGY A HAS SIGNIFICANTLY MORE BONDING SOCIAL CAPITAL THAN ANY OF THE OTHER STRATEGIES.



# Conclusions

- 📌 New users that requested to follow others having similar profile descriptions (i.e., bonding) significantly increased the number of follow-backs
- 📌 This empirical evidence confirms the prevalent sociological beliefs
- 📌 This research assists new users to determine who to connect to in order to grow their network



# Questions & Comments

Ask me now:



Email or Call me:

**Matt Smith**  
**smitty@byu.edu**  
**(801) 788-4920**

Connect:

[m.smithworx.com](http://m.smithworx.com)





Extra Slides

# Results - Follower-to-Following

strategy	significantly different
(A) <i>bonding</i>	B, C, E, G, H
(B) <i>bridging</i>	A, H
(C) <i>median affinities</i>	A, H
(D) <i>random</i>	E, G, H
(E) <i>min. following/ers diff.</i>	A, D, F, H
(F) <i>max. following/ers diff.</i>	E, G, H
(G) <i>median num. followers</i>	A, D, F, H
(H) <i>min. num. followers</i>	A, B, C, D, E, F, G

TABLE II  
FOLLOWERS-TO-FOLLOWING: PAIRWISE PROPORTION TEST RESULTS.  
( $\alpha = 0.01$ , BONFERRONI CORRECTED  $p$ -VALUES)

# Results - Clicks & Mentions

$\text{rank}_c$	$\text{rank}_f$	strategy	$\text{clicks}_t$	$\text{clicks}_p$	↓ total clicks	mentions
1	3	<i>random</i> (D)	900	9	909	2
2	1	<i>bonding</i> (A)	882	15	897	3
3	8	<i>min. num. followers</i> (H)	850	16	866	1
4	2	<i>max. following/ers diff.</i> (F)	849	7	856	1
5	4	<i>median affinities</i> (C)	846	9	855	1
6	6	<i>min. following/ers diff.</i> (E)	821	19	840	4
7	5	<i>bridging</i> (B)	773	11	784	2
8	9	<i>follow nobody</i> (I)	775	1	776	1

# Results - Clicks vs. Followers

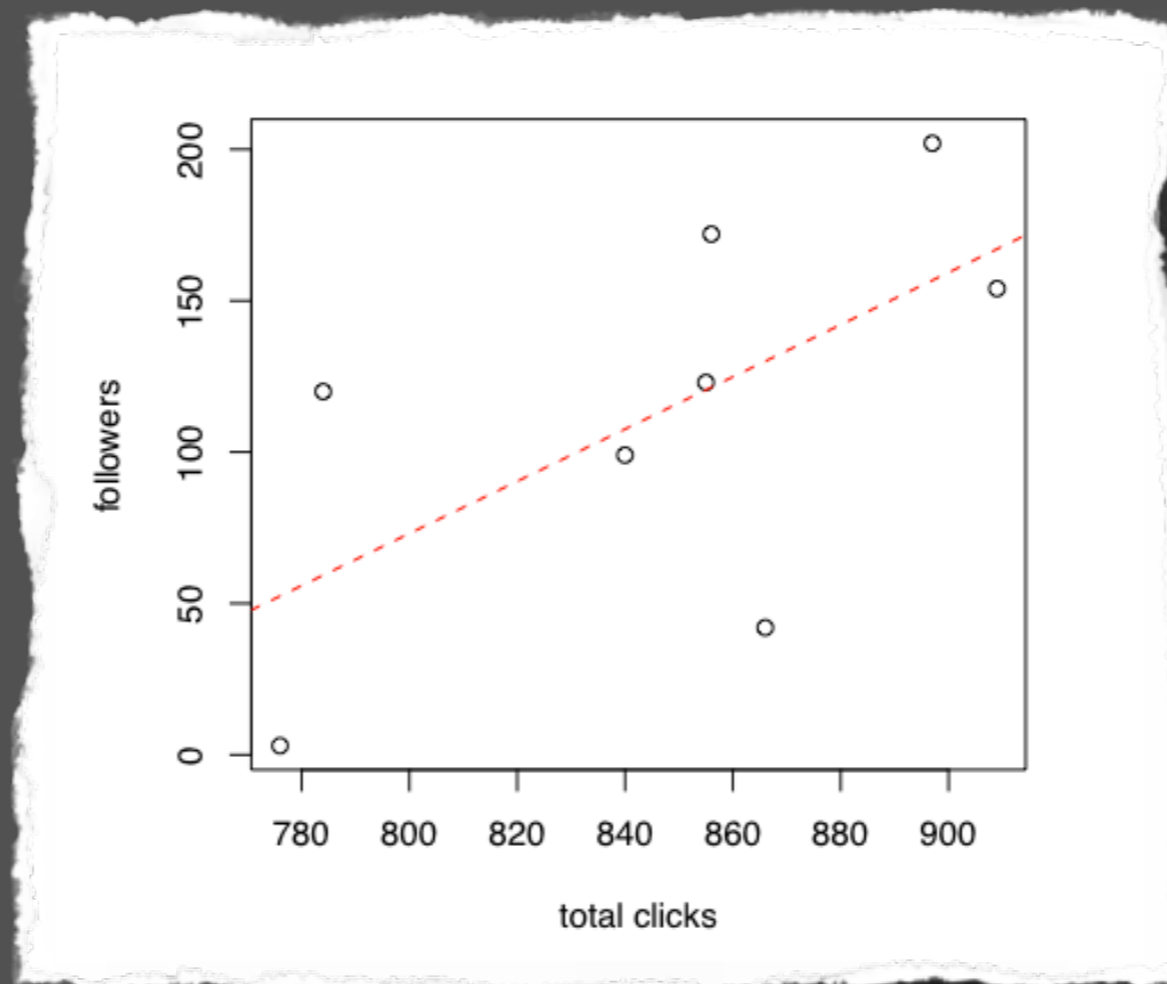


Fig. 3. **Clicks vs. Followers.** The linear model shown by the regression line (dashed) poorly fits the data having an  $R^2$  value of 0.28. There is, however, a positive Pearson correlation of 0.62, yet it is not as high as might be expected.

