Understanding Virality in a Small World

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SENIOR HONORS THESIS

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Introduction

Viral Marketing

Viral marketing was a term coined in 1997 by Draper Fisher Jurvetson (Jurvetson, S., 2000). It is when a message has its consumers pass it along. Jurveston writes, “one of the critical elements of viral marketing: every customer becomes an involuntary salesperson simply by using the product.” These viral movements often happen by word-of-mouth where people recommend a product to others due to its value or because it sometimes benefits the original person for a friend to use the product. Facebook and Hotmail are examples of strong viral marketing case where individuals who used either product recommended the product to their friends due to the social nature of the product. There was an inherent benefit to sharing Facebook because you could communicate with friends. Viral messages also carry with them an endorsement from a friend. Jurveston highlights that for consumers choosing what to buy is often difficult, and recommendations from trusted peers is often more convincing than the marketers themselves. Additionally, recommendations from many friends creates an ingroup that people want to join. Given how effective this is at broadcasting a message, people have tried to understand what makes a message become viral, for example, Malcolm Gladwell in particular has examined what creates a “tipping point” from a normal message to a viral one.

The Law of the Few, a term I first heard in Malcolm Gladwell’s The Tipping Point: How Little Things Can Make a Big Difference is stated as, “The success of any kind of social epidemic is heavily dependent on the involvement of people with a particular and rare set of social gifts” (Gladwell, M., 2006). His book sets out to understand what causes some messages to go viral and tries to diagnose what causes a “tipping point” for one message to achieve virality
over another. Gladwell splits the key players in a viral message into Mavens, Salesmen, and Connectors. Mavens are ones who are passionate about a subject and work to inform the people they care about to their findings. Mavens are the ones sharing information they gain with the people to whom they are strongly tied. Salesmen are charismatic people who are easily able to get people interested in their passions. Connectors know a lot of people and can maintain weak ties to many people bridging social and physical distance between groups. These three characteristics are not exclusive within people, and not all people are one of these three. These characteristics often show up in later research on the subject that connecters having many weak ties or connections to people in socially or physically distant groups, salesmen and mavens being people trusted to bring good information (Dodds, Newman & Watts, 2002; Granovetter & Mark, 1973). Virality happens when many people share a message to many other people, but this process is made up of small instances, one person sharing a message with another (Wilson, 2000). To better understand virality, one needs to understand how messages get passed from one individual to another and see if these characteristics are common in viral messages. This way of studying message transmission on an individual basis began with an experiment mentioned in Gladwell’s book, the *Small World Experiment*.

*Small World Problem*

Stanley Milgram and Jefferey Travers completed their study titled *An Experimental Study of the Small World Problem* (aka the Small World Experiment) in order to see how likely any two people know each other or to see how many people separate any two (Milgram, Stanley, & Travers, Jeffery, 1969). The best way to think of this is the common occurrence of you and some
stranger knowing the same person, or you know a person(a) and the stranger knows a different person(b), and the people (a and b) share a connection. This was tested by giving the task of finding a person in Sharon, Massachusetts to participants in Nebraska and Boston. The participants were chosen from one of three groups: people who live in Boston, people who live in Nebraska, or owners of blue-chip stocks in Nebraska. The first person would send the task on to a person who they thought could progress the task of finding the given person. The stipulations were that the message could only be mailed to one other person, and the recipient had to be a friend, relative, or acquaintance. The chains on average took 5.2 passes to reach the target person, however it took an average of 5.7 passes starting with the random people in Nebraska which rounded up is 6 mediating people or 6 degrees of separation between the two. This evidence indicates that there are roughly six close connections separating any two people. However, one major limiting factor to the experiment was the attrition. Participation was surprisingly slim with only 64 of 217 people (29%) completing the task. Although, the sample doesn’t allow for much generalization due to specific location sampling and attrition, six connections is not many to connect strangers. This gets even more interesting when looking at the details of the chains. Most of the chains in this study were passed through friends and acquaintances with the final person often being the final person’s landlord or business associate. Though basic questions were asked about how people decided to whom they should pass the task along, there was little investigation of the decision process of the participants. Further research into these relationships and the decision process of the senders can give insight into the strength of relationships and characteristics of the recipients along with improving of our understanding of what characteristics the senders were looking for in the recipients.
Dodds, Watts, and Newman replicated the Small World Experiment focusing on the characteristics senders look for in recipients when sending along the message (Dodds, Newman & Watts, 2002). They found that the most common reason for passing along the message was geographical proximity to the recipient. Attrition was a problem as it was in the original experiment, however, this study was able to collect data on where the attrition happened. It was found that the shorter the chain the less attrition. This study was also researching the effect of relationship strength on the likelihood of exchange and found that people were more likely to use a fairly close over an extremely close relationship. Therefore, relationship strength is not necessarily related to the likelihood of a sender choosing the person as a recipient, and to understand the interpersonal relationships involved in virality, we need to look at why these more distant relationships are more common choices than close ones.

*Tie Strength*

To understand how people decide to whom to send a message, it is helpful to look at Granovetter’s theory of the strength of weak ties. Granovetter’s theory of tie strength analyzes how different depths and strengths of relationships impact their utility on an individual and societal level (Granovetter & Mark, 1973). Virality is due to people sharing a message to other people. Different strengths of ties between people can cause fragmentation or joining of communities. Strong ties are made between people who have common interests and experiences which brings a group together. Strong ties strengthen a group but can cause fragmentation within a community because people will interact more with strongly tied people than weakly tied people creating more or less exclusive groups. Weak ties are made between people with infrequent
interactions and few ties with similar people. Weak ties, however, can bridge gaps in communities through only one connection meaning large distances, physical and otherwise, can be bridged by only one weak connection. These weak connections used in the social networks allows people to share connections from great distances social or physical. Instead of the chains having to move small geographic distances to their target, people who have many weak ties progress the message quickly. Strongly tied groups who know each other well could be more efficient within a group. Knowing exactly who will progress the message best allows for fewer transfers and a more direct route to the target. Granovetter’s extension of tie strength helps create a map of how a viral message could be transferred within groups of strongly tied individuals, and between groups with weakly tied people.

A study conducted by De Bruyn and Lilien bring together aspects of the Small World Experiment, tie strength, and viral marketing to develop a model of how people interact with media shared with them (De Bruyn & Lilien, 2008). This study had the same design as the Small World Experiment with a task being sent from person to person, however they were studying the attrition at different stages within the sending process. They studied the likelihood of attrition when the recipient received the message, forwarded the message, and completed a survey. They found that people were more likely to complete the task of sending the message along and completing the survey if the message was sent to them by a friend which means that there is a relatively strong tie between the two. Therefore, a person would most likely complete the task if there is a strong or intermediate tie between the sender and them. The authors tie this into virality because a viral message must then pass through those who are intermediately tied to individuals for the strongest likelihood of spreading the message.
However, the study done by Shen, Chiou, Hsiao, Wang, & Li (2016) shows that tie strength has varying effects on viral messages. Instead of focusing on solely the ties between the sender and receiver, this research focuses on interactivity of a message as well as the advertising literacy of the reader. Message interactivity is determined by whether the consumer is able to communicate directly to the marketer or the firm. The advertising literacy measures the reader’s skepticism and resistance toward advertisements with greater literacy meaning greater resistance and skepticism. These effects come from an understanding of how marketing is used to persuade a consumer, therefore a greater literacy means that the consumer is going to critically judge the advertisement making them more aversive to it. To support De Bruyn and Lilien’s claim, stronger tie strength generally improves a person’s attitude toward a message as well as their intention to pass it along no matter the reader’s literacy or the interactivity of the message. However, weak tie strength creates diverging results. People with high advertising literacy who received a message from a weak tie had much worse attitudes toward the material and were much less likely to share a message passed to them through weak ties. Although, due to tie strength, weak ties allow for socially and physically distant groups to be connected, a message being passed through a weak tie may result in fewer people forwarding it along. These studies show that there are mediating factors that impact the reception of a message other than the strength of the tie between the sender and recipient. In order to better understand how these factors work within an actual viral movement, it is important to contextualize these results by studying how past viral movements have developed.

A recent study conducted on how petitions flow through internet-connected groups via a network of peers (Liben-Nowell, & Kleinberg, 2008). This was studied by tracking the signatures of an individuals who signed a petition and to whom the individual passed the petition
after signing. The goal of this study was to see how information was spread through social networks in a viral setting. Models were then created to showcase the exchanges on a large scale, and one of the most notable aspects of them were how infrequently they branched into different groups. People passing the petition to their friends to sign and their friends passing the petition to their friends would create a very branching tree where every pass creates multiple routes where the information penetrates new social groups. However, this linear tree showed that the signatures were very unlikely to move into new groups, meaning that either people often wouldn’t share the information beyond their group, or that people were unlikely to act upon information given to them from outside of a specific group. This disputes the predicted small world conclusion of a few degrees of separation connecting large numbers of people. In this study researching the spread of information, the diverse social connections previously studied may not have as strong of an effect on passing information to a variety of people. This means that just because a social network can be broad and weak ties are well utilized in the search for a person, people don’t always utilize their connections as effectively when searching for information.

The question I propose is how do people utilize their social networks when searching for information. Social connections are effective in terms of facilitating the sharing of information amongst distinct groups of people or asking for favors, but when confronted with the task of finding information, how do people utilize these connections? The design of this study will be similar to Milgram and Travers’ experiment, however instead of the task of finding a person, the participants will be asked to find a photograph in a location physically close to the starting participants. Through this design, the general phenomenon of virality will be broken down to understand the decision process each person has when deciding upon a recipient to progress the
task of searching for information. This decision process will be studied through a survey asking questions about the type and strength of the relationship between the sender and recipient as well as the reasons the sender has for choosing the recipient. Due to Milgram & Travers’ finding great leaps over geographic distance through social connections as well as Dodds, Watts, & Newman’s findings that physical proximity was the most common reason for passing a message, I expect that participants will choose to choose a recipient due to their physical proximity to the goal or due to how socially connected they are. Social connection would mean that they have many friends and acquaintances through strong or weak ties that can progress the task to new groups of people which would be supported by Grannovetter’s research as well as De Bruyn & Lilien. I also will be surveying how well the recipient is trusted to complete this survey. Earlier it was mentioned how important trust is in viral marketing because it is often easier for a consumer to trust a peer than an advertisement. Therefore, I believe that people will use the people they trust to send the message similar to how people would be more receptive to information from a trusted peer. In order to minimize the attrition common in previous studies, this one will take place within a small radius to maximize people’s belief that the task can be completed, as well as, hopefully, keeping the chains as short as possible.
Methods

Participants

Initial participants were acquired two different ways. First, 13 participants were gathered through a convenience sample of North Central College faculty and staff, with a maximum of three participants per office. Second, 14 student participants were solicited through the SONA pool which includes Psychology 100 and 255 students. Later participants were chosen by the initial participants to participate in the study causing a snowballing of participants. The initial participants chose one other person to participate, and those participants chose one other person to participate, and the snowballing stopped once one person in the chain had completed the task of finding someone in the corner office of the Willis Tower or the participant chose not to send the email on to another person.

Procedure

Participants were sent an email (see Appendix A) containing brief instructions of how to complete the study along with a chain identifier to keep track of how the email travels and a link to a Qualtrics page (see Appendix B) which contained the rest of the instructions and a survey. The ability to track the chains’ progress allowed me to see how many people participated in a given chain, and for chains that find someone to complete the task, I can know how many exchanges a completion took. This Qualtrics page started with an informed consent (see Appendix C) and only after the participants consented were they allowed to continue. The participants were then asked if they have a photo or the ability to take a photo from a corner office in the Willis Tower in Chicago. If they fulfilled this requirement the chain ended. If they did not, they were asked to send the email to one other person who is a friend, relative, or
acquaintance who they thought could progress the chain of people toward someone who can fulfill the task. They then forwarded the email to this person who was to complete the steps above creating a chain of people until it reaches a person who has or can take a photo from the Willis Tower in Chicago. After the participants forwarded the email, they were asked to complete a survey detailing the type of relationship the sender had with the recipient as well as the reason they chose the recipient. They answered questions on the factors that they used when deciding upon a recipients, either physical proximity to the target, social connectedness to others, or how well they trusted the person to participate. Once the participants completed that, they were given a Debriefing (see Appendix D) and there was a raffle for two $50 Visa Gift Cards.
Results

The study started with 27 initial participants and snowballed to 29 participants. With only 2 people completing the task of finding a photo from a corner office of the Willis Tower. This means that there was an attrition rate of .9310 (27/29). The information in Figures 1, 2, and 3 indicate the answers participants had to the questions in the Qualtrics survey detailing the factors the sender used to decide to send the message to the recipient as well as the relationship they have.

Small World Factors

Figure 1 shows what factors people used to choose a recipient when searching through the network. The two factors studied, location and connectedness, are not mutually exclusive meaning people could have reported using both when sending the message. While there was little difference between the frequency of Location (n=13) and Connectedness (n=14) as a factor in the search, there was only one person who answered that they did not use either factor when choosing a recipient. These results are also shown in Figure 3. Figure 3 shows that people use the word work or similar words very often in their reason for sending along the message, however the primary relationship to the recipient was “work” 21% (4/19) of the time. There also seems to be a larger density of location-related words (lives, close, city) than connection-related words even though in Figure 1, the Connectedness and Location are very close in the number of people reporting to use them.
Tie Strength & Search

Figure 2 combined the data from Figure 1 with the measures used to indicate the impact of tie strength on their decisions. While most people sending the message to family often send the message due to both Location and Connectedness, people sending the message to personal acquaintances send the message primarily due to Social Connectedness, and people sending the message to work acquaintances primarily send the message due to Location. There is also notable data in the Trust section of Figure 2. Senders who gave a trust rating of 4/6 all sent the email with Connectedness as a factor. Senders who gave a trust rating of 3/6, 5/6, and 6/6 all sent the email with Location as a factor. This could indicate that different levels of trust could correspond to the reasons for sending along a message. All of these measures were used to
measure the type and strength of the relationship, and this data suggests a relationship between the relationship and the factors used when deciding to whom to send a message.
Figure 2
Graph A compared answers to the Connectedness question show in Figure 1 to the answers from other survey questions including the primary relationship of the sender to the recipient, the frequency the sender interacts with the participant, as well as how much the sender trusts the recipient to participate in the study. Graph B is the same as A, however, instead of connectedness, it compares the Location question from Figure 1.

Figure 3
This is a word map derived from the open-ended question asking what the reason the sender had for passing the message to the recipient. The more frequently the word is used, the larger the size of the word.
Discussion

This study set out to examine how people search for information to better understand how individuals relay viral messages. Through this study, we hoped to better understand the decision process for choosing recipients in a viral messaging setting. We examined this by conducting a study similar to the Small World Experiment and issued a survey to identify the different characteristics people use when deciding to whom a message should be sent. The key factors we believed people would use when making this choice were the physical proximity of the person to the goal, the general social connectedness of the person, and how well the person was trusted to send the message to someone else.

Analyzing the two primary factors, social connectedness and the physical proximity to the goal, only one person said that they did not use either social connectedness or physical proximity meaning that these were the two predominant factors people used when choosing a recipient. However, no large differences were found between these two factors. Therefore, this study has not found any information that may indicate that people use one of these two factors over another. This slightly contradicts the findings of Dodds Muhamed and Watts (Dodds, Newman & Watts, 2002), because their research indicated a strong trend toward people looking for recipients with a closer physical proximity to the goal. While their study observed many different factors involved in choosing a recipient for the message, physical proximity was by far the most common, where in my study, there was slightly greater use of social connectedness. This could be due to the proximity of the starting participants or to the fact that people were searching for information instead of a person. With a larger sample size, more definitive conclusions could be drawn about the magnitude of the difference between studies.
Previous research indicated that people who receive a message from a strong tie are more likely to act on it than a weak tie (De Bruyn & Lilien, 2008; Shen, Chiou, Hsiao, Wang, & Li, 2016). This shows that people are more likely to trust a source that they know well. I wanted to study the other side of that, do people send a message to people they trust? I found that overall, the recipients chosen had not only chosen people with a high amount of trust to complete the task ($\mu = 3.89/6$). This result was surprising at first because I assumed people would send it to people they trusted, however when seeing the attrition at 93%, I see that they were right to not trust the recipients much. When analyzing trust layered with location and connectedness, there were some differences. The most surprising difference was that people who trusted the recipient the most to participate in the experiment all sent it due to the recipient’s physical location. This could be due to a very close proximity allowing that person to complete the task. However, more information is needed to draw any conclusions.

Another measure of the impact of tie strength is relationship type. Relationships created through activities in the participants’ personal lives, which is through an activity the person chooses to do unlike a relationship through family or work, were chosen mostly due to their social connectedness. People who were chosen as personal life relationships as well as family relationships had the fewest interactions with the sender. This may be related to tie strength (Granovetter 1973). If the initial participant feels that they have no strong connection to anyone in the Chicago area, they may look to someone who has many connections hoping they have a connection in that area. This weakly tied, personal relationship could bridge a social or physical distance progressing the chain toward the goal.
Limitations

The biggest limitation to this study was the size of the participant pool. With a non-random initial sample within a small college community, there is not much generalizing to be done. The limited number of participants makes it difficult to draw significant comparisons because there is not much data to compare between groups, nor are there many people who completed the task. This is not different than the Milgram Study, Watts et al., nor other studies of this nature because they all shared a large element of attrition that I hoped to avoid. By keeping the study local and trying to reduce the number of exchanges to reach the goal, I did not prevent attrition beyond what was standard for these types of studies. Attrition is a key problem in virality. When De Breun and Lillian studied this phenomenon, they found that stronger tie strength increased the likelihood of a person reading and sending along a message (De Bruyn & Lilien, 2008). This is a key in viral marketing because it relies on word of mouth between people (Jurveston, 2000). If the people propagating the marketing campaign do not pass it along, the campaign dissolves. Therefore, research into how people decide to send along a message impacts how well viral marketing campaigns are executed.

The other major issue was with the survey. The key factors we were looking at, proximity, connectedness, and trust, should have had the same question structure. The way that the question is asked needs to be the same so to not accidentally make a question more confusing nor one option more compelling. The biggest limitation to my survey was the choice of answers for each question. The way the location question was asked included 3 choices, “yes,” “somewhat,” and “no.” which allows for “fence sitting” where the question about social connectedness includes 2 choices, “yes” and “no”, which does not allow “fence sitting” or the ability to not choose one extreme or the other. This means people were able to say that location
somewhat impacted their decision where they were not able to say that social connectedness somewhat impacted their decision. I also ended up combining the “yes” and “somewhat” answers for the question on location meaning that I had misled the participants in their answer choices. This weakens analysis because the people were misled to think they were answering “somewhat” when their answer was counted as a “yes”. Changing this would have allowed for better, more accurate comparisons between the three factors.

*Future Research*

Future research efforts could examine the search process for information using social media or finding a good way to combine internet search engines with a social networking approach. Given that technology allows people to search in new ways, understanding how people search using this new medium would improve our understanding of connections now as well as improving our understanding of how viral messages flow through these connections. Future research could focus on applying the current research to creating and executing a viral message.

There has been a recent increase in research studies on mathematically modelling social networks for data analysis purposes (Domingos & Richardson, 2001; Smith et al, 2009). With social media websites such as Facebook and Twitter, there is more data than ever on how people are connected to each other so understanding how read and interpret that data will be important. The study done by Domingos and Richardson creates an algorithm to show how markets are social networks and display how data mining practices can be used to understand how viral marketing campaigns work (Domingos & Richardson, 2001). These applications of computer science, mathematics, psychology, sociology, and marketing allow for many different interpretations and applications of social networks. However, in order to create these algorithms
and best market to the individuals, we need a constantly improving understanding of how social networks operate on a large scale and on an individual level.
References


Appendix A
Email to participants

Subject:
North Central Psychology Study

Body:
Hello,

You are receiving this message because the person who sent it to you believes you will take part in a study. The compensation for this study is a raffle for one of two $50 visa gift cards. This study consists of a chain of people passing along this email until a task can be completed by a recipient. The task is to have a photo from the corner office of the Willis Tower in Chicago. The procedures for taking part in this study are on the link below.

Chain Identifier: #### [you will need to input this 4 digit code into the Chain Identifier question in the study]

LINK: [https://noctrl.co1.qualtrics.com/jfe/form/SV_8e39s2Cnhe9X1nD](https://noctrl.co1.qualtrics.com/jfe/form/SV_8e39s2Cnhe9X1nD)

Ian Brugman
ikbrugman@noctrl.edu
Appendix B
Qualtrics Survey

Tie Questions

Start of Block: Decide which Informed Consent

Q6 Are you a North Central College student doing this study for SONA credit?

☐ Yes

☐ No

End of Block: Decide which Informed Consent

Start of Block: Informed Consent Non-Student

Q4

Informed Consent Form

Title of the Study:

Investigators: Jon Mueller, Ian Brugman

This experiment is exploring how people search for information through their network of friends, relatives, and acquaintances. We are looking for a photo from a corner office in the Willis Tower in Chicago, so your job will be to forward the email along to one person who
would have this or may know someone who has this. Should you choose to take part in this study, further directions are attached below.

Risks & Benefits: There may be minimal risk in this study if any. There is a potential risk of minimal psychological discomfort, but this will be no more than everyday life. Benefits that you may gain by participating in this study are knowledge about how research is conducted and knowledge of our topic. Those who choose to take part in the study will be entered into a raffle for one of two $50 Visa gift cards.

Confidentiality: For this study, your name will not be used. We ask that you provide us with your email so that we can track the progress of the chain and see who passed the form to whom. The use of your email will also be to contact you with the debriefing statement and if you have won the raffle for the gift cards. We will be storing our data in a password protected drive on Microsoft OneDrive. However, we cannot absolutely guarantee confidentiality due to possible human error. We will do everything in our power to prevent any breach in confidentiality.

Q8 Informed Consent Form

Title of the Study: This experiment is exploring how people search for information through their network of friends, relatives, and acquaintances. We are looking for a photo from a corner office in the Willis Tower, so your job will be to forward the email along to one person who would have this or may know someone who has this. Should you choose to take part in this study, further directions are attached below.

Risks & Benefits: There may be minimal risk
in this study, if any. There is a potential risk of minimal psychological discomfort, but this will be no more than everyday life. Benefits that you may gain by participating in this study are knowledge about how research is conducted and knowledge of our topic. Another benefit will be 1 SONA credit and entry into a raffle for one of two $50 Visa Gift Cards. Confidentiality: For this study, your name will not be used. We ask that you provide us with your email so that we can track the progress of the chain and see whom passed the form to whom. The use of your email will also be to contact you with the debriefing statement and if you have won the raffle for the gift cards. We will be storing our data in a password protected drive on Microsoft OneDrive. However, we cannot absolutely guarantee confidentiality due to possible human error. We will do everything in our power to prevent any breach in confidentiality.

Q2

Contacts: For questions or concerns about this experiment, please contact Dr. Mueller, study supervisor and principal investigator(jfmueller@noctrl.edu).

Participation: Participation in this research is voluntary. You may withdraw from the experiment at any time without penalty.

Compensation: For completing this study, you will be entered into a raffle for one of two $50 visa gift cards.
Age Requirement: You must be at least 18 years of age to participate in this study. By signing on the line below, you are indicating that you meet the age requirement. By signing below, you are also indicating that study you are participating in has been explained to you and that you agree to participate.

I certify that I’m over 18 or, if not, that I have provided the necessary documentation of parental consent.

☐ I consent, begin the study

☐ I do not consent, I do not wish to participate

End of Block: Informed Consent Non-Student

Start of Block: Instructions

Q9 Instructions for completing this study: The goal for this study is to pass the task of finding a photo from the corner office of the Willis Tower in Chicago along from person to person, ending with someone with a photo from the corner office of the Willis Tower. Finding a photo from the Willis Tower by looking it up online or by any other means outside of the directions below will not benefit the study nor your person. In order to complete this task please follow the steps below.
Q14 Please write your Chain Identifier here.

________________________________________________________________

Q18 Please give us your email and the email of the person who sent you this prompt.

☐ Your email ____________________________________________________

☐ The email of the person who sent you this prompt

______________________________________________________________

Q10 Do you currently have a photo from a corner office in the Willis Tower in Chicago, or do you have the ability to go, in person, to a corner office of the Willis Tower in Chicago and take one yourself?

☐ Yes

☐ No

End of Block: Instructions

Start of Block: Instructions for Have Picture
Q15 If you do have a photo from the corner office of the Willis Tower in Chicago, or you have the ability to go, in person, to a corner office of the Willis Tower in Chicago and take one yourself, you are done!

〇 I have a photo from the corner office of the Willis Tower, or I am able to take one in person.

End of Block: Instructions for Have Picture

Start of Block: Instructions for Don’t Have Picture

Q16 Forward the email you received to one relative, friend, or acquaintance who you think would either have a photo from a corner office of the Willis Tower in Chicago, have the ability to take a photo from a corner office of the Willis Tower in Chicago, or who would be more able to complete this task than you. Please do not contact the person before you send them the email, but feel free to check in with the person after you have sent the email.

*If you need to save your progress here and return when you have sent the email along, please do so.*

〇 I have passed the task along

End of Block: Instructions for Don’t Have Picture

Start of Block: Survey of why you sent this prompt along to the person you did.
Q19 What is your primary relationship to the person to whom you forwarded the email?

- Work
- Family
- Personal Life
- Other ________________________________________________

Q20 Rate how well you know this person.

<table>
<thead>
<tr>
<th>Not Very Well</th>
<th>Moderately Well</th>
<th>Very Well</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>

Relationship
Q21 How often do you interact with this person?

- Regularly
- Rarely
- Sometimes
- Never

Q22 Did you know the recipient's email (either from memory or in your contact list), or did you have to find it?

- Knew it
- Had to find it
Q24 Does the person live or work physically closer than you to the Willis Tower?

- Yes
- No
- I don't know

Q23 Did the recipient's proximity to the Willis Tower influence your decision to send the prompt to him/her?

- Yes
- Somewhat
- No
Q30 Did you send the prompt to this person due to how many people they know/how well he/she is socially connected?

- Yes
- No

Q25 How do you rate the social connectedness of this participant?

<table>
<thead>
<tr>
<th>Not Well Connected</th>
<th>Moderately Well Connected</th>
<th>Very Well Connected</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Q26 Rate how well you trust the recipient to participate in this study.

- No Trust to Participate
- Moderate Trust to Participate
- Full Confidence to Participate
Q31 Rate how strongly you believe the recipient will make progress toward the goal of finding someone who has or can take a photo from a corner office of the Willis Tower.

<table>
<thead>
<tr>
<th>Recipient will</th>
<th>Recipient may</th>
<th>Recipient will</th>
</tr>
</thead>
<tbody>
<tr>
<td>not help</td>
<td>make progress</td>
<td>definitely help</td>
</tr>
<tr>
<td>progress</td>
<td></td>
<td>progress</td>
</tr>
</tbody>
</table>

Q33 State your reason for why you passed the task along to this person.
End of Block: Survey of why you sent this prompt along to the person you did.
Appendix C
Informed Consent Form

Title of the Study:

Investigators: Jon Mueller, Ian Brugman

This experiment is exploring how people search for information through their network of peers. We are looking for a photo from a corner office in the Willis Tower in Chicago, so your job will be to forward this Form along to one person who would have this or may know someone who has this. Should you choose to take part in this study, further directions are attached below.

Risks & Benefits: There may be minimal risk in this study, if any. There is a potential risk of minimal psychological discomfort, but this will be no more than everyday life. Benefits that you may gain by participating in this study are knowledge about how research is conducted and knowledge of our topic. Those who choose to take part in the study will be entered into a raffle for 2 $50 Visa gift cards.

Confidentiality: For this study, your name will not be used. We ask that you provide us with your email so that we can track the progress of the chain and see who passed the form to whom. The use of your email will also be to contact you with the debriefing statement and if you have won the raffle for the gift cards. We will be storing our data in a password protected drive on Microsoft OneDrive. However, we cannot absolutely guarantee confidentiality due to possible human error. We will do everything in our power to prevent any breach in confidentiality.
Contacts: For questions or concerns about this experiment, please contact Dr. Mueller, study supervisor and principal investigator (jfmueller@noctrl.edu).

Participation: Participation in this research is voluntary. You may withdraw from the experiment at any time without penalty.

Compensation: For completing this study, you will be entered into a raffle for two $50 visa gift cards.

Age Requirement: You must be at least 18 years of age to participate in this study. By signing on the line below, you are indicating that you meet the age requirement. By signing below, you are also indicating that study you are participating in has been explained to you, and that you agree to participate.

I certify that I’m over 18 or, if not, that I have provided the necessary documentation of parental consent.

Date: ________/_______/_______

Name (printed): __________________________________________

Signature: _______________________________________________
Informed Consent Form (Students)

Title of the Study:

Investigators: Jon Mueller, Ian Brugman

This experiment is exploring how people search for information through their network of peers. We are looking for a photo from a corner office in the Willis Tower, so your job will be to forward this Form along to one person who would have this or may know someone who has this. Should you choose to take part in this study, further directions are attached below.

Risks & Benefits: There may be minimal risk in this study, if any. There is a potential risk of minimal psychological discomfort, but this will be no more than everyday life. Benefits that you may gain by participating in this study are knowledge about how research is conducted and knowledge of our topic. Another benefit will be 2 SONA credits.

Confidentiality: For this study, your name will not be used. We ask that you provide us with your email so that we can track the progress of the chain and see whom passed the form to whom. The use of your email will also be to contact you with the debriefing statement and if you have won the raffle for the gift cards. We will be storing our data in a password protected drive on Microsoft OneDrive. However, we cannot absolutely guarantee confidentiality due to possible human error. We will do everything in our power to prevent any breach in confidentiality.

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**Participation:** Participation in this research is voluntary. You may withdraw from the experiment at any time without penalty.

**Compensation:** For completing this study, you will receive two SONA research credits.

**Age Requirement:** You must be at least 18 years of age to participate in this study. By signing on the line below, you are indicating that you meet the age requirement. By signing below, you are also indicating that study you are participating in has been explained to you, and that you agree to participate.

**I certify that I’m over 18 or, if not, that I have provided the necessary documentation of parental consent.**

**Date:** ________/_______/_______

**Name (printed):** ________________________________________________

**Signature:** _____________________________________________________
Appendix D
Debriefing Statement

Title of study: Understanding Virality in a Small World
Investigators: Dr. Jon Mueller, Ian Brugman

Thank you for taking the time to be part of this study!

The goal of this study is to understand how people use their social connections to search for information. We gave you a prompt to find a picture from the corner office of the Willis Tower in Chicago. Either you had one, or you passed the prompt to one other person who you thought would be better suited to find the picture. We then had you complete a survey so that we could understand the relationship between you and the recipient, and why you chose them to continue the chain. These questions will help us understand the different reasons the sender sent the packet to this person improving our understanding of to whom people reach out when searching for information.

Our hypothesis is that people will most likely choose a person who they know well as the dominant factor in choosing the next person in the chain.

Contacts:
- Please contact Ian Brugman, student researcher, for results of this study at ikbrugman@noctrl.edu.
- For questions or concerns about this experiment, please contact Dr. Mueller, study supervisor and course instructor at jfmueller@noctrl.edu.
- If experiencing any distress from participating in this study, please reach the Dyson Wellness Center by phone: 630.637.5550.

Thank you, again, for participating in this study! The raffle for the two $50 visa gift cards will be held shortly.