The Final Report: *Understanding the Structure of Social Networks from Our Mobile Phone Contacts*

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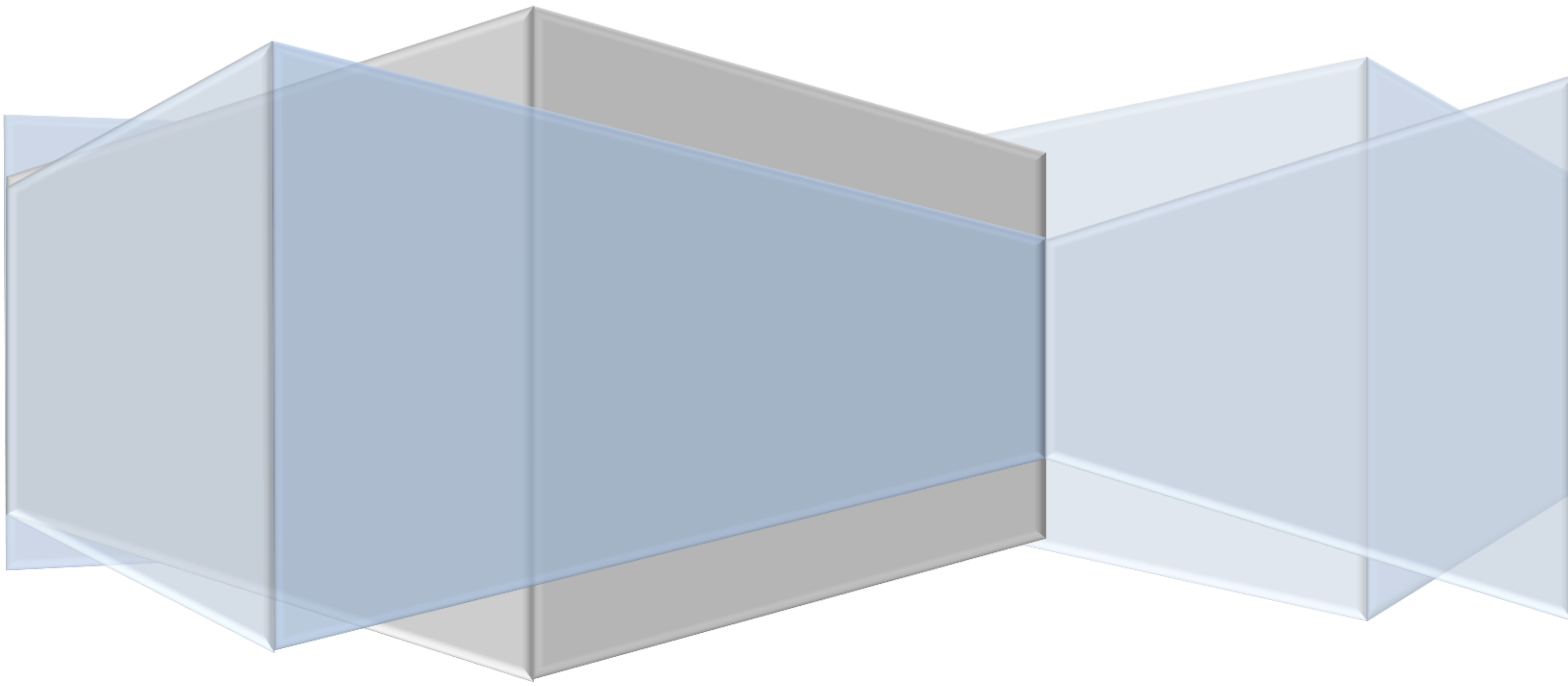

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Abstract

This research paper looks to further the understanding of the structure of an individual's social network through the exploration and examination of their mobile phone contacts. Based around multiple concepts regarding Robin Dunbar's research into social networks, and the different uses of such networks I have derived a set of conclusions from four initial hypotheses using two different methodologies. The methodologies that are used within the project are research experiments and a questionnaire. There is an extension to the question also used in situations where participants have more time to partake in the data collection process.

Introduction

The term "Social Network" can be defined in a variety of different ways depending on the context of the situation and also depending upon whom you ask. One of the most common definitions would solely refer to the context of a social networking site where an individual can build a virtual social network through establishing "relationships" between profiles. Another would refer to the complex network of people of you whom you have established a meaningful relationship due to interaction with one and other regardless of the means of communication. The secondary definition is closer to the root of this research paper, except the focus will become more heavily set towards the means of communication being via a mobile phone and the contacts that a person would store within their phone.

In 2012 Ofcom released research data that suggested 92% of the adult population in the UK use or own a mobile phone[1]. This of course discounts a large proportion of the general population as children (anyone under the age of 18) have not been included in the above figure. The generation that children and adolescents are growing up in currently is heavily influenced by technology and the ubiquity that comes with the territory of advancements in communication.

Advancements that will be explained further through the extra background research section of the paper have meant that the original hypotheses that I have been working from have changed slightly. The final hypotheses that have been fully explored and concluded are:

Hypothesis One *-"The social network mapped out through the use of your mobile phone contacts does not reflect your true social network support system"*

Hypothesis Two *- "Mobile phone contacts allow you to hold more un-meaningful relationships than usual through old contacts"*

Hypothesis Three *- "A user's age may affect how important mobile phone contacts are at maintaining the user's current lifestyle"*

Hypothesis Four *– "Different genders harness their mobile phones in different ways in order to achieve different results in terms of topics of conversation and preferred methods of communicating."*

Hypotheses One and Two are predictions that I am looking to discover conclusions to through research that will be carried out during the project and are based on the fact that mobile phones are an ever increasing convenience of the modern world, and are far more ubiquitous in people's lives than is realised. There is not a specific piece of research that I have found to base these hypotheses upon as they have been created purely based upon my own judgements regarding the use of mobile phone, and the statistics sourced from Ofcom regarding mobile phone ownership and usage.

However Hypothesis Two is linked to Robin Dunbar's research in order to authenticate the definition of a meaningful relationship. This research has previously been discussed in the Interim Report. Alternatively Hypotheses Three and Four are directly influenced to two different studies that have been carried out previously by Robin Dunbar and Erik Erikson. They detail the differences between male and female social interactions and the development of the knowledge needed in order to socially interact respectively.

Background Research

There have been progressions to the project in the recent months that have led to additional background research to be carried out in order to substantiate new ideas and alternate hypotheses that have been created through these further progressions. To further the project there are two main subjects to mention that have been looked at in order to further my knowledge of them and understand how the ideas they contain relate to the research project currently being undertaken.

How Many Friends Does One Person Need – Robin Dunbar [2]

One of the main concepts that have been adapted during the duration of the project thus far is that surrounding the differences in the usage of a mobile phone based on gender. The main difference between the sexes is not in terms of the physical usage of the mobile device but in terms of the topics that they discuss whilst using the phone and whether or not they would prefer to use the phone to communicate or not.

Dunbar suggests that men and woman primarily use conversation for two different reasons. Women tend to use their communication channels to service their social networks. Using the art of conversation to maintain and build upon a complex web of relationships in a social world forever in flux. The main aim of these social interactions is to ensure you are in the desired crowd. Women will tend to discuss others in the same social grouping, whereas men will tend to focus their conversations around either themselves or a topic that they feel they hold superior knowledge about. This can be summed up in by using an extract from the publication itself "*Harry likes to talk about Harry, and Sally likes to talk about Susan"*.

Men will lean towards self-advertising themselves instead of taking the time to discuss others and their business. They use what can be referred to as a vocal form of the peacocks tail, in order to promote themselves within the social circle or even to perspective mates. Men are influenced by the sex of their company when it comes to what they talk about and how they talk about it. For example when a woman becomes present in the group men will generally alter their conversation style in order to "show off" and attempt to instigate laughter as a response.

In light of this research I have decided to alter the forth hypothesis in order to reflect not only the differences between genders regarding the usage of mobile phone devices but also the topics that are discussed. Originally the hypothesis read "Males use their mobile phone contacts less for social contact and more as a means or arranging physical social contact and activities", for the rest of the study it will become "Different genders harness their mobile phones in different ways in order to achieve different results in terms of topics of conversation and preferred methods of communicating."

Psychosocial Developmental Stages – Erik Erikson [3]

The way in which a human develops in a social instance is heavily connected to the biological development of the human body as also the psychological development of the brain, and individual personality including a persons' ego. Erikson had long believed that the personality of a person will

develop in a predetermined order, a theory the Freud himself believed to be at the core of psychological development. However Erikson believed that instead of looking at the differences between the different sexes, there were more important observations and conclusions to be drawn from looking at how children socialise amongst themselves and the effects that this then has on a child's self of self.

Even at the tender age of 0-12 months a child's social development has begun in terms of developing a sense of trust through consistency and reliability of the parent or care giver. This can immediately hinder a child's further social development when it comes to socialises with other people including children of a like age.

In terms of relation to the topic the next important phase that a child will see during their social development is as they reach and precede the age of 3-5 years old. During this stage of psychological development the child begins to assert themselves on a more frequent basis during interaction with other children. At this age it becomes slightly more obvious to the child that interaction with peers is an important part of life.

Peer importance in a child's life grows further during the age of 6-12 years as this is the main stage in a child's life where their chosen peer group will become a major part of their self-esteem and become embedded within their social thinking. The idea of having to win approval of your peers becomes more evident during this stage and it is at this stage where a child will begin to development their own sense of appropriate communication methods in order to best achieve said acceptance.

Even though already the child has established the virtues of hope, will and purpose, and competence, the most important stage in a child's development has yet to occur. The transition between childhood and adulthood (13-18) is a major stepping stone in a person life where they gain independence and a cemented sense of their own personal identity. Once a child has reached 18 although there are further stages on psychological development to come they have (or should have if they have not experienced any of the negative effects of the development stages such as mistrust etc…) a solid sense of their personality and ego, and how they can best communicate to peers whether it is in regards to matters of acceptance or simply socialising.

Erik Erikson's research has simply established the connection that was needed in order to substantiate the idea that the widespread social acceptance and ideologies regarding communication through mobile phones can be directly related to the generation in which a person has grown up in.

For example if you have developed psychologically through the stages previously stated during the generation where technology has not yet become widely infectious, and progressions such as creating the very first personal computer are still to be made then you are more likely to have grown up under the influence that socialising relies heavily on either physically interacting with others in a social environment or perhaps sending letters etc... Children during this generation would think of technology as a "space age" aspect of life, one that is not yet accessible and is almost certainly implausible in their eyes to use as their main form of communicating amongst peers.

In complete contrast to that example if a child was to proceed through their social and psychological development in a generation much like today, where communication lines have been opened up further and technological advancements that a majority of children will know about are less substantial leaps and more frivolous. For example instead of the very first computer becoming

available to the public to buy, there is simply a new social media website to join, or the latest version of a pre-existing gadget to buy.

The way in which a person will now view a communication channel such as a mobile phone can therefore be related back to not only their current age, but also what generation they grew up in and how they perceived the art of communication from an extremely young age.

Through researching Erik Erikson's Psychosocial Developmental Stages it has allowed me to substantiate the third of the four hypotheses, which discusses the perceived importance of a mobile phone in regards to separate generations; "A user's age may affect how important mobile phone contacts are at maintaining the user's current lifestyle".

Design

In order to gather data that once analysed will allow me to substantiate the hypotheses that have been determined at the beginning of the report, appropriate data collection methods needed to be analysed and implemented accordingly. The obvious data collection choice when researching a range of different topics at the same time as trying to appeal to a large number of different participants is the use of questionnaires. Unfortunately not all of the data could be gathered using questionnaires as social diagrams needed to be created by the participants, as this format of creating visual diagrams does not fit the framework of a questionnaire. Hypothesis One called for a comparison between a person's social network represented through their mobile phone usage and their actual social support network. In order to collect this data in such a way that it could be standardised in order to later compare and evaluate it, individual research experiments were carried out in controlled environments.

Questionnaire Design

Initially when designing the questionnaire all of the data needed to validate the hypotheses excluding the data that would be later collected through research experiments, was to be accumulated through the use of a single questionnaire. It was thought that through the use of a singular questionnaire there would be a high participant involvement rate as filling in multiple surveys can be seen as time consuming and arduous, whereas one questionnaire has the illusion of simplicity and ease.

In order to create a questionnaire that would result in the collection of relevant data that could be collated and used to prove or disprove each of the hypotheses in turn. The hypotheses alone cannot simply be represented by one question each as this would not provide all of the variables needed, and certain aspects of the results would be based on unreasonable assumptions instead of reliable figures from the questionnaire. Each of the hypotheses has a number of different variables attached to them, which give the hypotheses their depth. An insight can also be gained into the influences between the variables and the connections that make the hypotheses complex to research.

To clearly show the connections between the variables that form the hypotheses and the questions that will be used within the questionnaire, each of the hypotheses (excluding hypothesis one as the data for this will be collected through the research experiments) firstly has been broken down to observe the variables and the influences between them, and then secondly based upon those variables suitable questions have been formed.

Hypothesis Two – Variable Evaluation

Hypothesis Two is based around research conducted by Robin Dunbar, which has become known worldwide as Dunbar's Number. The findings explain that humans lack the capacity within their brains to hold and maintain over 150 meaningful relationships. It's a basic problem of being able to budget ones time, there is simply not enough time in everyday life to invest enough time to make every potential relationship that you could hold meaningful. The meaningfulness of a relationship can be quantified against the amount of time that is invested into the relationship. Dunbar's Number is a formula to work out how many meaningful relationships one holds. It begins with all of the current relationships held, and then excludes all of those that have no current social connection and also those who are only known in the most general of sense.

Then by looking at the relationships that have no current social connection the question of "would you wish to maintain a relationship with any of the people that have a status of no current social relationship if you were to be re-introduced" is asked and if there are any they are then re-added to the previously calculated figure. The resulting figure represents a person Dunbar Number.

The equation that calculates a person's Dunbar Number is as below:

Total Number of Relationships Held	**-**	**Amount of relationships where the person is only known in a general sense**	**-**	**Amount of relationships holding no current social context**	**+**	**Amount of relationships you would like to hold again if re-introduced**

With the purpose of relating the topic back to communication through a mobile phone there are four variables that will need to be considered when composing the questions that will allow the participants Dunbar's Number of their mobile phone to be calculated, they include:

- Total number of mobile phone contacts.
- Number of contacts who are known in a general sense.
- Number of contacts that hold no current social connection to participant.
    - Number of the above contacts where if re-introduction occurred the relationship would be maintained.

Hypothesis Three – Variable Evaluation

Hypothesis Three is centred on the differences in technology usage and the importance of that usage in order to maintain current relationships between different generations. A child learns how to interact socially through observing others around them for examples. From a young age children begin the process of gaining social awareness and interaction skills that will allow them to hold and maintain relationships during the later stages of their lives. If the interaction they learn from is heavily reliant on technology to communicate and little physically social interaction then the child in turn will become reliant on technology to communicate.

Technology as generations progress is becoming more ubiquitous as the main advancements that the public are made aware of are regarding upgrading already existing products or new ways of socialising through technology and less about the fundamental leaps of technology such as the first micro –processor chips etc… Therefore it can be assumed that there will be a technological gap in how technology is perceived as a tool to aid communication. As the advancements have to a degree lessened (no longer fundamental) the reliance on technology has increased and therefore the social norm for interaction and maintaining relationships has changed.

Based on the influences described above a total of five relevant variables can be defined when discussing technology and generational differences.

- Current age of the participant, from this I will be able to gage what year the participant was born in and therefore when they would have been processing through the steps of Psychosocial development and what technology was available during this period.
- Age the participant received their first mobile phone.
- Amount of time spent each day communicating through a mobile phone.
- Reliance of an individual on their mobile phone to maintain meaningful relationships and their current social lifestyle at the same level of quality.

Hypothesis Four – Variable Evaluation

The final hypothesis is based around more research that has been carried out by Robin Dunbar that's concluded men and women use their social relationships in different ways. To reiterate the research that has previously been explained in the Background Research section of the report, men will generally discuss topics that they consider themselves a well versed expert in or a topic directly related to themselves and their lives. In contrast women will discuss the other members of the social circle in order to "Gossip" with others and improve their own social standing. They disclose less about their own personal life in order to stop themselves becoming the topic for discussion.

The variables needed for the questionnaire that will correlate back to this hypothesis are fairly obvious:

- Participants Gender.
- What is the most common topic of conversation that they discuss.
- % of time spent communicating each day about the given topic.

Future Progression

There are other variables that will be used within the questionnaire to allow for possible future research angles to be explored. The variables will revolve around the theory that online social media has now become less about maintaining relationships with friends and more of a competition regarding how many online friends one has. By including to further variables when creating the questionnaire this theory could be explored:

- Number of online friends on social media site used most often.
- What social media sites are used? Singular site usage or multiple different types of site.

This could then be compared against the social structure diagrams that have been created by the participants themselves, detailing who they believe they hold a relationship with. Therefore the link between the amount of friends declared on a social media site and the actual about of people a participant can recall when asked who they hold social relationships with will appear.

Demographic Questions

Some of the identified variables fall into the heading of questions regarding the participant's demographic category. Both the gender and the current age range of each of the participants needs to be known in order to compare and contrast the differences between genders, and/or

generations. People can feel that the demographic category they belong to is sometimes more important than the information regarding the questionnaires topic that they are providing if they are asked such questions at the beginning of the questionnaire.

This can leave a participant feeling a sense of prejudice towards them before they even begin to answer the questionnaire and therefore possibly cause skews in the data collected. The easiest way to avoid this is to place the questions regarding the participant's demographics (gender and age) until the end of the questionnaire therefore giving the illusion that the information on the topic is more important than the information about them and that the demographics are simply for curiosity sake and are not providing fundamental information.

Questionnaire Prototype

When conducting a research project it is important to test the methods by which data gathering will occur, as without sufficient of correct data the research hypotheses proposed are invalid and pointless. Once all of the hypotheses to be included in the questionnaire had undergone a variable evaluation, the creation of the prototype questionnaire could begin. Overall thirteen of the fourteen variables identified will be taken into consideration when writing the questions.

Appendix One details three annotated images that together construct the prototype questionnaire that was created. The annotation of the questionnaire is there to represent which questions are representations of which hypotheses. The questions relating to hypothesis four were in relation to the old hypothesis before it was altered based on the research into Erik Erikson's Psychosocial Stages of Development.

Walkthrough Evaluation

Before releasing the final questionnaire design to the whole target audience, a prototype can be used to conduct a walkthrough evaluation with a possible participant to identify how long it will take people to complete the questionnaire and also if there are any issues regarding misunderstanding the wording etc...

The walkthrough was conducted with a male University student aged 20-25. Each numbered point is the discussion and/ or questions that were brought up between the test subject and me during the interactive walkthrough. The script of the walkthrough can been seen in appendix nine.

Alteration and Final Design

The results of the evaluation proved that there were issues with the prototype questionnaire; the problem that could cause the most issues is that of the time it took to complete the questionnaire. When creating the questionnaire on of the main aims was to keep it less than 15 questions in order to keep it appealing to complete to participants. Although the length of the questionnaire was taken into consideration during the prototype design, the time required to complete the questionnaire was however overlooked. In order to keep the completion of the questionnaire under 7-8 minutes instead of 21 minutes, all of the questions regarding Dunbar's Number were removed.

The question of "Lost or destroyed mobile phone contacts would greatly hinder your current social lifestyle" needed to be altered slightly to read "disrupt" instead of "greatly hinder" as greatly hinder could subconsciously skew the results as It may not have as a severe effect that it will greatly hinder a person's lifestyle however its likely to disrupt it. Also the extra option of "none of the above"

needed to be added to the question regarding social media websites, as currently there are only three options regarding different types of social media sites and nothing for participants who do not have any accounts. Without changing this question the participants who had no social media accounts would have to leave it blank and this would result in the questionnaire being rejected as it would have been incomplete and therefore not taking in account during the analysis phase.

Due to the alteration to hypothesis four some of the questions were altered in order to collect the relevant data to the new hypothesis. The variables discussed in "Hypothesis Four –Variable Evaluation" are correct to the altered hypothesis and therefore they formed the basis for the new questions. The altered questionnaire is available in appendix two with annotations next to the questions to show which of the hypotheses the question relates too.

Separation of Dunbar's Number

As all of the variables linked the hypothesis one which in turn is linked to the theory of Dunbar's Number are no longer included in the questionnaire, a new way to retrieve the relevant data had to be created. A simple table that could be used in collaboration with the questionnaire in situations where the participant had more time and would be willingly to partake in a longer study. The four questions that were removed from the questionnaire are in the table as well as other questions regarding duplicate phone numbers, and service phone numbers. Through the exploration of duplicate phone numbers it allows conclusions to be drawn regarding an altered Dunbar's Number, and also regarding whom the duplicate numbers belong to whether they are kin, friends or acquaintances.

The rough prediction is that the majority of the duplicates held in a person's mobile phone contact list will belong to kin, with the remainder belonging to friends of the person. More often than not the contacts will not belong to any acquaintances under the theory that you would invest less time into the relationship with an acquaintance than with kin or friends and would need/ want to contact them less and therefore would hold less ways of contacting them. By combining the study of the amount of numbers held that are related to services and the amount of duplicate numbers in a person's contact list we can establish the amount of ACTUAL people that participants hold connections with through their mobile phone contacts. A copy of the Dunbar's Number Table design is available in appendix three.

Research Experiments

To collect relevant data in relation to Hypothesis One the use of a questionnaire would be inappropriate as although participant involvement is key to the data collection, a questionnaire would not represent the data correctly. This is where the idea of research experiments developed, as the initial idea was to conduct a set of focus groups however they are mainly discussion based, and in order to collect reliable, and un-bias data anonymity was a major factor to consider.

Each participant would be given two pre-drawn templates and asked to complete the diagrams using coloured dot stickers to represent other people that they contact through their phone on the one diagram, and people they believe they hold relationships with on the other. Three different coloured dots will be used for both of the diagrams to represent which sticker represents kin, friends, or acquaintances. This should hopefully allow a connection to be made based upon the fact that a more frequent relationship does not necessarily mean a relationship of better quality.

Social Support Network Diagram

The template that would be used for the participant to model their social support network structure upon consists of four blank rings, and there are guidelines to accompany the template to inform the participant of the rules regarding who to place in each ring. According to Robin Dunbar's research notes that generally peoples relationship circles will progress in three's.[1] This means that the number in the previous circle should be three times larger in the following circles as the circles move outwards. The intimacy and quality of a relationship will also decreases the further out in the circles someone is placed.

The guidelines that are provided to the participant have been adapted from the research of Robin Dunbar[1] in relation to who should be placed in each circle. The inner most circle should have the people placed within it of whom you would automatically go to in a time of trouble for perhaps comfort, advice, or maybe even a loan of money. Moving outward the next circle is called the "Sympathy Circle" and this consists of people who if they were to die tomorrow it would leave you distraught, and affect your life for a prolonged period of time.

The third circle is then for relationships that are still considered as intimate but perhaps less frequent, and the outmost circle is where you would expect to find the people with the lowest emotional intimacy and possibly the least frequent relationships. The guidelines were provided so the participant would have little to no queries regarding the task. A definition of a friend and an acquaintance was essentially as everyone has their own interpretation of what each means so there was a need to standardise it. Also participants were reminded not to feel pressurised to place certain people where they *believe they should be placed based on social pressures* and to place them *where they felt they belonged in terms of their relationship with them.* The diagram and the guidelines are available in appendix four for further explanation of the process.

Social Network via Mobile Phone

Unlike the Social Support Structure Diagram the Social Network Template consists of five different rings and they are determined by the frequency of contact through the mobile phone to each contact. Service numbers such as hairdresser, and dentists etc… are all excluded from the diagram it is simply refers to social relationships. The contact has to be through either texting or calling a contact from a mobile phone and does not include the use of social media contact through your phone. Robin Dunbar[1] suggests that there are three main circles of difference regarding contact and they are; every 3-5 days, monthly, and yearly.

On the social network guidelines given out accompanying the template there are five groups that the participant can place contacts into, this is an extension of Dunbar's research as a daily, and 6 monthly contact options were added. The participant would also be asked to place a mark on any of the circles where their contact that person via a text message more than they ring them. Also on the guidelines it has been stated that it doesn't matter how you ring or text someone, whether you use a mobile network or an internet connection, they still class as either a phone call or a text message. Again friend and acquaintance are defined to avoid any misinterpretation. The guidelines and the template are available in appendix five.

Implementation

For each of the different data collection methodologies a slightly different approach towards implementation needed to be developed, although the same sample of people was used to randomly select participants for both methods. Incentives were used throughout the process of data collection, with the main incentive used in both circumstances of collection was the promise of anonymity. As data is being collected from multiple different people it is a necessity that all of the data is protected in compliance with the Data Protection Act 1998.

Data Protection

A Data Protection Act Compliance document was submitted to Nick Avis for review before any of the data was collected and stored. There are two different aspects to the document; one being how data from the questionnaires will be treated and then the data from the research experiments. The data that is collected through the distributed questionnaires will be treated as generalised data and guidelines of how I will deal with this are stated in the document which is available in appendix Seven A. Guidelines include:

- Encrypting all of the documents that contain the data either in raw or collated forms.
- Passwords protect the laptop and the USB Drive that the data is stored upon and do not share the password with others.
- Never save the data on a public computer in order to reduce the risk of theft, unauthorised alteration and/or destruction of data.

The data from the research experiments will also be subject to the same guidelines however there is a subtle difference in the type of data and therefore further actions need to be taken. Once the data from the questionnaires has been collated into the correct clusters and combined overall the individual questionnaires will be destroyed and therefore the data will only temporarily be stored as data that could possibly be related to an individual. As the diagrams created through the research experiments need to be kept as individual pieces of data in order for them to be compared and contrasted against other individuals diagrams.

As this data could be classed as identifiable to a degree to a certain individual a Data Protection Contract was created for research participants to sign in advance of completing the diagrams. The contract can be seen in appendix Seven B. The contract states that any data that will be collected throughout the project will remain anonymous and will be stored in a safe and secure environment, and at all times will be handled in accordance to the Data Protection Act 1998.

Demographic Groups

For obvious reasons the demographic categories that I have chosen consist of people that are closely related to my life which introduces bias into the data that will be collected. Through the use of an online Random set and list generator the bias was reduced; this will be discussed further later.

The demographic groups that were chosen to take part in the research are:

- Third Year Information Systems and Computer Science Students at Cardiff University.
- Staff within the Newport branch of BHS.
- Selected close friends and immediate family.
- COMSC Department staff at Cardiff University.

The above demographics will act as clusters, in order to use the method of cluster sampling. Cluster sampling is a refined random sampling method, where clusters are defined and then random members of the clusters are chosen to partake in the data collection activities. The demographic groups were selected as there is a higher chance of me getting complete responses that could be used for data analysis from people that know me, as I would hope they would want to assist me and understand the benefits of their involvement to my project. The other option that I considered using was to draw a representative sample, which means that every member of the population has an equal chance of being selected to participant, however there are large costs incurred using this methodology in regards to contacting time, geographic capabilities, and also financial costs.

When considering the size of the overall sample there are two other main issues regarding the data that is needed that need to be contemplated. Firstly there are the statistical considerations such as the accuracy of the data collected and the problems regarding statistical significance. On the scale of the current project statistical consideration is more of an added benefit than a necessity. Obviously if a study is being accredited by formal institutions and will be used to base further studies upon one of the main issues regarding the data would be the accuracy and statistical significance.

Secondly the amount of proposed comparisons that are going to be made using the data once it has been categorised into sub groups is an issue that needs to be considered. The more sub group comparisons that need to be made the larger the sample size needs to be. With the data that will be collected during the project comparisons between gender and age will be made.

The demographic group of: Third Year Information Systems and Computer Science Students at Cardiff University, contains a ratio of around six boys to every one girl and therefore the cluster is heavily bias towards male participants. To balance the ratio of the entire sample the demographic group of BHS Newport staff were chosen as the ratio of male to female is roughly one male to every 7 females, and although the cluster size of the BHS Newport staff is less than that of Third Year Information Systems and Computer Science Students at Cardiff University it helps the chances of randomly choosing a male or a female from the overall sample to participate in the questionnaire or experiments slightly more even.

Random Generator

Using an online facility that randomly choses members of the cluster from a predefined list removes some of the bias revolving around the demographic groups chosen. Firstly the amount of sets needed and the number of digits in each set is defined and the generator outputs the sets. Once the sets have been generated the page was printed out as every time that you return to the page the set would have random re-generated.

In order to randomize the list containing all of the names within the cluster before applying the set digits to them, another online function will be used that randomly re-arranges the list into a random order and then outputs it. Again the list needs to be printed so that it can be matched up to the set digits before it re-generates another random list. If the lists were not printed out and every time new participants were needed the process was carried out again it could lead to the same name being chosen multiple times and making the process longer. (Screenshots of the random set and list generation are available in appendix six)

Questionnaire Implementation (Including Extended Dunbar's Number Table)

The questionnaire will be created through an online website called SurveyShaker, the website allows the account holder to distribute any questionnaire on their account to 100 people through email addresses. However only twenty of the response can be exported and any additional responses would need to be manually copied from the website to an Excel Spreadsheet. Also only twenty of the questionnaires will be included in the online data analysis tool, the charts that would be automatically generated would not be of the whole sample and therefore conclusions could not be drawn from them.

Although the questionnaire was created through the online questionnaire website, the chosen method of distribution was by hand to each participant, because of the disadvantages that are associated with SurveyShaker. There are a range of reasons for choosing this method over online distribution through email and the main one is that it allows me to be able to gage whether or not the participant may complete the Dunbar's Number Table also based on time they may have spare.

When the questionnaires were distributed I stayed with them as I predicted they should only take around 5-8 minutes maximum to complete. I found that people were more enthusiastic about filling in the questionnaire once I provided a short disclosure of what the data will be used for and how it will be kept anonymous and secure at all times. They did not have to sign the Data Protection Contract however I found that offering a complete disclosure of my intentions for the data they worked like an incentive for participants. Also being present allowed people to ask any questions that they may have regarding the questionnaire wording or the meaning of particular questions.

Through staying with each of the individuals whilst they completing the extended questionnaire (Table for Dunbar's Number) it allowed me to ensure they did not simply guess the answers and they actually use their mobile phone contacts It became evident through the walkthrough evaluation of the prototype questionnaire that the effect involved in counting and evaluating all of your mobile phone contacts can encourage participants to "guesstimate" rather than provide correct answers.

Once the questionnaire had been filled in, I entered it into an Excel Spreadsheet to make sure that the data was not lost. Firstly the data was entered into a separate spreadsheet according to the cluster that it belonged to, and then entered into a spreadsheet that would be used to collate all of the data from the sample. After the questionnaires data had been extracted and placed into Excel the original questionnaire was destroyed in order to comply with the Data Protection Act Compliance Plan that had been submitted. From the overall and the cluster based spreadsheets charts and graphs can be made to allow for easy comparisons and conclusions to be made regarding the proposed hypotheses. More will be discussed on the creation of the comparisons in the Results and Evaluation Section of the report.

Research Experiments Implementation

Research Experiments were used in order to collected data from participants to validate hypothesis one. The research experiments were carried out in individual instances and therefore hold little resemblance to a focus group as generally this includes multiple people in one meeting discussing their results. The research experiments were carried out in a controlled environment in an attempt to standardise the experience and remove distractions for the participant.

The fact that each of the participants completed the diagrams though individual consultations with myself it introduced an element of added security for the participant and allowed them to feel more comfortable in themselves to place people where they truly should be and not where society pressures them to place certain figures. No one, including myself could see the diagrams that were being created in order to reduce interference and bias from others and associations of diagrams to people from myself.

There could be no contact with other people during the experiment, as seeing someone or having a conversation with another could cause the participant to remember people through associations with the people that they are communicating with, and therefore the results produced would not be true to them as individuals. Also I had to be present whilst the experiment was carried out to make sure that the participant carried out the social support structure diagram before the social network via their mobile phone diagram. This again relates to the fact that if someone carried out the diagram where they have to examine their mobile phone contacts first, then there may be people in their contacts list that they had forgotten about and therefore wouldn't have placed on the diagram of their social support network as they wouldn't have remembered them. It will cause un-meaningful relationships to be added into the social support diagram.

At the beginning of the experiment I read the guidelines to the participants to make sure that they understood exactly what was being asked of them, and then I briefly explained what the data would be used for. Once this had been explained each of the research experiment participants were asked to sign the Data Protection Contract if they felt comfortable carrying on with the experiment. The participants were then asked to quietly read over the guidelines once more to allow them to take them in fully as some people cannot learn how to do something simply from listening to instructions they need to re-read them to take them in fully. I found the guidelines were relied upon heavily during the experiments as a reference for the participant to reassure themselves that what they were doing was correct.

There were incentives put in place to ensure that the participants felt comfortable that the data that they were proceed to submit would be confidential and not traceable back to themselves.

Firstly there was the fact that no names or associated relationships were involved with experiment. When the participant is asked to identify the relationship of the each person they place on the diagram is simply the type of relationship such as kin, friend, or acquaintance and not mum, dad, close friend. The use of the coloured stickers allowed the participants the freedom to place people where they feel they should be placed without fear of judgement from myself, as there is no way of my knowing which family members are on the very outer circle, I just simply know that they are family of some kind. Also the stickers mean that there is no handwriting to recognise and therefore again reassuring people that the diagrams will not be identifiable as their own.

Each participant was given an envelope at the beginning of the experiment and asked to place the completed diagrams back to back in the envelope at the end of the experiment and seal it over. There are two reasons why this was carried out, the first reason is to remind the participant of the high level of anonymity and the second was to ensure the stickers did not rub off onto someone else diagram and contaminate the results. I did not open the envelopes after each of the experiments as I could then associate the diagram to each participant, instead I waited until all of the diagrams had been completed and collected and then once shuffled I open them all at the same time, removing

any potential assumptions I may make about the diagrams based on the knowledge I hold about each participant.

Results

Each of the hypotheses that have been proposed as the basis of this research project requires different results from the data collection to validate them as either true or false. In this section each of the hypotheses will be explored separately to understand what the related data is showing in regards to comparisons between variables found in the data. Once the suitable data for each hypothesis has been analysed and compared against each other, it can then be decided if the hypotheses proposed are to be proven or disproven.

Hypothesis One

Hypothesis one revolves around the disillusion of people to believe that frequent contact is the only factor that increases the strength and meaningfulness of a relationship, hence the belief that the more you contact a person through your mobile phone the stronger the relationship between yourself and that person must be. This is wrong to a degree as although the belief that contact is necessary to uphold a strong relationship is does not necessarily mean that the contact through your mobile phone will represent you social support network correctly.
The original hypothesis is as follows:

"The social network mapped out through the use of your mobile phone contacts does not reflect your true social network support system"

All of the data that was collected through the research experiments was used to substantiate hypothesis one. Six research experiments were carried on a selection of people that were again selected randomly using the online set generator. Although six is a relatively low number of respondents to base reliable conclusions upon there are patterns within the data that relate to the hypothesis and the background theories that the hypothesis is based upon in abstract ways.

Social Support Structure Diagram Results

Firstly whilst examining the diagrams that depict the participants social support structure it is obvious that the average number of relationships that are placed on each of the rings increases the further out the circle is on the diagram. The average figures for each of the rings are shown in the Figure One. Research carried out by Robin Dunbar suggests that the amount of people in each circle should increase by a multiple of three each time the circles move further outward. The data that has been collected does support the theory that the amount of relationships held increases and the intensity of the relationships decreases however only the first two rings support the theory of multiplying each time by three. The two outermost rings are too close to support the theory of multiples of three, but this could have been caused by an anomaly in the data as one of the diagrams only has ten relationships in the outermost circle whereas the average of the other participants is 44. The table containing all of the data relating to the social support structure diagrams can been seen in appendix eight.

Circles	Average Total
First	9
Second	22
Third	32
Fourth	39

Figure One – Average Number of relationships placed in each of the circles on the social support network diagram.

Figure Two – Average number of acquaintances placed in each of the circles on the social support diagram

Circles	Average Total
First	0
Second	0
Third	7
Fourth	25

Another interesting theme that can be seen throughout the diagrams is that of acquaintances only becoming noticeably present in the outer two circles. These diagrams tie nicely back to the fact that in order to uphold a meaningful relationship there needs to be a higher amount of time invested along with other factors to maintain it. All of the averages shown in Figure Two are rounded to the nearest whole number. By showing these figures it can be seen that there is over a forty times as many acquaintances in the third circle than the second, and over three and a half times as many in the fourth than in the third.

In an ideal situation acquaintance do belong in the outermost rings of the diagram, as by definition an acquaintance is someone whose company is a momentary convenience and therefore a lot of optional time would not have been invested into the relationship. It is more of a knowledge of someone enough so that you could greet them pleasantly and exchange in topical conversation without awkwardness. The data that has been gathered supports the notion that time is a necessary component regarding the strength of a person relationship with another.

Lastly on average in the third and fourth circle moving outward the amount of kin increases and the amount of friend's decreases. In the third circle of the diagram the average number of kin is 11 and the average number of friends is 15, showing that there are more friends placed within the circle than kin. In the last circle on the diagram there is an average number of kin of 9 and the average number of friends is 5. I believe this is down the aspect of distant family, as family members no matter how often you see them or communicate with them they will always technically remain as kin. Whereas if you do not see or communicate to a friend often or even at all then they could fall under the acquaintance category instead, as once a friend does not always make you a friend.

The average social support structure based upon the above findings would consist of 103 overall relationships, 33 of which would be kin, 38 would be friends and finally 32 would be acquaintances. A diagram depicting the average social support structure figures can be seen in reference ten and the total number of each circle can be seen in figure one.

Social Network via Mobile Phone Contacts Diagram Results

One of the main focuses of the creation of the social network through a participant's mobile phone book diagram is to analyses the way in which different types of contacts (based on relationship type) are contacted. The first significant difference that can be seen in the type of contact within the results is that of the preference of texting over making a phone call to another person. I believe that a phone call shows more intimacy than a text message as there the contact is being instigated on a more personal level, also there is less effort needed to show interest in a conversation and keep the flow of the communication going when texting.

The data collected shows that a person is more likely to text an acquaintance or friend than call them and are more likely to call a family member than send them a text message. On average however the preference to sending a text message still surpasses the preference of making a phone call. Below are the percentages for each category of relationship (Kin, Friend, and Acquaintance) in regards to the method of communication.

***43%** of kin within a participant's contact list would be contacted via a phone call.*
***52%** of kin within a participant's contact list would be contacted via text messaging.*

***24%** of friends within a participant's contact list would be contacted via a phone call.*
***76%** of friends within a participant's contact list would be contacted via text messaging.*

***40%** of acquaintances within a participant's contact list would be contacted via a phone call.*
***60%** of acquaintances within a participant's contact list would be contacted via text messaging.*

There are two issues with the data above that were caused by anomalies on one of the diagrams produced. One of the participants went against the trend and said that they would ring 31 contacts in their phone book that were classed as acquaintances whereas the other participants listed an average of 4. If the anomaly was to be changed to 4 to match the average trend the % of acquaintances contacted via phone call would drop to 15% which would fit the trend of a reduction in a preference to phone calls the less intimate the relationship is.

The other anomaly was caused by two different diagrams in regards to the amount of acquaintances the participant would contact via a text message. One of the diagrams showed that the participant never uses the function of texting and therefore all the categories equalled 0, whereas the other diagram stated that the participant would only consider texting one acquaintance. This again goes against the trend as the other diagrams have an average of 16. Therefore if the 2 anomalies were changed to 10 and 16 the % of acquaintances contacted through texting would equal 75% and better represent the trend.

If an average number of contacts that were held in a participants phone book equalled 75 then 66% of the contacts stored would be contacted through the use of text messages more than a phone call, and 34% would be contacted through a phone call instead of a text message. This shows that as the main form of communication through a mobile phone texting is almost twice as popular as making a call.

The average number of contacts within a participants mobile phone is 72 of which 16 phone numbers would belong to kin, 37 phone numbers would belong to friends, and 20 phone numbers would belong to acquaintances. As seen in Figure Three.

							Average
Total Contacts	115	40	19	62	93	101	72
Total Kin Contacts	30	7	10	28	9	9	16
Total Friends Contacts	6	53	21	36	31	73	37
Total Acquaintances Contacts	4	39	12	29	21	12	20

Figure Three- Shows the demographics of contacts for each participant and then as a group average.

The split of above average number of contacts within the social network diagram would be as follows in Figure Four. A diagram displaying the average expected split of relationship types over the five time periods is available for reference in appendix eleven.

Circle	Kin	Friend	Acquaintance	Total
1	4	3	0	7
2	3	9	1	13
3	4	10	2	16
4	4	9	3	16
5	2	3	15	20

Figure Four – Average number of each relationship type placed within each ring on the diagram.

Comparing and Contrasting Diagrams

In order to understand whether or not the data from the research experiments has proved or disproved the given hypothesis, the two sets of data collected from the different diagrams needs to be analysed against each other, in an attempt to spot correlations or contrasts in the trends. The main aim of the hypothesis is to prove that the social support structure that you rely upon regardless of the amount of contact that you have with the people within is misrepresented through the amount of contact through a mobile phone.

Opposing the hypothesis that the Social Network via Mobile Phone Contacts diagram would not correctly represent participants actual support structure the data surrounding the amount of contacts between the participant and acquaintances and family member is re-enforced by the structure of the social network diagram, as acquaintances are contacted less and family are contacted more regularly.

On average between the options of daily to monthly contact only three acquaintances are contacted on average as opposed to eleven family members. In comparison the amount of acquaintances between the options of 6-montly to yearly contacted is at an average of eighteen and family members being at a lower average of seven. This shows that frequent contact is needed to result in a more meaningful relationship as acquaintances are the least meaningful of relationships and they are contacted the least frequently.

The diagrams contrast in terms of the split of the overall number of relationships stated on the diagrams into the separate categories. There is a higher percentage of kin placed on the support structure diagram than the diagram concerning a person's mobile phone contacts, yet the support

diagram also has a higher percentage regarding the number of acquaintances present. A difference of 8% was present between the amount of family members that a person could name to place on their support diagram and the amount of contacts that are held belonging to a member of family. Considering the number of acquaintances present is 3% higher when people were asked to recall associations from memory and not using their phone, this could indicate that people are holding on to a higher number of less important (borderline un-meaningful) relationships in their memory than through their phone contacts, essentially disproving the hypothesis. Figures Five A&B show the division in fraction and percentage forms of the types of relationships present on both of the diagrams created.

Type of Relationship	Fraction	Percentage
Kin	33/103	32%
Friend	38/103	37%
Acquaintance	32/103	31%

Figure Five A – Fractional division and associated percentage of relationships present on the average support structure diagram.

Type of Relationship	Fraction	Percentage
Kin	18/77	24%
Friend	37/77	48%
Acquaintance	22/77	28%

Figure Five B - Fractional division and associated percentage of relationships present on the average social network via mobile phone contacts diagram.

Hypothesis Two

Hypothesis two is firmly based around the research of Robin Dunbar and how to calculate a person's Dunbar's Number based on their mobile phone contacts. When calculating Dunbar's number there is a consideration for all of the relationships that you currently hold where no current social context is apparent, in real terms those relationships would represent people who you no longer hold a meaningful relationship with. I proposed that the data I would discover based around participant's mobile phone contact list would hold a high number of contacts where no current social contact is apparent. The original hypothesis is as follows:

"Mobile phone contacts allow you to hold more un-meaningful relationships than usual through old contacts"

All of the data that was collected through the use of the extension to the question (shown in appendix three) was analyzed and outputted to valid this hypothesis. Fifteen participant's covering a range of demographics completed the extended questionnaire, and again although fifteen is a relatively low number it was achievable against time constraints that were present during this project.

Average Number of Contacts	General Sense	No Social Context	Re-Introduced
73	19	13	4

Figure Six – Averages for Dunbar's Number Calculations.

The averages numbers shown in figure six above are representing all of the data that was collected regarding the calculation of a participants Dunbar's Number. Following the equation previously stated in the design phase of the report on average a person's mobile phone contacts would produce a Dunbar's Number of 45. This is hugely disproportionate to the true figure as Robin Dunbars research states anyone person can hold up to 150 relationships and this figures seems remarkably small. For example if you attend a well-populated university and also hold a part time job in a retail setting then there are going to be at least 40+ relationships present in those scenarios combined. The spreadsheet containing all of the data can be seen in reference to appendix twelve.

The amount of contacts within a persons contact list does not correlate with how many "Actual People" they hold phone numbers for. There are cases where one number can represent two people that could possibly be contacted for example: *Mum and Dad Home.* Although this is counted as one phone contact it actually represents two individuals, also the reverse of this is holding multiple numbers for only one person such as: *Jane Home, Jane Mobile, Jane Work,* counted as three numbers representing one person. On average 85% of the total number of contacts in a phone are linked to actual people based on the removal of duplicates and service number and introducing extra people when a number relates to more than one person. Figure Seven below shows all of the data held relating to overall number of contacts and the number of actual people contactable for each of the participants.

Overall Phone Contacts	Number of Actual People	% of Actual People
54	44	**81%**
31	24	**77%**
72	65	**90%**
115	98	**85%**
50	49	**98%**
54	33	**61%**
40	35	**88%**
125	104	**83%**
88	70	**80%**
67	55	**82%**
28	22	**79%**
71	67	**94%**
52	47	**90%**
165	152	**92%**
89	74	**83%**

Figure Seven

In relation to the number of actual people that are represented through a person's mobile contacts, the discrepancies between that figure and the calculated Dunbar's Number can be easily seen. Once again the number calculated based on Dunbar's rules of relationships is incorrect to a person's "real life" situation when calculated solely using their mobile phone contacts. The average Dunbar's Number (as figured out above) is 45, yet the average number of actual people represented through a persons contact list is 63, which is a discrepancy of 18 people unaccounted for. This in turn allows the conclusion to be drawn that simply by calculating a persons Dunbar's Number using mobile phone contacts it can become evident that even though there are 63 actual people in a an averages persons contact list they would only class 45 of those people as meaningful relationships. Therefore a mobile does allow you to hold on to a high percentage to relationships that have become un-meaningful. Figure Eight below shows the data collected regarding this conclusion.

Calculated Dunbar's Number	Actual People
43	44
29	24
54	65
72	98
40	49
16	33
15	35
35	104
53	70
43	55
21	22
54	67
42	47
95	152
64	74

Figure Eight – Shows the connection between the number of actual people represented in a mobile phone contact list and the calculated Dunbar's Number the same list.

Multiple mobile phone numbers are an aspect that can increase the ability to communicate with someone, but also at the same time can hinder communication through the storage of previous and now unused mobile numbers for a single person. The results discovered connected to the theme of multiple numbers supports the idea that the closer the relationships of a contact the more likely it is that multiple number will be stored for them. A person is more likely to hold multiple numbers for a family member than for either a friend or an acquaintance combined.

Number of People Where Multiple Numbers Are Held	Kin	Friend	Acquaintance
4	3	1	0
3	3	0	0
4	4	0	0
10	5	4	1
4	3	1	0
12	8	4	0
6	3	2	1
16	9	6	1
11	8	2	1

	7	6	1	0
	1	1	0	0
	4	3	1	0
	4	4	0	0
	16	13	3	0
	8	6	2	0

When there are multiple numbers present (based on each of the averages being rounded to the nearest integer approximately) 71% of the time the numbers will belong to a person that holds a relationship of kin with the participant in question, 29% of the time the numbers will belong to a person who holds a friendship with the participant. The reason the % of multiple number is 0 for acquaintances is when the averages were calculated it equalled 0.16 and therefore rounded to the nearest number is 0%.

This could lead to the conclusion that as the more time invested in a relationship leads to a higher quality and intensity of relationship, then it could be argued the more ways in which a person can contact another person the higher their levels of communication could be and therefore the higher the potential for a better quality of relationship.

Hypothesis Three

Hypothesis three was created to explore any possible links between the generation a person grew up in and their successive reliance on their mobile phones to communicate and maintain relationships. A series of statements were used against a choice of responses in the form of the Likeard Scale of Strongly Agree – Strongly Disagree.

The first important factor to consider when looking at the differences in generations is the age of which a person received their first phone. As if the phone was received at a younger age then as the child develops through Eriksons Psychosocial Stages they will associate communication through a mobile phone as the norm. The data collected regarding the participants current age and the age they received their first mobile phone is displayed in the table below.

Current Age	9-13	14-19	20-25	25-35	35-50	50+
14-19	3	0	0	0	0	0
20-25	17	9	0	0	0	0
25-35	1	4	2	1	0	0
35-50	0	1	1	11	2	0
50+	0	0	0	2	7	4

The data shows that the younger (14-19 and 20-25) age groups received their first mobile around the age of 9-13, with a staggering 20 out of 29 responses choosing 9-13. At this age children are at the end of the Primary School years and beginning to move into High School education. Between the ages of 6-12 the idea of peer acceptance becomes apparent in a child' social life, the idea of having to win approval of your peers becomes more evident during this stage and it is at this stage where a child will begin to development their own sense of appropriate communication methods in order to best achieve said acceptance.

In contrast the older the age group you currently fall into the more likely it is that you received you first mobile phone after the age of 25, and have therefore already matured through the development stages where you establish communication channels to have a successful social life and a phone will act as an extension of these channel and will not represent the channels themselves.

Another factor that will differ between generations is that of the reliance on a mobile phone to uphold the same level of contact and the quality of any given relationship through texting or calling them. Based on the background research discussing Erik Erikson's Psychosocial Development Stages I assumed that the data that would be produced would show that younger age groups rely heavily on their mobile phones to maintain relationships as there's a subliminal need through the ubiquity of mobile phones to be in constant contact with other people. As shown in the previous table as children are gaining the ability to contact through a mobile phone at such a young age their dependence on the technology is higher than older generations as they have not had chance to develop other methods of effective communication. The table below shows the answers given in terms of the Likeard Scale, to show which of the generations most needs their phone to maintain the quality of the relationship and the communication level.

Likeard Scale	14-19	20-25	25-35	35-50	50+	Overall
Strongly Agree	0	0	1	4	6	11
Agree	2	2	2	6	4	16
Neither Agree or Disagree	0	1	1	0	1	3
Disagree	1	8	4	4	1	18
Strongly Disagree	0	15	1	0	0	16

The age group of 20-25 year olds seem to disagree most with the statement, proving that they would not be able to maintain their relationships without the use of a mobile and therefore rely on the phone heavily for communication. As out of the 26 participants aged 20-25, a vast majority of 23 answered with either disagree or strongly disagree and only 2 agreed and one felt impartial towards the statement.

This differed from the majority opinion collated from the responses of the older generations, as out of the 26 people that responded with an age between 35 and 50+ an overwhelming 20 either strongly agreed or agreed with the statement.

The reliance on a mobile phone to a participant can be seen through the data collected regarding the statement "Contact through a mobile phone greatly improves your ability to maintain relationships" as this is no longer looking at maintaining their current ways of socialising but instead it's about a participants inability to maintain relationships without their mobile phone to aid them.

In the table below is the data relating to the response given to the above statement question.

Likeard Scale	14-19	20-25	25-35	35-50	50+	Overall
Strongly Agree	1	19	1	1	2	24
Agree	1	7	4	4	2	18
Neither Agree or Disagree	0	0	2	5	4	11
Disagree	0	0	1	4	2	7
Strongly Disagree	0	0	0	1	3	4

Younger age groups again are heavily reliant on their mobile phones as their main channel of communication and socialising with others, therefore it does greatly improve their ability to maintain relationships. Referring to the previous table of results a heavy proportion of the age group of 20-25 disagreed with the statement of "You could easily hold the same level of contact and maintain the quality of current social relationships without a mobile phone" so there should be a heavy proportion of the 20-25 age group agree with the statement related to this table of results as its talking about the use of mobile phones to communicate in a positive light. The results do correlate as the all of the 26 respondents within the age group either agreed or strongly agreed with the statement.

Whereas the older age groups disagreed with the statement as 10 out of 15 of the respondents from the 35-50 age group and 9 out of the 13 respondents from the 50+ age range all disagreed with the statement. Again correlating with the fact that 20 out of the 26 (Combined age ranges) of all the respondents within the age range 35-50+ agreed with the previous statement.

The final statement that participants were asked to express an opinion on was "Lost or destroyed mobile phone contacts would disrupt you current social lifestyle". Looking now longer at relationships in general as these could relate to contacting anyone and now focusing specifically on the effect a loss of contacts would have the respondent's social standing and their lifestyle.

The younger generation grew up in a society where technological developments have become less fundamental and more to do with the latest advancement of a pre -existing technology which is widely available to the public, or the launch of a new type of social networking website. While the older generations would have grown up in a society where communication technology was still seen as a scientific marvel and not a convenience to assist everyday communication.

The table below shows the response of the different age groups to the statement "Lost or destroyed mobile phone contacts would disrupt you current social lifestyle".

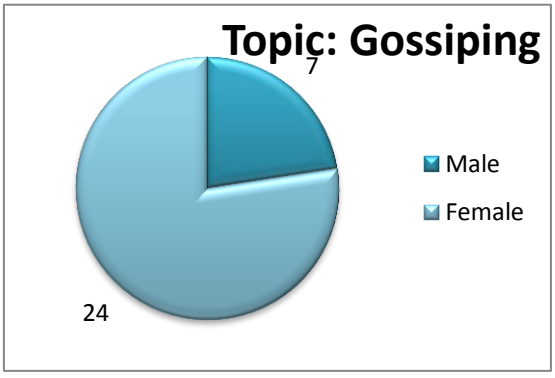
Likeard Scale	14-19	20-25	25-35	35-50	50+	Overall
Strongly Agree	0	12	0	0	3	15
Agree	0	11	3	4	4	24
Neither Agree or Disagree	1	3	0	1	1	6
Disagree	0	0	3	7	2	12
Strongly Disagree	0	0	1	3	3	7

The figures above strongly reiterate the conclusions previously drawn regarding the age of the participant and their reliance on their mobile phone to communicate socially. As out of the age group representing 20-25 year old respondents 23 out of a possible 26 agree that the loss or destruction of the phone contacts would disrupt their lifestyle, and as expected only 11 out of a possible 28 people from the combined age groups of 35-50+ stated it would cause them some disruption. Otherwise the remaining 17 respondents from the oldest two age groups disagree, and therefore believe their social life would carry on as normal, again referring back to the age that they received their first mobile phones in relation to their Psychosocial Development.

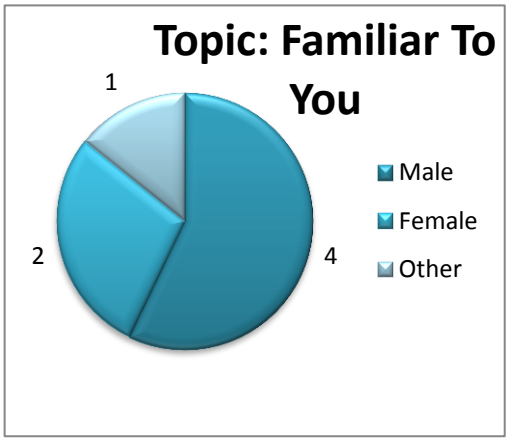
Hypothesis Four

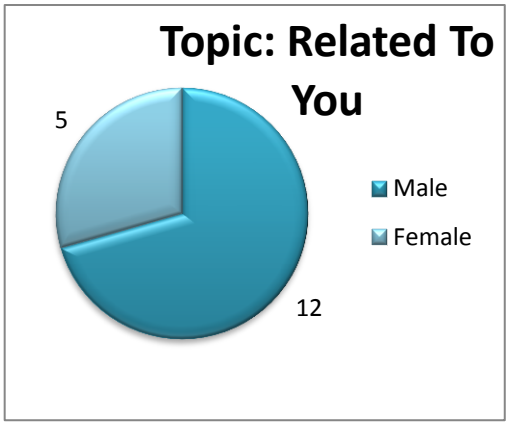
The final proposed hypothesis connects the gender of a participant to the preference of communication, and also the main topic which the communication is generally about. To verify the research carried out by Robin Dunbar there would have to be a preference towards "gossiping" as the main topic of conversation for women and preference towards either talking about themselves or a topic they are familiar with and able to flaunt knowledge about for men.

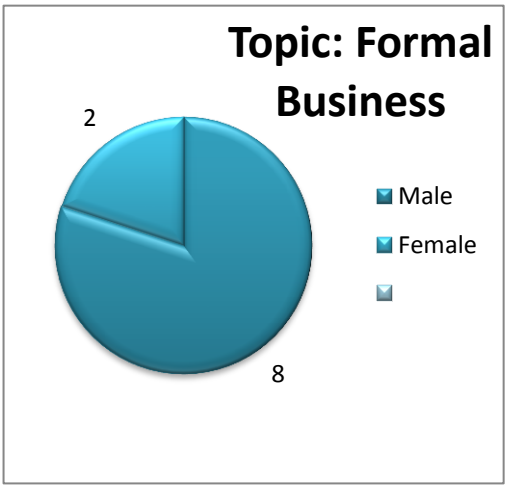
When analysing the relevant data it becomes obviously that there are differences in the genders when it comes to choosing a given topic. A total number of 31 participants chose the select "Gossiping as their main topic of discussion. Unsurprisingly in accordance with the background research carried out 24 out of the 31 were women and 7 out of the 31 were men, reinforcing the idea that women will gossip about others and men generally don't.



The choices of "A topic directly related to you" and "A topic you are familiar with" although they were analysed separately, they should both show more men opting for this choice and less women as the research suggests that a man will chose either of this options in accordance to the social situation to allow for the best form of "peacocking" himself. A combined result of 27 people chose to select either of the above topics and a resounding 20 of those respondents were men and only 7 women. This data reinforces the other side of Robin Dunbar's theory that women not only gossip but men parade themselves during conversations, showing that the two different sexes use the ability to communicate socially for different purposes.







The topic of "Formal Business" was introduced not in relation to either of the sexes in particular but more to give people who do not use their mobile phone for social means but to communicate in regards to business matters (i.e. a corporate contract phone) a via option to choose. The research shows that males tend to use their mobiles more for business matters than women, and linked with the data that women gossip more than men the conclusion could be drawn that women use their mobiles more than men to socialise and men harness a phone more as a business tool.

The number of participants that selected the different amount of time spent communicating options each day using a mobile phone overall and separately for males and females is shown in the table below.

Minutes Spent Communicating	Male	Female	Overall
0-10	13	9	23
10-20	2	2	4
20-40	4	10	14
40-60	6	5	11
60+	4	8	12

The data shows that both of the sexes on average communicate for less than 40 minutes each day through their mobile phones with 19/29 males choosing options upto and below 40 minutes, and 21/34 females choosing a option of 40 minutes or less. However there is a higher number of men that chose the option of 0-10 minutes as their under 40 minutes option and more women chose the high bound of the under 40 minutes options of 20-40 minutes each day. So although the majority of both genders prefer to use their mobile for less than 40 minutes each communicating women will reach the upper bound of the limit whilst men stay close to the lower bound.

The same theory is relevant to the participants that selected options above 40 minutes a day, females generally chose the highest option of 60+ and males chose the lowest or 40-60.

The amount of the above time spent talking about the participants preferred topic is shown below in terms of an average percentage for males and females, and then the amount of each chose the topic. Although more men chose the topic of formal business the below table shows that when

communicating women will spend more of their overall time each day talking about business (if that was their chosen topic) whereas mean will only spend a third of the same time discussing it.

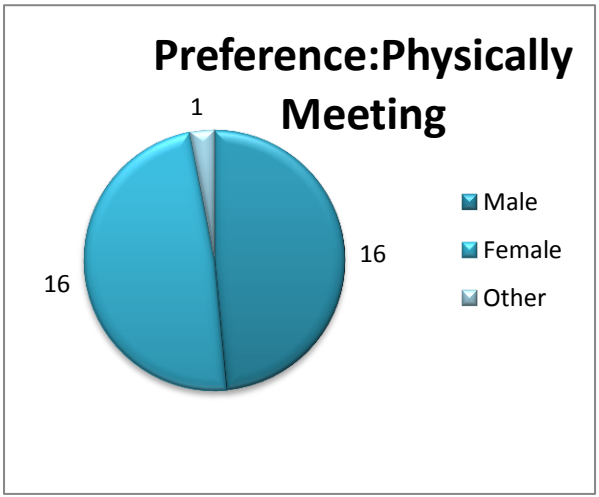
More than three times as many females chose “Gossiping” as their main topic of conversation when communicating with others, however the % of the amount of time spent each day discussing the chosen topic is higher for males when associated with gossiping that females. So although females may gossip more frequently than men, men will spend a greater percentage of their overall daily communications discussing gossip.

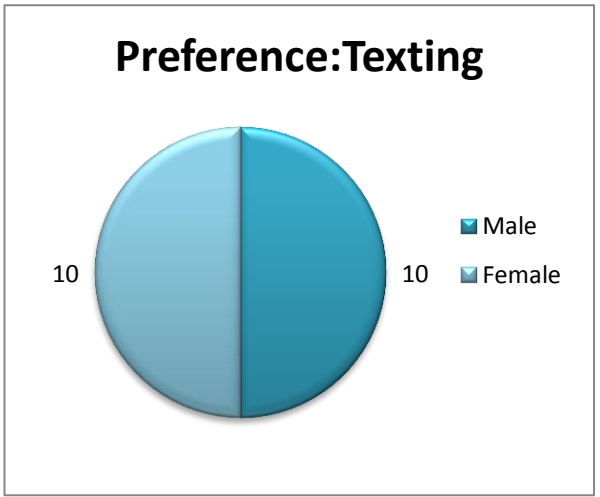
Twice as many men chose the option of “ A Familiar Topic” than women and also they will tend to spend twice as much of their daily communications via their mobile phones with others discussing the topic. Therefore positively reinforcing that males will not only lean towards choosing to flaunt their knowledge on a familiar topic more than women would but they also will spend a higher percentage of their overall daily communications discussing this topic. Men also stay true to the prediction regarding a topic of information “Related To You”. Fewer women chose this topic than men but they also generally would spend less of their time discussing it with others on a daily basis then a man seemingly would. Again validating the hypothesis that men are more likely to communicate about themselves or a topic they consider themselves well versed in.

Topic	Female	Male	Female vs. Male
Gossiping	44 %	59%	24 vs. 7
Related To You	44%	63%	5 vs. 10
Familiar To You	16%	40%	2 vs. 4
Business	99%	39%	2 vs. 8

When exploring the data collected regarding the preference of communication, the expectation was to find that women would generally choose to use their mobile to communicate more than men would. Based on the fact that above it was proven that women gossip more and men generally peacock which is more than likely to happen in person, in a social setting for example a pub where they can bounce off of other men’s statements and “one up them” by talking about themselves or flaunting knowledge.

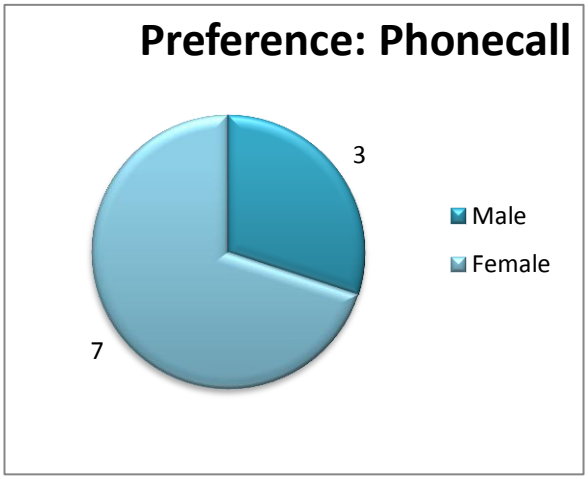
The data showed an interesting equal divide between male and female participants regarding a preference towards texting or physically meeting as the main means of communicating with others. Out of the 33 people that selected the option of “Physically Meeting” 16 male and 16 females were present in the results (One participant selected the gender option of other). Showing that there is no difference in opinion regarding the idea of communicating physically and not through a mobile phone. The same conclusion can be drawn from the use of text messaging as a form of





communication as out of the 20 people that selected the preference 10 were male and 10 were female, showing that the distance and convenience a text message provides is harnessed by the sexes equally.

There is however a distinct difference between the genders when it comes to making a phone calls. Ten people selected the option of preferring to make a phone call however only 3 of them were male and 7 were female. This could imply that a female prefers to use the phone in order to be able to instigate a conversation regarding gossiping or another topic at their convenience, ensuring that even though for some reason they cannot meet the other person they do not have to go without the communication. Also making a phone call is a more personal way of communication than sending a text message, which could imply that women hold more intimate relationships than men regarding friends and family. This would be a topic for progression in the future to see if the type of communication increases or decreases the intimacy of relationships.



Evaluation

Methodologies Used

The two methodologies used although they were not without their flaws worked well together to allow sufficient amounts of topical data to be collected. To enable a critical evaluation to be carried out on the methodologies both the positive and the negative factors surrounding each need to be identified.

Questionnaire

A benefit of using a questionnaire as a data collection methodology is the speed at which a participant can complete the task given to them. By making a questionnaire quick and accessible it will increase the response rate and also the amount of questionnaires that are returned complete, as people won't leave sections that they feel will take them too long to fill in blank. Another way of encouraging the uptake of a questionnaire is to hand them out personally, as I found people were more likely to answer the questionnaire if I asked them in person than the people that I sent an email too and emails are easy to forget about whereas someone standing in front of you is not. The final benefit that I experienced when using a questionnaire is that the results once collected were easy to collate and identify possible patterns or trends in the data.

As I distributed the questionnaires by hand a negative effect of this is the possibility of losing the questionnaire once they are returned to you. Obviously the solution to this is to distribute them online or through a specially designed program, however I would have then lost the benefit of the personal approach encouraging people to complete the questionnaire. The obvious other negative effect is that can be experienced through hand distribution of questionnaires is the fact that the process takes a lot longer than sending a mass email or even personalized emails to participants.

Research Experiments

The research experiments provided an in depth insight into the demographics of the participants mobile phone contacts instead of the simply knowing the numbers regarding the participants mobile phone contacts. For example being able to determine the relationship type of each of the contacts and the subsequent amount of contact that occurs tells me more than just the overall amount of contacts a participant has alone. The negative effect experienced by conducting the research experiments was that it was difficult to spot patterns in the diagrams that had been created as different people placed the dots provided in different places and therefore made comparing them extremely difficult. Also two different trio's of colours were used when carrying out the experiments and therefore distinguishing trends through colours was impossible.

Reliability of Data Collected

The data that was collected through the method of questionnaires is largely reliable as there were a large number of complete responses, from a wide range of different people with a spectrum of different demographic backgrounds. If a questionnaire was not completed correctly or there were blanks present in the data then they were not included for data analysis, this action improved the reliability of the data itself as there would be no null value to skew the averages of the data. There were only a very small proportion of incomplete questionnaires and those questionnaires were ones received through the online website method of collection. This I believe happened as I was not able to be present during the completion of the questionnaire to check that the data was correct and complete before the participant left.

Another way that the reliability of the data was ensured during the project was through the process of variable evaluation for each hypothesis as part of the design phase. This meant that the data collected was rich enough to be able to make a wide variety of complex connections and conclusions from instead of simple statistics of "75% of people agreed with the statement, and 25% disagreed".

The main pitfall regarding the reliability of the data concerns all of the data collected from the research experiments. Only six different participants took part in the experiments due to timings constraints of the experiments and therefore any anomalies that occurred within the data skewed the results more than normal as the results were within a small sample size.

Possible Improvements

The project as a whole was successful in terms of both the data collection methods and the subsequent data that the methods allowed conclusions to be drawn upon once it had been collected. I feel for the amount of time that I had to carry out the research and develop solid contrasts and comparisons the results achieved are in line with possible expectations. However there are two main alterations that I would make to the project if I were to carry it out again.

In order to gain more reliable data to make conclusions upon, it would be advantageous to conduct a high number of additional research experiments to substantiate hypothesis one. There were skews in the results collected during the project that were caused by a using a small sample size, as the smaller the sample size the larger the effect an anomaly can have on the average trends in the data. This would improve the reliability of the data collected hugely as it would increase the data spread and allow anomalies to become normalized before conclusions were drawn.

The second improvement that if I were to re-do the project I would carry out would be to collection information regarding the participants “Real” Dunbar’s Number and not just based on their mobile phone contact list. That way when the comparisons between the number that has been calculated from their mobile phone contact list and the figure that would represent their real life relationships there would be solid evidence to authenticate the hypothesis and not just assumptions about an average figure.

Future Work

There are aspects of potential research that have not been explored during this project due to time constraints that were to be expected. Due to these constraints there are a number of different suggestions to outline in this section of the report for progression into new opportunities for research in other directions.

When exploring the hypothesis regarding the perceived importance of a mobile phone as a form of communication based upon the opinions of different generations, the only aspects of communicating were text messaging and making a phone call. To further this research the exploration into the additional functionality that younger generations now demand when purchasing a mobile phone in order to facilitate additional methods of communicating with others. This could be through an online social networking account or simply over the Internet using an application for messaging or calling.

In order to establish the demand for functionality firstly the fact of whether people use these type of services regularly would need to be understood in order to see if this would be a viable path to research. This could be done through the use of a short survey asking if the participant has any online accounts that allow you to communicate with others through and whether or not they harness that option. Secondly it would be interesting to see by which means the participant prefers to communicate via whether it would be through a mobile phone, computer, iPad, etc…

Once the data regarding online accounts and preferred methods of communication had been establish the next step would be to begin to look into the actual desire for a mobile to have the additional features allowing enhanced communication or whether it is a simply a perk of a mobile phone that has been selected based on other criteria.

The aim once more would be to see if there was a difference in responses relating to the age groups of the respondents. I feel that as was the case for hypothesis four of the project generational perceptions towards how to harness technology to aid communication will be the contributing factor.

Another potential avenue of research that I have discovered through the analysis of the collected data is that there is a correlation between the topic that you mainly communicate about and the age group that you are currently within. Generally the data that was collected showed that the younger generations tended to choose the option of “Gossiping” more than the older generations as they mainly selected “Related to you” as their main topic. I believe that different generations have different opinions as to what classifies as gossiping, as having a general chat that mainly revolves around a topic based on yourself would more than likely be classed as “Gossiping” to a younger person whereas to a member of a later generation would more than likely see that as talking about

topics relating to themselves. The variables that would need to be identified for this would be the definition of what participant's class as "Gossiping", this could be done through providing a series of definitions for "Gossiping" and asking the participant to select which one they feel is correct.

The final idea for future progression is centered around the use of social media websites and the amount of friends that a person has on their profile. Robin Dunbar has discussed how the feature of a friends list on a social network site is used as more of a tool for competition than it is to keep in contact with genuine friends, family or acquaintances. It is becoming an opportunity to exhibit your wealth of connections and relationships to others, although in reality a majority of the people on the website account are people that are known through other people or people that you may have meant once and you do not even know enough about them to class them as an acquaintance.

An interesting study would include getting a single participant to evaluate all of their relationships held on their social networking websites in an attempt to calculate a figure representing the participants Dunbar's Number through their online account. This could then be compared against the actual known Dunbar's Number that has been calculated for the person to show just how many un-meaningful relationships the site allows them to hold where there is zero current social contact.

Conclusion

In order to properly determine whether or not the project has been successful, each of the hypotheses main aims need to be compared against results in order to establish if the hypotheses have been proven or disproven.

Hypothesis One

The main aim of hypothesis one was to show that the social networks mapped out through mobile phone contacts and the frequency each contact is communicated with, does not correctly represent a person's real life social support structure. This comparisons was made in order to shows that it is true that a higher amount of communication is needed to maintain relationships of a high intensity, however they people you frequently contact through your mobile phone may not be the people you actually hold the high intensity relationships with.

The overall results show that the social network diagram mapped out using a person's mobile phone contacts does mirror the support structure diagram in regards to the fact that acquaintances are mainly placed on the outermost rings of the diagrams in terms of frequency of contact and also in terms of relationship intensity.

However the main difference in terms of miss representation of real life relationships the amount of phone number stored in a person's mobile belonging to kin is 8% less than the average amount of kin placed on a support diagram. Also there are 11% more friends stored in a mobile phone contact list than would be expected on the support network diagram.

As although there is a mild comparisons between the amount of acquaintances found on the furthest rings of each of the diagrams, proving the lesser the communication the lesser the quality of the relationship, the contrast in the numbers of each type of relationships present on each of the diagrams is too great to ignore. Therefore I have decided that the hypothesis has been proven

correct because without the correct number being stored within a phone the amount of communication with key people within the real life support system is not going to exist anyway.

Hypothesis Two

Hypothesis two was created in order to discover whether a mobile phone allows people to hold onto more un-meaningful relationships than they would normally through old contacts or contacts of people of whom they no longer have any social contact with.

There were two different aspects to the data collected regarding the hypothesis two. The first aspect does not relate the theory of un-meaningful relationships it however examines extra trends discovered relating to multiple phone numbers and the type of relationships that they generally belong to. Almost always when multiple numbers are present they belong to kin, or secondly to friends, however never to acquaintances.

The second main result found in relation to the hypothesis is that the average calculated Dunbar's Number, which is a representation of the meaningful relationships held based on a participants mobile phone contacts was averaged at 45. However the number of actual people that a participants contact list represents is 63, therefore there are 18 relationships stored via contact numbers in a person's mobile phone that they themselves would class as un-meaningful when calculating their mobiles Dunbar's Number. Therefore I consider the hypothesis proved correct as the discrepancy of 18 un-meaningful relationships is too large a number to be ignored, however the if the future improvements regarding calculating both a Dunbar's Number based on a person mobile numbers and there real life connections the hypothesis could be further validated.

Hypothesis Three

Overall the aim of hypothesis three was to explore the possible difference in the perception of different generation regarding their reliance on a mobile phone to communicate. The main findings of the research show that the age group of 20-25 year old respondents received their first mobile phone at the age of 9-13 whereas 35-50+ year old participants did not get their first mobile phone until there over 35 years old.

The conclusion can be made regarding the younger generations that the relay on their mobiles to maintain the same level of communication and quality of a relationships. Also they believe that having a mobile phone improves their ability to communicate with others and that their current social life would be disrupted if their mobile phone contacts were to be destroyed.

In contrast older generations believe that they do not need a mobile phone to maintain the level of communication and quality of their current relationships or that is improves their ability to communicate. Loss or destruction of their mobile phone also did not faze older respondents.

I feel the above conclusions based on the data collected proves that a child's social communication development can be altered by the influence of having a mobile phone during the stages of psychosocial development, as younger generation rely on their phones to communicate socially whereas the older generations would have grown up in an environment almost free of communication technology and therefore would have established effective communication channels and methods with current relationships before mobiles were commercially introduced. Therefore

the hypothesis is proved to be correct, as there are completely different attitudes regarding mobile phones and there power to be used as a social communication tool.

Hypothesis Four

Hypothesis four's main aim was to reveal a difference in what topics the different genders generally discuss on average. In accordance with Robin Dunbar's research it was revealed that men to lean towards discussing a topic either directly about them or one of which they are well versed and can therefore flaunt knowledge of, and women will generally gossip as a form of conversation.

However although the majority of women chose "Gossiping" as there answer was higher than the amount of mean that chose it, on average men would spend a higher percentage of their time spent each day talking about the given topic. Men if they chose "Gossiping" would on average spend 59% of their communications for the day via their mobile discussing gossip whereas as women only spent 44% of their daily communication time.

This was not present in the topics that men chose more than women, as for both the topic of "Related to you" and "Familiar to you" mean spent a higher percentage of their daily communications discussing the chosen topic than the women that chose the same topics.

I have decided that hypothesis four has also been proved as correct as there is a noticeable difference in the amount of men and women that chose "Gossiping", "Related to you" and "Familiar to you".

Reflection

On a whole the project has allowed me to discover a wealth of new knowledge through in depth research and has allowed me to improve and refine skills such as time management and report writing. There are a number of contributing factors that I feel hindered the progress of the project in general, and there are also certain aspects of the project that I wish I had completed differently in hindsight.

My time management skills were found to be lacking during this project as in the beginning I completely miss managed the time needed to correctly structure and design the project and attempted to simply begin the implementation of the research experiments, which lead to the collection of data that was useless and unrelated to the main hypotheses. The effect that this had on the overall project is that the proposed time plan could not be followed and other stages of the project such as data analysis had to be shortened in order to regain the time lost.

Also I misunderstood to demand of the modules that I had selected to undertake in the Spring Semester. I hoped to complete a majority of the project in the Winter Semester as I had chosen fewer modules. However the modules I had chosen were both 100% coursework and required a lot more of work and research to achieve high grades than anticipated and therefore the ambitious milestones that I had set myself within the project began to be pushed back.

In December I suffered a great personal loss and therefore the project fell behind further as I had previously set myself a high target of work to complete over the Christmas Break as I only had one exam to revise for, and I did not achieve even half of what I hoped to.

If I had not experienced any of the above issues I could have carried out more research experiments during the Spring Semester and this in turn would have increased the validity and reliability of the data that I collected. Also I could have spent further time analyzing the data collected and possibly may have had chance to explore one or more of the new research areas that have been proposed in the future work section.

Having to face these issues inevitably improved my time management skills in the long run as I learnt the importance of following a pre-defined plan in order to complete the necessary actions in the correct order and therefore not ending up in a situation where time is having to be scarified from other stages. Also I learnt that there are circumstances in life that cannot be predicted and therefore when planning your time there needs to be a certain degree of flexibility. The flexibility allows alterations or delays to affect the time plan without major disruption to the project as a whole.

The main assumption made in connection the project is that the figure created using the equation for Dunbar's Number on the basis of a person's mobile phone contacts is a miss representation of the number of meaningful relationships the persons holds in real life based on real life situational assumptions. For example I described a real life scenario much like my own, describing that if someone works in a retail setting and also attends a university course then they are going to hold more than 45 relationships based on the equation, as even if a person is only an acquaintance so long as it's a current connection and you know them more than a "general" sense then the relationships is still classed as meaningful.

I feel this is a reasonable assumption to make in theory however it would have been better for the validity of the project overall if I had conducted an identical study of each person's real life connections in order to compare the figures against each other to prove the point.

The background research that I found in regards to Robin Dunbars multiple theories was extensive by the time the project was reaching its final stages, however if was going to re-do the entire project again I would make sure that the same level of knowledge was held at the beginning of the project. That way a tighter sense of direction and ownerships of the ideas would be felt and that way any miss direction would be easily noticed.

I think the main strength that I have conveyed throughout the project is attention to detail and a high amount of granularity during the design phase of the project. By not simply just listing the hypothesis but actually evaluating each one separately in order to define and understand the variables that I would need to gain data about, allowed the questionnaire to be designed in such a way that all of the data need to prove or disprove the hypothesis was present and an unnecessary amount of assumptions did not have to be made. This meant that the overall conclusions that have been made at the end of the project are more dependable and accurate.

Overall I am pleased with the research that I have completed for my final year project as I feel although there are some minor inconsistencies and small changes that I would make if I had a second chance to complete the project, the implementation of the project from the design section to the data analysis section, I feel shows my ability to think both logically and creatively to create a piece of work that has viable conclusions built upon trustworthy data.

Appendix

Appendix One

How many mobile phone contacts do you currently have stored in your phone ?

Hypothesis 2

How many contacts do you have in your mobile phonebook where you only know the person in a general sense ?

Hypothesis 2

How many contacts do you have where you previously knew the person but have NO current social relationship with them ?

Hypothesis 2

Based on your answer to Question Two...

How many of those people would of you wish to start and maintain a steady social relationship with if you were to be re-introduced ?

Hypothesis 2

Which method would you prefer to a communicate with a mobile phone contact via...

- Phone Call
- Text Message

Hypothesis 4 – Before altered hypothesis

If you selected a preference to phonecalls please answer this question if not skip to question 6.

Which of the following options most describes your feelings for preferring phonecalls as a means of communication?

- Limitation of texts within contract and an abundance of voice minutes
- Need for a quick response or immediate communication
- More personal than text but less effort than physically meeting
- Personal constraints on time avaliable to communicate

Hypothesis 4 – Before altered hypothesis

If you selected a preference to text messaging please answer this question.

Which of the following options most describes your feelings for preferring text messaging as a means of communication?

- Limitation of voice minutes within phone contract and an abundance of text messages
- Limitation of time to call or meet physically
- Minimal socialising effort is required for text messaging
- Expense of a text message is less than the the charge per minute for a phone call

Hypothesis 4 – Before altered hypothesis

Do you think that communication through a mobile phone instead of communicating face to face in a social setting is damanging to "socialising" as an experience?

- Strongly Agree
- Agree
- Neither Agree nor Disagree
- Disagree
- Strongly Disagree

Hypothesis 3

Lost or destroyed mobile phone contatcs would greatly hinder your current lifestyle.

- Strongly Agree
- Agree
- Neither Agree nor Disagree
- Disagree
- Strongly Disagree

Hypothesis 3

What age were you wehn you acquired your first mobile phone?

- 9-13
- 14-19
- 20-25
- 25-45
- 35-50
- 50+

Hypothesis 3

Do you have any of the following social networking accounts?

- Twitter
- Facebook
- Instagram

Future Progression

What sex are you ?

- Male
- Female
- Other
- Prefer not to say

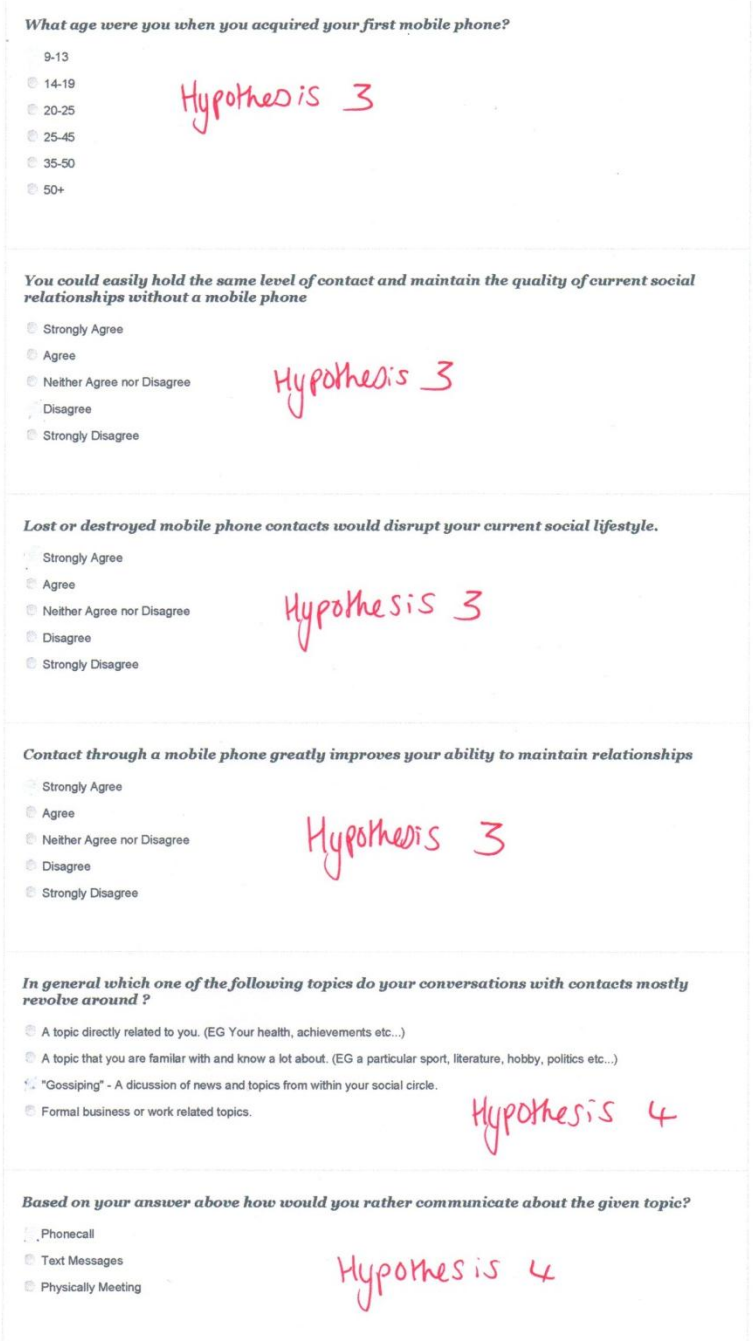
Hypothesis 4

Please select the age range of which you current age is within.

- 14-19
- 20-25
- 25-35
- 35-50
- 50+

Hypothesis 3

Appendix Two



What age were you when you acquired your first mobile phone?

- 9-13
- 14-19
- 20-25
- 25-45
- 35-50
- 50+

Hypothesis 3

You could easily hold the same level of contact and maintain the quality of current social relationships without a mobile phone

- Strongly Agree
- Agree
- Neither Agree nor Disagree
- Disagree
- Strongly Disagree

Hypothesis 3

Lost or destroyed mobile phone contacts would disrupt your current social lifestyle.

- Strongly Agree
- Agree
- Neither Agree nor Disagree
- Disagree
- Strongly Disagree

Hypothesis 3

Contact through a mobile phone greatly improves your ability to maintain relationships

- Strongly Agree
- Agree
- Neither Agree nor Disagree
- Disagree
- Strongly Disagree

Hypothesis 3

In general which one of the following topics do your conversations with contacts mostly revolve around ?

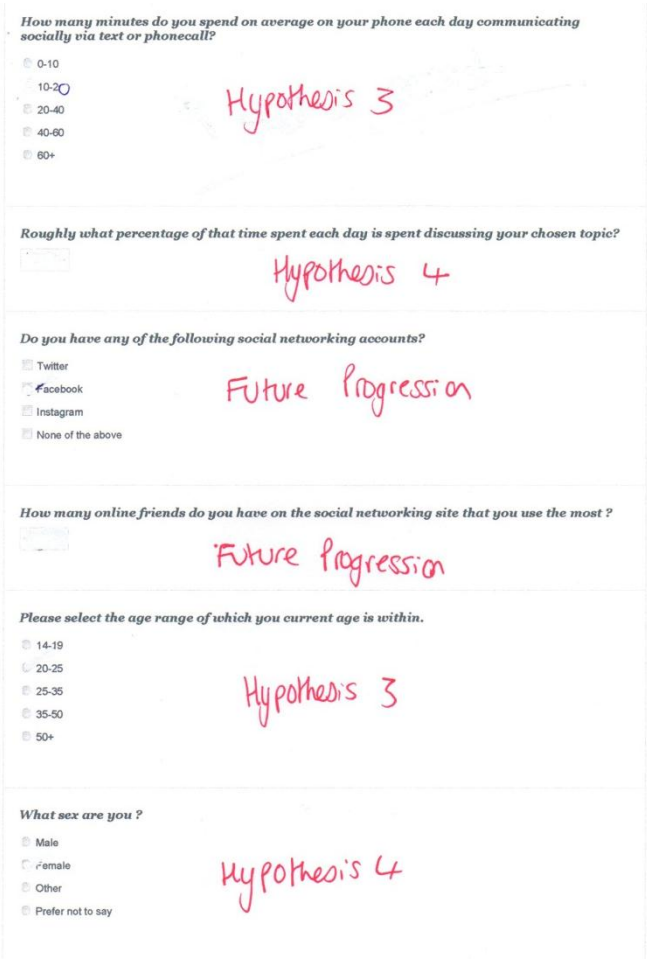
- A topic directly related to you. (EG Your health, achievements etc...)
- A topic that you are familar with and know a lot about. (EG a particular sport, literature, hobby, politics etc...)
- "Gossiping" - A dicussion of news and topics from within your social circle.
- Formal business or work related topics.

Hypothesis 4

Based on your answer above how would you rather communicate about the given topic?

- Phonecall
- Text Messages
- Physically Meeting

Hypothesis 4



How many minutes do you spend on average on your phone each day communicating socially via text or phonecall?

- 0-10
- 10-20
- 20-40
- 40-60
- 60+

Hypothesis 3

Roughly what percentage of that time spent each day is spent discussing your chosen topic?

Hypothesis 4

Do you have any of the following social networking accounts?

- Twitter
- Facebook
- Instagram
- None of the above

Future Progression

How many online friends do you have on the social networking site that you use the most ?

Future Progression

Please select the age range of which you current age is within.

- 14-19
- 20-25
- 25-35
- 35-50
- 50+

Hypothesis 3

What sex are you ?

- Male
- Female
- Other
- Prefer not to say

Hypothesis 4

Appendix Three

How many phone contacts do you have stored overall in your mobile phone?	
How many of those mobile phone contacts do you only know in a general sense? **NOTE: This means you know little to nothing about the person.**	
How many of your contacts do you current have no social connection with?	
Using the number that you have no social connection with, how many of those people if you were to be re-introduced would you wish to maintain a steady social relationship with once again?	

How many of the contacts that you have stored in your phone are regarding services? (EXAMPLE: Doctors, taxis, dentist etc...)		
In terms of **ACTUAL** people, how many phone contacts do you have in your phone? (If someone has more than one number in your phone only count them once. Also if a phone number relates to more than one person for example *"Auntie Jane and Uncle John Doe Home Number"* count it as two)		
How many **ACTUAL** people do you have more than one contact number for?		
For each contact that you have multiple numbers for, how many do you hold for each one? (EXAMPLE: *"Jane Work", "Jane Mobile", "Jane Home")* Use A,B,C... to aid anonymity of your contacts, so if A was *Jane* you would write 3 in the "No. of Numbers" column.	Contact A B C D E F G H I J	No. of Numbers
What amount of the contacts that you hold multiple numbers for are *Kin, Friend, and Acquaintances?*	Kin	Friend / Acquaintance

Appendix Four A

Lucy Ryan Dissertation Experimental Research

First Experiment

In this experiment I would like you to use three different coloured dots each colour representing a friend, kin, or acquaintance type of relationship, to represent the structure of your social circle.

There are four different circles in which you can place people within each of them represents a different level of emotional intensity and relationship quality. There is guidance as to who belongs in each circle and it is as follows:

- Inner Circle – People you would automatically go to in a time of trouble for perhaps comfort, advice, or maybe even a loan of money.
- Second Circle – It is defined as the "Sympathy Circle" which means if any of those people were to die tomorrow it would leave you distraught, and effect your life for a prolonged period of time. For example an immediate family member, or long term friend.
- Third Circle – This is where relationships are still intimate but perhaps less frequent.
- Outer Circle – As the last circle it is where you would expect to find the people with the lowest emotional intimacy and possibly the least frequent relationships.

NOTE: DON'T feel pressured to place people in the circles that you think they SHOULD be in because of social pressures. As this is completely anonymous and there is no way of the people you are placing onto this diagram ever seeing it please feel free to place people where you FEEL they belong in your eyes.

The coloured spots that you will be using are:

- Blue – Kin (Family relations of yours)
- Yellow – Friends
- Orange – Acquaintances

To remove all confusion I have provide a definition for Friend and Acquaintance below.

Friend – "A person with whom you want to spend time with"

Acquaintance –"*Someone whose company is a momentary convenience"*

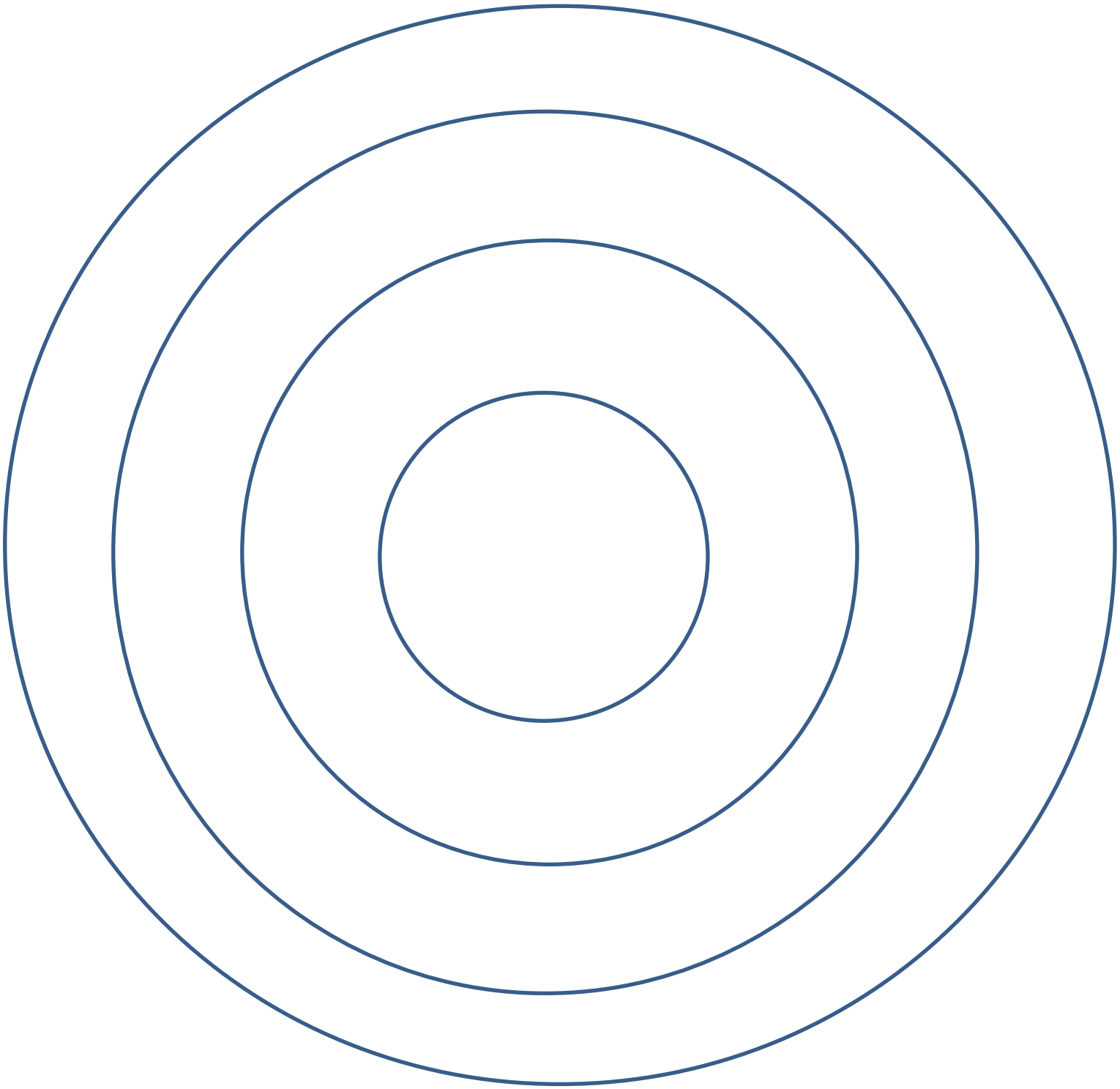
Now please carry out the experiment based on the above rules in regards to all of the people that you can recall who you **SOCIALLY KNOW**. Anyone that you know in a social sense should be included for example even if you were to sat "hello, how are you?" to a neighbour once in a blue moon, you still hold a relationship with them however it would just be of a weak nature and probably belong as an acquaintance in the outermost circle.

Please place the dots on the lines of the circles and not in the circles.

NOTE: Frequent contact DOES NOT necessarily mean a better quality relationship.

Appendix Four B

Social Network Structure Template



Appendix Five A

Lucy Ryan Dissertation Experimental Research

Second Experiment

In this experiment I would like you to use three different coloured dots each colour representing a friend, kin, or acquaintance type of relationship, to represent the structure of your social circle via your mobile phone contacts. **NOTE: PLEASE EXCLUDE ALL CONTACTS THAT ARE SERVICE RELATED SUCH AS DOCTORS, HAIRDRESSER, TAXI ETC…**

There are five different circles in which you can place people within each of them represents a different level of frequency of contact through your mobile phone. There is guidance as to who belongs in each circle and it is as follows:

- Inner Circle – People you normally contact daily.
- Second Circle –People who you contact every 3-5 days.
- Third Circle – People that you would contact more than once a month.
- Forth Circle – People that you contact at least once every six months.
- Outer Circle – People that you contact at least once a year.

The coloured spots that you will be using are:

- Blue – Kin (Family relations of yours)
- Yellow – Friends
- Orange – Acquaintances

To remove all confusion I have provide a definition for Friend and Acquaintance below.
Friend – "A person with whom you want to spend time with"
Acquaintance –"Someone whose company is a momentary convenience"

Also I would like you to look at **HOW** you use your phone to contact certain people. If you use your phone to **RING** the contact leave the sticker blank when you place it on the diagram. However if you **TEXT** the contact then please place a dot on the sticker as you place it on the diagram. If you use both methods to contact a single contact then choose the method that you use most likely.

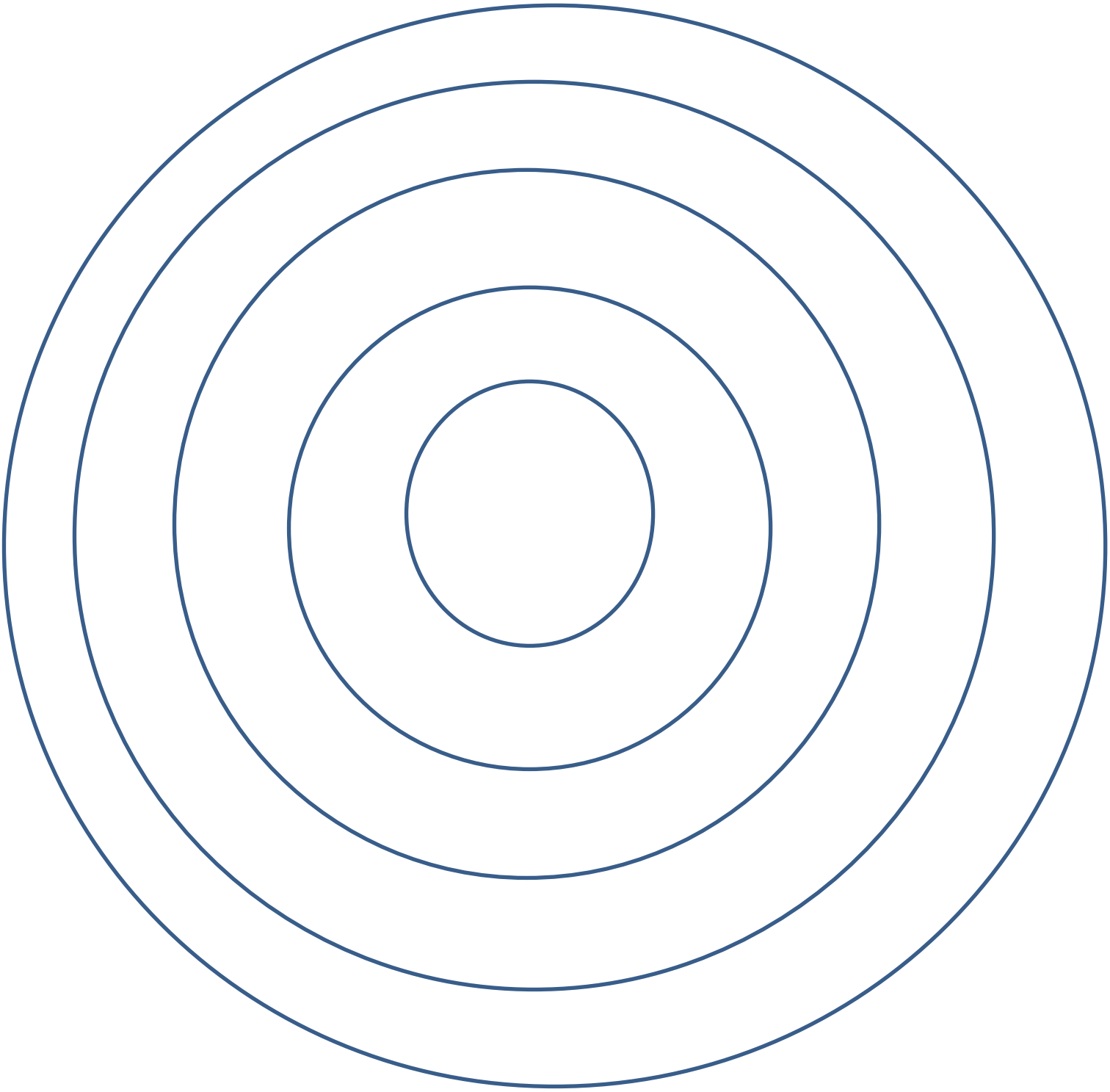
If you are having a **LIVE VERBAL CONVERSATION** no matter what the means, so long as it uses your mobile phone contacts it classes as a **PHONECALL.** For example you could ring someone over a phone network or over the internet and they both class as a **PHONECALL.**

If you are having a **NON VERBAL CONVERSATION** no matter what the means, so long as it is using your mobile phone contacts it is classed as a **TEXT MESSAGE.** For example a text over a phone network or over the internet both class as a **TEXT**.

Now please carry out the experiment based on the above rules in regards to all of the phone contacts that you have stored in your phone. Please place the dots on the lines of the circles and not in the circles.

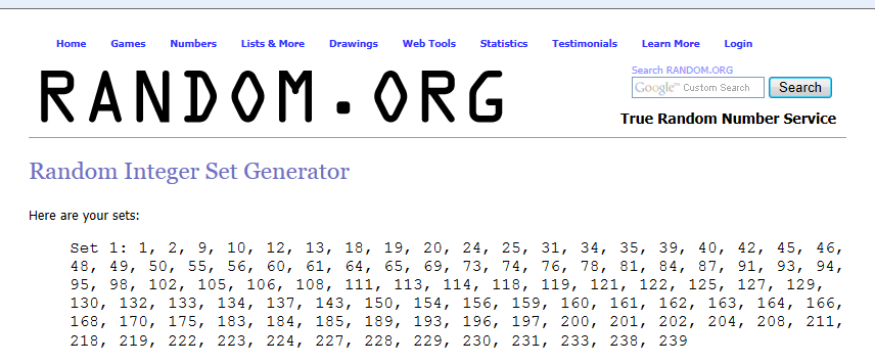
NOTE: A better quality relationship DOES NOT necessarily mean frequent contact.

Appendix Five B



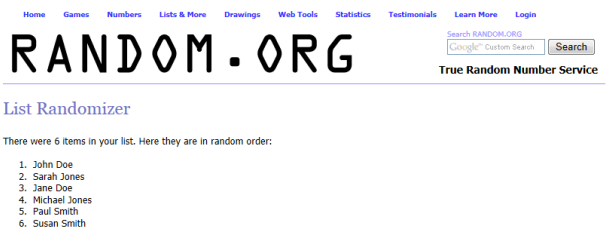
Appendix Six

Defining that there should be one set containing 100 random numbers between 0-240. 240 is the overall sample number.



The set is then generated ready for the numbers to be assigned to the randomly shuffled list of participant names.

For reasons relating data protection the print screen on the left simply shows example names. Below is how the list has been outputted from the generator after being randomly shuffled.



Appendix Seven A

Data Protection Act Compliance

Firstly I will ensure that all of my research participants sign a contract that states that they are happy for me to hold the data for the duration of the project providing it is held in compliance with the Data Protection Act. I will be mainly focusing on the 7th Principle of the Data Protection Act which ensures the security of the data.

"Appropriate technical and organisational measures shall be taken against unauthorised or unlawful processing of personal data and against accidental loss of, destruction of, or damage to personal data."

The steps I will take to ensure the data are kept secure are:

- ✓ Only I will have access to the data as I will encrypt all of the documents that hold the data with a password, which I will not share with anyone else.
- ✓ This will also mean that only I can edit, delete or disclose any of the data that is held about a specific research subject.
- ✓ All data once collected will be anonymous, however I will know vague descriptions of the participant such as their occupation or age.
- ✓ I will save the data both on my own personal laptop and also my personal USB memory stick and never on a public computer. In order to prevent the risk of data being tampered with, destroyed, or exposed.
- ✓ Both the laptop and the USB have passwords to access them, which again only I hold.
- ✓ The data will initially be collected via paper questionnaires, as a form of convenience as I can ask people to fill them out anywhere, anytime regardless for the need of a computer. I will update a spread sheet with the collected information as quick as possible and then I will shred the questionnaire in order to prevent others from seeing the information accidentally.

Risk Assessment

I have carried out a risk assessment in order to see if there are any opportunities for the data to be lost, damaged, altered or stolen. As far as I am concerned the biggest risk lies with the possibility of accidental loss or damage to the data when it is paper based. Paper based research is a necessary part of my project as I need to run focus groups in which the participants will need to fill out an extended questionnaire and I cannot rely on all of the individuals to bring a laptop with them to the group. This would exclude any participants who do not have access to a portable computer and would introduce bias into my research.

The way in which I will ensure that this possible issue does not arise is to collect the data and immediately update the computer based spread sheet so that I can hold an electronic version in case of accidental loss or damage to the paper based version. The questionnaire will then be shredded at the earliest convenience.

Also the loss of my USB memory stick seems to be the other main issue surrounding the protection of the data. As I have previously stated I will be encrypted both the individual documents that are held on the USB containing the research, and the USB memory stick itself. This means that even if I do lose the USB the data will still be safe as not only will they not be able to access the memory stick they will also not be able to access the files within it.

Appendix Seven B

Data Protection Contract for Research Participants

Once I have finished explaining the research that I am currently undertaking and you are completely satisfied that you understand the role of a research participant and the conditions of the data collection, please read the contract below, fill in the name spaces and then sign and print your name at the bottom of the page.

If you have any questions during the focus group please do not hesitate to ask.

Where I receive any personal data (as defined by the Data Protection Act 1998) from _____, I shall ensure that it fully complies with the provisions of the Act and only deals with the data to fulfil its obligations under the contract.

I will not be asking for you to place your name on any of the research data that I will collect and therefore it will be completely anonymous from the beginning of the project to the end.

All of the actions concerning data collection and analysis will be carried out in full compliance with the Data Protection Act, especially the Seventh Data Principle which deals with the security of personal data.

I shall take all reasonable steps to ensure that all information handling complies with the Data Protection Act when compiling and rendering the data anonymous.

I shall allow _____ reasonable access to the results that I collate from the data as I will not be able to allow _____ access to specifically their own data as it will be collected anonymously and I won't have any way of indicating what data was collected from them.

Signed By

Lucy Ryan

Signed By

Appendix Eight

First Circle	Participant 1	Participant 2	Participant 3	Participant 4	Participant 5	Participant 6
Kin	5	4	5	6	7	5
Friend	4	0	6	0	8	4
Acquaintance	0	0	0	0	0	0
Total	9	4	11	6	15	9
Second Circle	**Participant 1**	**Participant 2**	**Participant 3**	**Participant 4**	**Participant 5**	**Participant 6**
Kin	7	8	14	8	13	5
Friend	21	6	15	1	14	28
Acquaintance	0	0	0	0	0	1
Total	28	14	29	9	27	34
Third Circle	**Participant 1**	**Participant 2**	**Participant 3**	**Participant 4**	**Participant 5**	**Participant 6**
Kin	3	10	17	15	8	10
Friend	12	9	25	10	12	20
Acquaintance	7	7	6	1	10	9
Total	22	26	48	26	30	39
Fourth Circle	**Participant 1**	**Participant 2**	**Participant 3**	**Participant 4**	**Participant 5**	**Participant 6**
Kin	13	6	7	20	9	0
Friend	0	10	0	2	15	3
Acquaintance	28	28	35	30	19	7
Total	41	44	42	52	43	10

Appendix Nine

Red Writing = Questions asked by the Test Subject
Blue Writing = Questions asked by the Test Initiator (Lucy Ryan)
Black Writing = All observations and comments regarding the walkthrough.

1. No trouble with the wording or answering the question in an appropriate manner.
   "Does the action of having to count all of your contacts put you of completing the questionnaire truthfully?"
   "No, as I only have a small number of contacts on my phone, however if I had any more than what I already do stored I probably would be inclined to simply guesstimate instead of actually counting them all"

2. The test subject has difficulty understanding the meaning of "general sense" and also what the difference is between "friend" and "Acquaintance". He feels the difference between the two should be explicitly defined on the questionnaire.

3. "Do you think there should be a time limit in regards to no social contact, in order to set a clear boundary?"
   "I don't think there is a need for a time limit as that introduces bias on your part as you're not thinking about the people who may be less regularly socially active than others, and although they may not talk to someone in 6 months they may hold a strong bond with them. It also restricts people's ability to make their own judgement on whether or not they still hold a relationship with a particular person.

4. Completely understood the concept of the question when asked what kind of people he would have included in his calculations.

5. Easy to understand and there is no confusion as to what needs to be done. Good having the two options to avoid any ambiguity.

6. "Do you have any comments in particular regarding question six?"
   "Well the question currently allows the user to select all of the answers if they choose to so perhaps there is a need to change the wording slightly to read "which one of the following". However there is a good choice of answers that cover most limitations that a person would experience."
   NOTE: Change the "skip" comment to question seven, numbering is wrong.

7. No answer was given for this question as he understood that he would only need to answer if he hadn't already answered question six.

8. "Damaging" not clearly understood. Example would benefit the user or perhaps consider re-wording it to keep the question shorter than having an example.

9. "Greatly hinder" should be changed to "disrupt" as greatly hinder is slightly too strong of a term and may skew the results. A participant may not see something as hindrance in life but they may see it as a disruption.

10. Perfectly worded and completely understood. No further comments.

11. Should have a “none of the above” option as there is currently no option for people who do not have social network sites. This will look like an incomplete response if the question is left blank but it may be because they don’t have any of them.

Demographic Questions

1. “Did the placement if the demographic questions affect your opinion of the questionnaire?”
   “Having them placed at the bottom of the questionnaire made me feel that the actual information collected was not dependent on my demographics.”

2. “Do you feel uncomfortable answering the questions regarding your demographics?”
   “No. I was more than happy to state my age, sex and also there is a good range of demographic choices for both o the questions.”

Any Other Comments

× Need an additional question to ask how many duplicate numbers are held within a person’s phonebook. For example “Mum Mobile” and the “Mum work” can be assumed to belong to a singular relationship.

Timings to Complete the Questionnaire

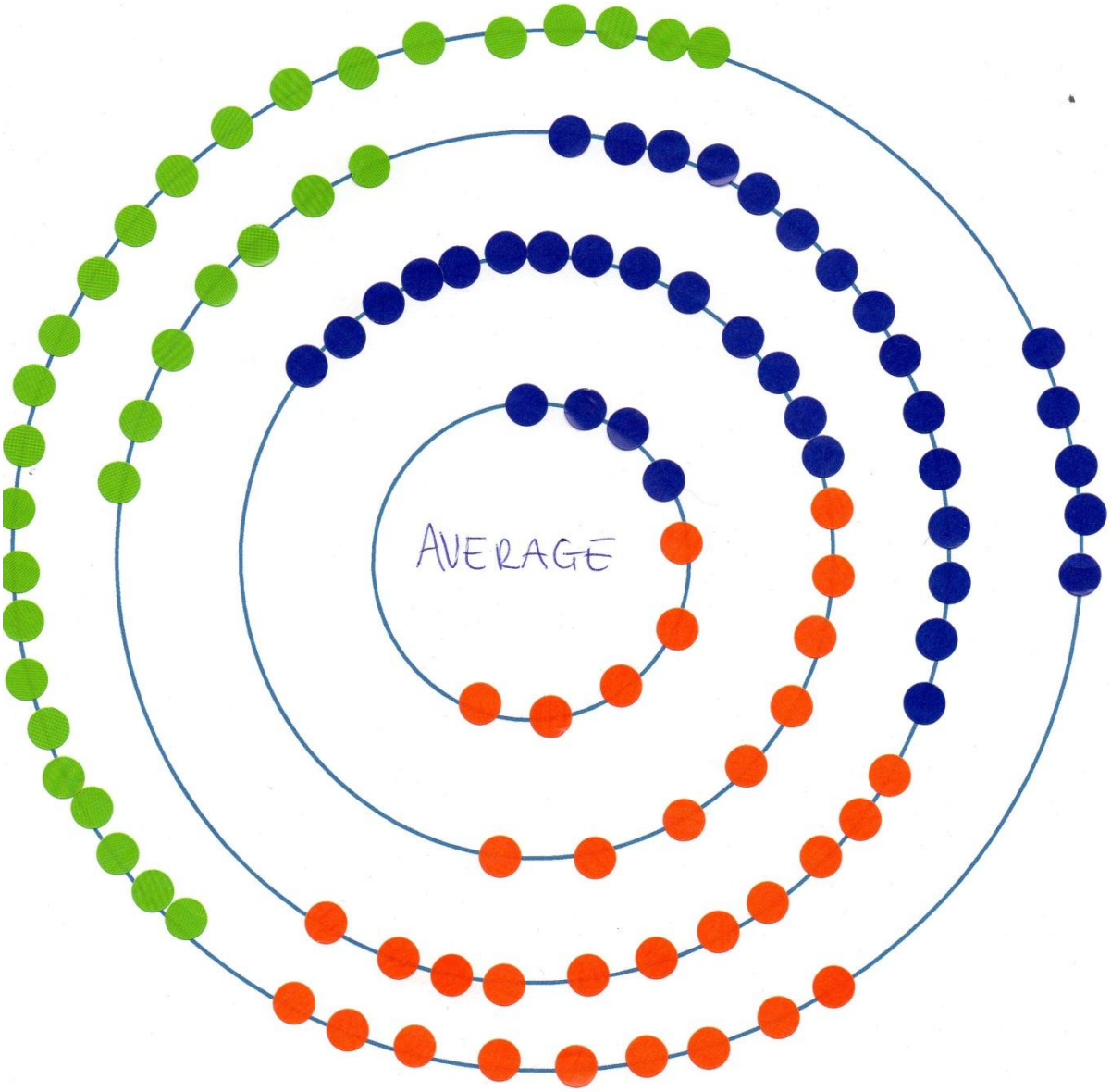
Started at 13:15pm **Finished at 13:36** **Time Taken - 21 minutes**

Each question was timed in order to see which questions took the longest to answer. The timings are as below (All timings where rounded to the nearest whole minute, 0 minutes means it took less than 30 seconds to complete and therefore the nearest whole minutes in 0 minutes.)

1. 5 minutes
2. 3 minutes
3. 4 minutes
4. 3 minutes
5. 0 minutes
6. 1 minute
7. N/A
8. 2 minutes
9. 1 minute
10. 1 minute
11. 0 minutes
12. 0 minutes
13. 0 minutes

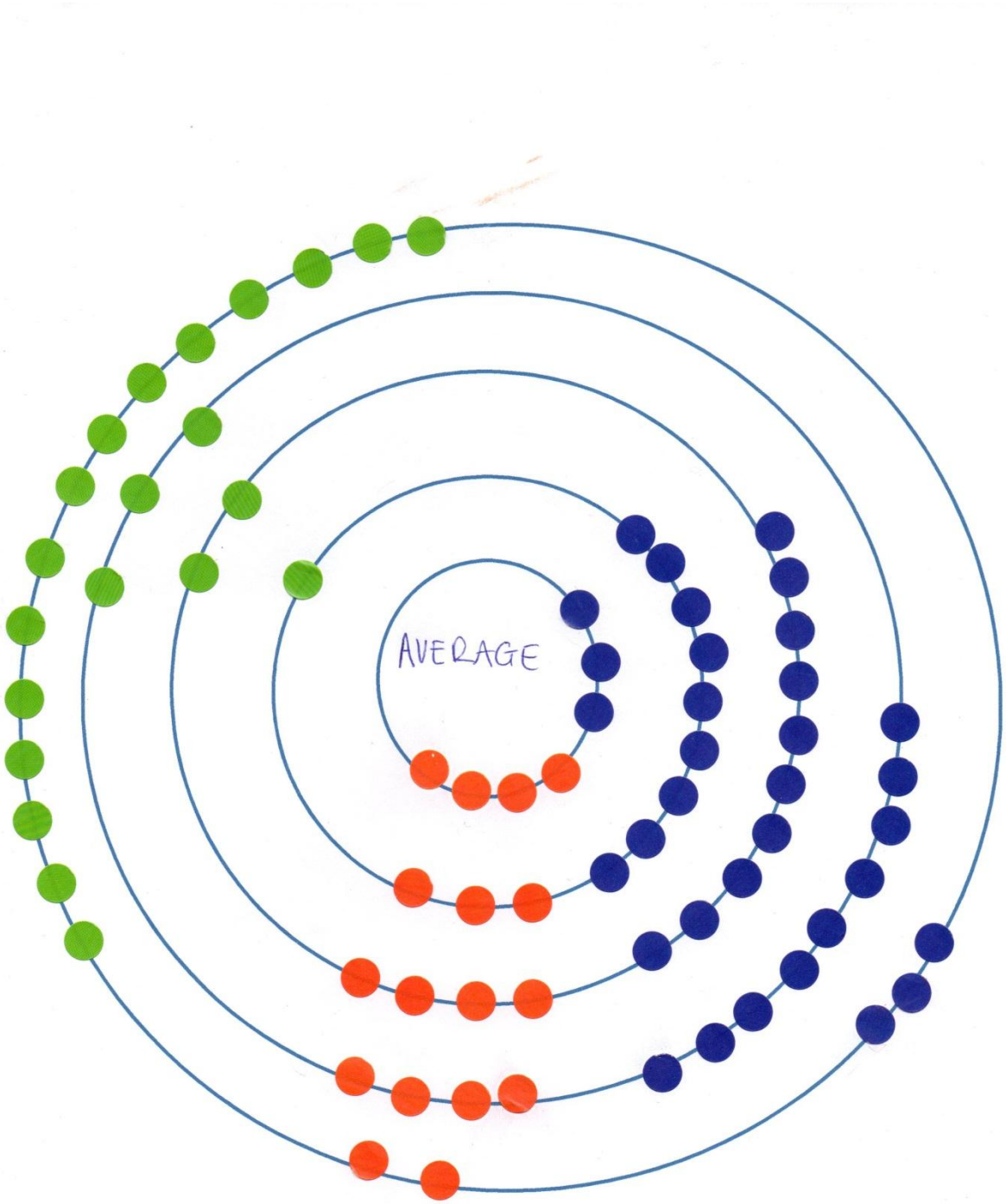
Appendix Ten

RED- KIN BLUE- FRIENDS ACQUAINTANCE - GREEN



Appendix Eleven

RED- KIN BLUE- FRIENDS ACQUAINTANCE – GREEN



Appendix Twelve

								8															9		
PARTICIPANTS	1	2	3	4	5	6	7	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	K	F	A
Participant 1	54	8	3	0	7	44	4	2	2	2	3													3	1	0
Participant 2	31	2	0	0	4	24	3	4	2	3														3	0	0
Participant 3	72	11	8	1	4	65	4	2	2	3	2													4	0	0
Participant 4	115	31	16	4	7	98	10	4	4	3	3	2	2	2	2	2	2							5	4	1
Participant 5	50	8	15	13	2	49	4	3	2	2	2													3	1	0
Participant 6	54	17	24	3	18	33	12	2	2	2	2	2	2	2	2	2	2	2	3					8	4	0
Participant 7	40	20	10	5	10	35	6	2	2	3	2	2	2											3	2	1
Participant 8	125	45	54	9	20	104	16	2	2	3	3	2	2	2	2	2	2	2	2	2	2	2	2	9	6	1
Participant 9	88	24	13	2	7	70	11	4	3	3	2	2	2	2	2	2	2	3						8	2	1
Participant 10	67	18	6	0	5	55	7	3	3	2	2	2	2	2										6	1	0
Participant 11	28	4	5	2	4	22	1	3																1	0	0
Participant 12	71	14	8	5	7	67	4	3	2	3	2													3	1	0
Participant 13	52	8	3	1	5	47	4	2	2	3	2													4	0	0
Participant 14	165	58	24	12	11	152	16	3	2	2	2	2	2	2	3	2	4	3	2	2	2	2	2	13	3	0
Participant 15	89	18	7	0	4	74	8	2	2	2	2	3	2	3	2									6	2	0