

**Identifying the causes and effects of poor privacy practices by
online social network users: The potential of advisory
monitoring software in changing user behaviour**



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This thesis is submitted for the degree of

Doctor of Philosophy

Faculty of Science and Engineering

8th November 2018

I would like to dedicate this thesis to my parents

Dr. Sufian Yousef and Basima Salameh

And

My Wife Laila Salameh

and

My Son Mahdi

Declaration

I declare that this thesis is my own original work, except for references. This thesis has not been submitted, in whole or in part, to any universities, except for the qualification of Doctor of Philosophy (PhD) at Anglia Ruskin University.

Yaacoub Sufian Yousef

8th November 2018

Acknowledgements

I would like to express my sincere gratitude to my supervisors:

Dr. Ian Van Der Linde for his extra support and encouragement during my PhD. I am also grateful for his guidance and motivation, throughout this thesis.

A very special thanks to my previous second supervisor Mrs. Debbie Holly

I would like to also thank Professor Eamon Strain and Professor Michael Cole for the financial support towards my fees.

Special thanks to Professor Marcian Cirestea for hosting my supervision and support within the Computing & Technology Department.

Finally, I would like to thank my wife and parents for their moral and financial support during the course of this PhD, and providing me with encouragement throughout my whole life.

Abstract

In this thesis the behaviour of online social network users is examined, with a particular focus on user activities that preserve or compromise personal privacy. A two-fold approach to data collection was used, with a large-scale online survey (n=90 respondents) that measured user's online social network use (using Facebook as a case study) and their personality traits (via Cattell's 16 Personality Factors questionnaire), followed by a smaller number of semi-structured interviews (n=14 participants).

A hypothesis under examination was that personality traits serve to predict the behaviour of online social networks users, and have the potential to identify those users at risk of either carelessly or unknowingly compromising their personal privacy (and thereby placing themselves at risk of identity theft and other malice), and to inform the design of training materials that attempt to encourage those users to protect their personal information more carefully.

Survey data were subject to correlational analysis to examine the association between the 16 Personality Factors, and the Big Five personality traits derived thereof, and the information visibility settings of the respondents (viz., in the online social network selected as a case study, the settings of "public", "friends only", "custom", "only me" or "not supplied" for each information type).

To identify at-risk participant groups (i.e., those making sensitive personal information publically available), cluster analyses were performed by partitioning respondents into their dominant Big Five traits grouping. For survey respondents with the least cautious settings, it was found that the most highly correlated Big Five traits were Independence (Agreeableness) and Self-control (Conscientiousness), with a smaller effect of Tough-mindedness (Openness). More fine-grained analyses were performed that related user behaviour to facets within each trait.

Follow-up interview data indicates that the true settings of at-risk group was indeed similar to those reported in the survey, but also that a significant proportion of participants were not aware of settings available to protect their privacy and so did not make use of them.

Finally, a set of recommendations in relation to privacy settings has been constructed, in addition to detailed guidance of how to behave safely on the case study online social network (Facebook). A set of recommended actions for Facebook themselves are also included.

Keywords: Online Social Networks; Privacy Settings; 16 Personality Factors; Big Five traits; User Behaviour; Security.

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Glossary & Abbreviations

ANOVA: Analysis of Variance to compare between two means

AIC: Akaike Information Criterion is a measure of fit which penalises the model for having more variables. If AIC is bigger, the fit is worse and vice versa.

B: The regression equivalent of R^2 at the multinomial logistic regression analysis which is called Regression Index. The effect of regression is $\text{Exp}(B) = e^B$.

Big Five Traits: The Global Five Personality traits that control the human behaviour which are Cattell's 16 PF: Cattell's 16 Personal Factors

Cook's distance: The way to measure the accuracy of the model. Any value > 1 is a cause of Concern.

DPA: Data Protection Act

Demographics: The general personal details such as the country, the age, the gender.

Epistemology: epistemology is the study of knowledge and justified belief.

Euclidean Distance: the Euclidean distance between two values is the arithmetic difference.

F Ratio: is a way to test regression

Facebook Settings: Is a set of choices provided by Facebook to protect the personal privacy and retrieve the account if it is hijacked or compromised.

Facebook Activities: The 51 Facebook activities by Facebook users.

F_{ratio} : is a way to measure the accuracy of prediction as $F_{\text{ratio}} = MS_M/MS_R$. If F is > 1 , the model is good.

Identity Theft: Is the stealing of the personal details such as Date of Birth or Street address for malicious or illegal purposes.

Grounded Theory: is the outcome of an inductive research process

K-Means: that is popular for cluster analysis in data mining. K -means clustering aims to find k number of clusters.

Logistic Regression: is the categorical regression where the reply is either Yes or No way of analysis.

Multiple Regression: Similar to the tests in this thesis when the Big Five traits are all tested against one Facebook activity.

Multicollinearity: The main concern in adding more than one predictor is Multicollinearity due to the strong correlation between two or more predictors.

Mixed Method Research: is the use of quantitative and qualitative research methods.

MIT: Massachusetts Institute of Technology.

Multinomial Logistic Regression: is the optional choice out of many choices way of analysis.

Null Hypothesis: When $R^2 = 0$.

OSN: Online Social Networks

Offline: in real life

Online: Activities on the Internet

OLS: Ordinary Least Squares

Ontology: ontology as the theory of objects and the ties.

Outliers: To check the model bias in SPSS.

$R\% = (SS_M/SS_T) \times 100$

Residuals: Way to check the model accuracy. The residuals can tell if the model is a poor representation of the actual data. If Residuals are 2 or more, the model is poor.

R: Correlation in linear systems

R^2 : Squared Correlation or Regression or the percentage of effect of the correlation

R_L^2 : The Regression when the respond options are Yes or No at the Logistic Regression Analysis for multi-layer regression.

Risky Behaviour: When the user discloses the personal information on the public accessibility and act without care to the personal privacy.

SPSS: Statistical Programme for Scientific Systems

Stens: The standardised scores that make up the Big Five trait

SNSS: Social Networking Security Survey

SurveyMonkey: Is the name of the online survey website: (www.surveymonkey.co.uk)

SS: Some of Squares.

SS_T : The model sum of squares with respect to mean

SS_R : The model sum of squares

VIF: Variance Inflation Factor. VIF indicates if the predictor has a strong linear relationship with other predictors. If $VIF = 1$ or less is a good prediction. If $VIF > 10$ then the prediction is biased.

Ward's Method: Is another clustering method where Cluster membership is assessed by calculating the total sum of squared deviations from the mean of a cluster, i.e. $(\text{value}_1 - \text{value}_2)$ such as the hypotenuse of the triangle as a minimum distance.

Chapter 1: Introduction

1.1 Overview of the Research

This introductory section aims to supply a big picture about the research undertaken on the online social networks (OSN) poor practices by users by discussing the causes that renders these practices, unacceptable by other users due to their bad effects on the personal privacy and the harm that results from identity theft, hijacking or insult. However, the wrong behaviour or the good behaviour on the online social networks stems from the personality of a user which can be defined as a set of characteristics that makes someone unique. These unique characteristics can have major impact on the online and offline user's behaviour. Therefore, it is intended in this research to investigate the correlational link between the personal factors and each of crucial 51 online social network activities by psychological online survey, quantitative research survey and qualitative interviewing. The prominent Facebook is chosen in this study to represent the online social networks. Ultimately this study has sets of recommendations and educational guidance to help users in protecting their profiles by knowing the nature of cyber-attacks, how to improve the level of accessibility to their private data, change their poor public behaviour and use the right privacy settings. The research overview details are included in the following three categories:

1.2 Poor Privacy Practices by Online Social Network (OSN) Users: The Causes and Effects

In this research project, the issues surrounding information security in online social networking are investigated. Online social networks (OSN) have an important role in enabling connectivity in social, educational, commercial and political domains. The use of social networking systems has seen a meteoric rise in popularity over the last decade, and their use among the young is particularly pervasive (Lampe et al., 2008). Despite widespread media coverage of the risks of identity theft and other threats, surprisingly, many OSN users do not properly secure personal information from public view, and engage in risky behaviours, such as befriending strangers, clicking unknown hyperlinks, 'liking' unknown companies or individuals (rendering profile data visible), and downloading applications from unfamiliar sources (Bilge et al., 2009; Strater et al., 2007; Gross & Acquisti, 2005). The impact of privacy concerns on members' behaviour was analysed by Acquisti and Gross (2006). In

their study they have combined a survey of a representative sample of Facebook users at US University with data mined from Facebook profiles. They looked for the different motivations driving the behaviours of members and non-members of the network in relation to privacy risks. They compared by method of a survey the attitudes of users with their usage patterns and analysed the effect of privacy concerns on their behaviour. Bilge et al. (2009) investigated the feasibility of undertaking identity theft by automated means, focussing upon five social networking sites. They presented and evaluated two attacks of identity theft. In successful attacks, a friendship is established with the victim and then the attacker can access the profiles of the victim's friends and their personal details. Their results proved empirically that the majority of users are not careful when adding friends or judging the safety of accessing links that they receive. In the first experiment, they used cloned accounts and sent friendship requests to the cloned victim's friends, this allowed the attacker access to the friend's private information. The second experiment involved taking the details of a user from one social network and using it to create a forged account on a different social network where the user was not registered and then contacting the victim's friends who are registered on both networks. Then they added the friends of the victim who had accounts on both social networks. To provide a control group, a fictitious account was made for each cloned account and a friendship request was sent from this account to the cloned account's friends. The friendship acceptance rate for the cloned profiles was over 60%, however, for the fictitious profiles the acceptance rate was over 30%. Hoadley et al. (2009) investigated the issue of privacy by performing a survey of 172 active Facebook users in a US university to investigate their usage patterns and opinions on privacy regarding the addition of the News Feed and Mini Feed elements. They studied the effects of the News Feed privacy controversy on the behaviour of users. The findings illustrated how the readily accessible information and the lack of restriction on the News Feed driver's features raised privacy concerns to users. An empirical study was conducted by Krasnova et al (2010) to identify factors that were responsible for self-disclosures on social networks. They empirically tested a Structural Equation Model of self-disclosure with 259 users. They found that the disclosure of information by users stemmed from the fact that it is convenient to them to maintain and develop their relationships and enhances online enjoyment. Protecting the privacy of OSN users is of crucial importance, since social network user profiles may contain information that can be exploited by the unscrupulous for identify theft, accounts may be used to launch

SPAM and phishing attacks (Bilge et al., 2009; Gao et al., 2010), and users may be lured into downloading malware and viruses (Faghani & Saidi, 2009). Hoadley et al. (2009) argue that compromising a social network account presents a greater threat even than email hacking, due to the sensitivity of the information submitted, and the inherent trust between users that may enable one compromised account to be used to harvest information from many others. Therefore, the main causes and effects of the poor practices on the Online Social Networks such as the Facebook can be summarised as follows:

- Many OSN users do not properly secure personal information from public view.
- Risky behaviour such as befriending strangers and clicking unknown hyperlinks.
- 'Liking' unknown companies or individuals rendering profile data visible.
- Downloading applications from unfamiliar sources.
- Supplying privacy information that can be a source for identity theft which in turn can be used by malicious people to open fake accounts and allure the victim's friends to give away their personal details.
- The disclosure of information by users such as street address, email and date of birth is crucial for attacks and impersonation. Some users disclose their data to maintain and develop their relationships and enhances online enjoyment.
- Creating "public" instead of "private" accounts make it easier to compromise the public accounts and launch SPAM and phishing attacks on others.
- Less use of the provided settings by OSN providers renders these accounts vulnerable.
- Adding friends due to their look, being common friends and the way, they share interest.
- Giving accessibility to their personal favourites and preferences.

However, either in the OSN user reckless or cautious behaviour or in the malicious OSN behaviour, there is personality factors and psychology background that lead to the positive or negative offline and online behaviour.

1.3 The Personality Factors that Impact the Offline and Online Behaviour

The personality of a user can be defined as a set of characteristics that makes someone unique. The personality factors are the set of numerical values that the Cattell's 16 PF produces for global analysis that impacts the offline and the online behaviour. This research examines the correlation between the Big Five personality traits and online behaviour and possible attacks on users' profiles. In this research, the correlation with public and private accounts is evaluated and the extent of personal information disclosures is measured. The hypotheses that motivated the researcher stemmed from a generic hypothesis which states that: Certain personality traits will lead to a certain Facebook activity. The total number of the tested Facebook activities is 55 activities. Many researchers have directed for the personality factors to be considered to define their impact on the user behaviour. Hoadley et al (2009) claimed that many scholars have indicated that privacy perceptions should be related to individuals' psychology rather than consequences of personal information disclosures. They suggested future studies could look for other factors such as Introversion vs Extroversion. The further investigation could study the effect of culture and cross-cultural differences on behaviour and information disclosure (Dinev et al 2006). Ross et al (2008) investigated the personality and motivations related to the Facebook use. The authors in (Dinev et al 2006). Ross et al (2008) described Facebook as unique in its offline-online trend as majority of users are met offline before they become friends on Facebook. They concluded that the motivation of users is the main factor in terms of Facebook use. (Yilin et al, 2011) studied the relationship between web behaviour and personality. Personality was introduced in their paper as an implicit construct where personality cannot be observed directly and therefore behaviour samples are needed to describe and assess abstract concepts indirectly.

In this research, a survey was conducted with consenting users to measure the degree of their awareness of the security settings provided by Facebook, the disclosure of personal information and the profile handling in one hand and to define the personality factors (16 PF) of the respondent in the other hand. In the first section, demographics, online practices, disclosure of information, privacy experiences and behaviour were tested. In the second section, the Raymond Cattell's 16 Psychology Personality Factors (16 PF) at (Cattell and

Schuerger, 2013) were investigated that has led to the extraction of the Big Five traits per person that has been correlated with each Facebook activity practices. The total number of the Facebook user activity practices that were tested is 49 activities. This number does not include the demographic questions. The personality factors survey per respondent included 163 psychology questions. In this context, for example, certain personality traits will correlate to using the "Report Story or Spam" on Facebook wall posts and their impact on users behaviour. Finally, the conducted survey data were analysed to establish Facebook activity result per each respondent and then correlated to the Big Five trait for each same respondent. Additionally, another qualitative research survey was conducted on smaller sample of respondents to ask different questions to those were asked in the quantitative research through organised interviews to explore practical experiences that the users went through when using their Facebook profiles to lay the grounds for the Educational and Guidance Chapter. The SPSS package was used to establish the correlation and the regression factors between the Facebook 51 behaviours and the extracted Big Five traits per each respondent.

1.4 Raymond Cattell's 16 Personality Factor (PF) Technique

The 16PF Questionnaire is a comprehensive and widely used measure of normal, adult personality which was developed from factor-analytic research into the basic structural elements of personality. First published in 1949, and now in its fifth edition, the questionnaire is based on Cattell's multi-level personality theory, and measures 16 primary factors, 5 global or second-stratum factors (the original Big Five), and 2 third-stratum factors. Although summary of reliability studies indicates that the questionnaire provides reliable information, and a selection of validity studies illustrates how the instrument is used effectively in a variety of contexts. For over half a century, the 16PF Questionnaire has proven useful in understanding and predicting a wide range of important behaviours, thus providing a rich source of information about tested users.

The Personality factors (PF 16) Meaning between two extremes as follows:

Warmth (A): lies between Reserved to Warm

Reasoning (B): lies between Concrete to Abstract

Emotional Stability (C): lies between Reactive to Emotionally Stable

Dominance (E): lies between Deferential to Dominant

Liveliness (F): lies between Serious to Lively

Rule-Consciousness (G): lies between Expedient to Rule-Conscious

Social Boldness (H): lies between Shy to Socially Bold

Sensitivity (I): lies between Utilitarian to Sensitive

Vigilance (L): lies between Trusting to Vigilant

Abstractedness (M): lies between Grounded to Abstracted

Privateness (N): lies between Forthright to Private

Apprehension (O): lies between Self-assured to Apprehensive

Openness to Change (Q1): lies Between Traditional to Open to Change

Self-Reliance (Q2): lies between Group-Oriented to Self-Reliant

Perfectionism (Q3): lies between Tolerates Disorder to Perfectionistic

Tension (Q4): lies between Relaxed to Tense.

1.5 The Big Five Traits of the 16 Personality Factors

The detailed descriptions of the Big Five traits are as follows (Hellriegel and Slocum, 2009, 2011):

Extraversion (E): is directly related to social skills, talkative ability and personal charm and energetic versus shy, unassertive, withdrawn, solitary and reserved.

Independence/Agreeableness (A): reflects the individual behavioural characteristics, such as conducting help, cooperation and sympathy for others versus unkind, difficult, cold, rude and independent.

Tough Mindedness/Openness (O): reflects the richness of the individual imagination, aesthetic feelings, degree of dedication, inventive and curiosity about new things versus dull, unimaginative, literal-minded and cautious.

Self-Control/Conscientiousness (C): includes elements of self-discipline, organization and thoroughness of planning, as well as the need for achievement versus impulsive, careless and irresponsible.

Anxiety/Neuroticism (N): reflects the degree of emotional stability, effective, secure and confined versus moody, self-doubting, nervous, sensitive, depressed and anxious.

The details of how the 16 Personality Factors (16 PF) survey results were converted into the Big Five traits is shown in the Research Methodology at chapter 3.

1.6 The Research Questions

1. What are the poor privacy practices and how can these affect the privacy?
2. How can the privacy of social networks users be protected?
3. What are the personality factors that impact the offline and the online behaviour?
4. What is the correlation between the Big Five personality traits and the online behaviour?
5. What is the correlation of the Big Five traits with public and private accounts of users?
6. can the user behaviour be evaluated?
7. What impact does the personal information accessibility have on privacy?
8. How can the personal information disclosure be measured?
9. Is it possible to specify the percentages of the at-risk groups in online social networks?
10. How can the Facebook users be guided for best behaviour and for best privacy protection?
11. What is the degree of the awareness of the Facebook privacy settings between Facebook users and the role of the gender in this issue?
12. Why and how do the Big Five traits influence Facebook Users to behave either with or without caution in their activities and information disclosures?

1.7 Hypotheses

The hypotheses that motivated the researcher is based on a generic hypothesis which states:

Certain personality traits will lead to more or less of a certain Facebook activity.

The total number of these crucial Facebook activities reached 55 types.

The specific hypothesis research question pertaining to this project can be stated as:

Is there any relationship between Psychology (personality traits) and the computing behaviour during the Facebook activities of the users?

The aim of this study can, therefore, be to obtain a clear picture of the existence and nature of the relationship between personality traits and the behaviour of the social network users. For this study, the 16 PF Personality Factors questionnaire will be used to measure the dominant personality trait(s) as independent variables versus the social network user questionnaire as dependent variables to identify different aspects of behaviour of the Facebook user. From the above big picture research question, a very broad hypothesis can be derived:

H: There is a relation between personality traits and a social network user's behaviour in performing any of the Facebook 51 different activities

The null hypothesis could therefore be stated as:

H0: There is no relationship between personality traits and social network user's behaviour in performing any of the Facebook 51 different activities

In support of the 55social network Facebook user activities, the individual hypotheses can be stated and tested as follows:

H1: There is relationship between personality traits and the number of the friends in the Facebook profile

H2: There is relationship between personality traits and the number of the uploaded photos in the Facebook profile and so forth for the rest 53 Facebook activities by the participants of the online survey.

1.8 Aims and Objectives

To meet the overall objectives, the following research challenges have been pursued in this research: Most of previous research activities in this field rely on extracting information from online social networks, while in this research the personal information and Facebook activities are extracted from the Facebook users themselves. A survey was conducted by consenting users to measure the degree of their awareness of the security settings provided by Facebook, the disclosure of personal information and the profile handling in one hand

and to define the personality of the respondent in the other hand. In the first section, demographics, online practices, disclosure of information, privacy experiences and behaviour were tested. In the second section, the Raymond Cattell's 16 psychology Personality Factors (16 PF) were investigated that have led to the extraction of the Big Five traits per person that has been correlated with each of the 51 Facebook activity practices. In this context, for example, certain personality traits will correlate to using the "Report Story or Spam" on Facebook wall posts and the impact on users' behaviour. The 16 PF Factors has been established from the 163 questions survey and then the related Big Five traits are established. Conducting a large-scale testing by SPSS and analysis of the correlation between the personality traits and the privacy behaviour and the disclosure level of personal information that were included in the survey's 62 questions plus 5 demographic questions in the same survey. The Big Five traits are taken as independent variables and correlated to the dependent variables of the Facebook different activity, privacy and behaviour questions. Examine how the psychology traits relate to users' tendency to protect or ignore their privacy on Facebook and finding which personality traits can lead to more privacy attacks/bullying on Facebook and relate this to the nature of their Facebook profile which can characterise these accounts for other users. Therefore, establish best description of any personality from its online behaviour. This has led in this project to find a finger print (benchmark) aspect from each social network profile so others can decide in advance to either add this friend request or not. Others can use the psychological description of the profile for other purposes such as marketing or health diagnosis. Conduct a qualitative research survey by interviewing a sample from the same population of respondents to the online quantitative research survey.

The objective in this interviewing survey is to:

- i. ask questions that were not asked in the online quantitative survey and to
- ii. get more insight in the day-by-day practices of the Facebook account so a better picture of the behaviour is investigated especially at times when the Facebook user had experienced attacks, bullying or a compromised account.
- iii. Developing a novel privacy setting which can be adopted by the OSN providers.
- iv. Identify the at-risk groups by clustering by specifying the public accounts, personal information disclosure and the related Big Five traits. The established

educational package will include the best interfaces to be designed for users that suits their psychological background.

- v. Draw set of recommendations and educational guidance to help users in protecting their profiles by knowing the nature of the malicious accounts and how to improve the level of accessibility into their private data.
- vi. This includes the awareness of the provided privacy settings.
- vii. Change the users' poor public behaviour and lead users to convert their accounts from "public" to "private" accounts.

1.9 Thesis Structure

Chapter 1- Introduction

This chapter will introduce the field of online social networks advantages and challenges that face privacy and information of users. This chapter presents the growing need of facing the cyber-crimes, online attacks and identity theft dangers that are growing in parallel to the rapid growth of online social networks usage. This chapter includes the potential of the personality factors and the global Big Five traits influence on Facebook users. This chapter has included research questions, hypothesis, objectives, the knowledge gap filling contribution and the critical review of the research. A brief description of each chapter in this thesis is included.

Chapter 2- Literature Review

This chapter details the variety of more than 50 research papers that have been published in the area of online social networks security and privacy risks in one hand and the psychological back ground of the users of Facebook in the other hand. The detailed research activities of researching the human Big Five traits effect on the behaviour and handling the Facebook accounts are presented and the gaps of knowledge that are highlighted by previous researchers are summarised and became basis for the motivation and aims of this research.

Chapter 3 – Quantitative and Qualitative Research Methodology

This chapter describes the approach that was taken to design the questionnaire which has 51 Facebook activity and 16 demographics questions and 163 personal factors questions. Details of how the psychological questions were transferred to the Cattell's 16 Personality factors are explained. The details of how the results of the 16 personal factors are transferred globally to the Big Five traits are also included. The ethical documents that were supplied to the participants and the ethical rules are presented. The use of the qualitative research by interviews that includes sampling and snowball sampling, literature review on qualitative interviewing, preparation for the interview, strength and limitations of qualitative interviewing as data collection method are explained. The importance of social media qualitative research and online social networking research are presented.

Chapter 4 – A correlational Study that Relates Personality Traits to Online Social Network Privacy Practice

The three Testing methods by the SPSS are as follows: Quantitative answers by the participants by supplying numbers such as the number of friends, uploaded photos....etc. In this case the aim is to find the Big Five trait as the major independent predictor that influences the Facebook activity by finding the linear regression R and the regression square R^2 . The second testing method is the Binary logistic regression which is adopted for testing questions that have one of two categorical cases where the answer is "Yes" or "No". The third testing method is the Multinomial logistic regression which is adopted for the questions with multiple cases (more than two choices) to find the regression factor B. This chapter has included detailed testing tables, explanations, interpretation of results and partial analysis.

Chapter 5 – Full Correlational Test Results and Analysis for the Big Five traits and the Facebook Activities

This chapter provides a critical review of the results and analysis that has been taken from the SPSS testing chapter 4. This chapter also provides individual questions results analysis in the three types of testing (quantitative, Categorical regression and multinomial) by finding the final value of the Big Five traits in correlation with each Facebook activity question. Then each testing method questions are analysed before the global analysis of the whole the Big Five traits versus the Facebook activities is performed. An algorithm is created to show the flow chart of the psychological background for each individual Facebook activity. Then a

benchmark will be created to judge any profile through the algorithm to decide, with high significance, the related Big Five trait(s).

Chapter 6 - Clustering Analysis of the Testing Results to Identify the At-Risk Groups

This chapter starts by identifying the clustering method which is the k-means clustering which is very different from the hierarchical clustering and Ward method, which are applied when there is no prior knowledge of how many clusters there may be or what they are characterized by. K-means clustering is used when you already have hypotheses concerning the number of clusters in your cases or variables. Then each Facebook activity is tested for the clustering of the survey respondents of their activity in each of the 51 activities and relates clustering towards the Big Five traits to get the final cluster centres, the ANOVA, the number of cases in each cluster and the percentage of each cluster. The un-weighted number in each cluster is defined for each choice of the participants. Therefore, the at-risk group is identified in correspondence to the Big Five trait (s). Then, the percentage of the at-risk group is identified for each Facebook activity and under the influence of one dominant Big five trait.

Chapter 7 the Qualitative Research by the Interviewing Testing and Analysis

Qualitative research by interviewing is discussed for the advantages, disadvantages and limitations. Qualitative research to investigate the reasons of behaviour of Facebook users and the way they handle the Facebook settings. A list of aims of the interviewing process are explained and a questions sheet about the Facebook activities accessibilities are identified and to establish a distribution of the population in a table for the male and female participants separately. Three zones of privacy risks were identified for all male and female participants where risk percentages of public, friends and safe zone of accessibility options. A Discussion of the Data for all participants, female participants and male participants in regard of level of privacy risk was included.

Chapter 8 Identification of How and why A Big Five Trait Leads to Risky Behaviour in Major Personality Models and Recommendations for Risk Awareness

This chapter investigated how and why the risky Big Five trait can influence the Facebook user to act in a risky way. So far three Big five traits are identified from clustering testing to be riskier than the other two Big Five traits. In other words, it is found in this research that Tough-Mindedness, Self-Control and Independence are bearing risks for the user behaviour. The Extraversion and Anxiety personalities are safer but this is subject to the value of the trait within the two extremes. The second important issue is the educational recommendations for the Facebook users in the field of awareness of the profile settings and the behaviour in regard of a wide range of recommendations on how to protect the profile through following a group of actions and precautions such as how to respond to friendship requests and the awareness of the level of risk before clicking on other friends' posts which may hide viruses.

Chapter 9 – Conclusions and Further Research

A summary of each chapter's conclusions is presented in addition to the major achievements and detailed recommendations to Facebook users to use fully the provided privacy settings and use additional measures to stop their profiles from being hijacked or compromised. A further research topic will be required to continue exploring the other online social networks security and their privacy settings such as Twitter or otherwise investigate the characterisation of the Facebook based on the nature of the activities.

Chapter 2: Literature Review

2.1 Introduction

This literature review presents a survey of the fields that are related to the study of privacy in Online Social Networks (OSNs) and Facebook in particular. In each section, a summary is included that highlights how the research discussed research motivated the present work. The following main research themes are discussed:

2.2 The Psychological Background of Facebook Users and Its Effects on Their Behaviour and Online Practices

2.2.1 Big Five Personality Traits

Several studies have investigated female attire in Facebook profile photos from different points of view. This hypothesis proposed that women would be objectified based on what they wear. Results revealed that objectification of women was the reason for choosing the profile photos. Self-presentation has been shown to affect perceptions of abilities, potential, and respectability in various aspects of women's lives in maintaining a professional career (**Glick, Larsen, Johnson & Branstiter, 2005**). Employers tended to perceive provocatively dressed women negatively and often hired women who dressed appropriately; this shows that employers can now learn more about job prospects and the related employees by viewing their Facebook profile photos. **Mickens and Kirk (2014)** found no significant differences when examining gender differences in perceptions of female clothing in Facebook profile photos. A pilot study was conducted to examine whether "likes" affected participants' perceptions of a target's extraversion, agreeableness, and conscientiousness. The profile's clothing significantly affected participant's personality judgments. The provocatively dressed female target was considered more extroverted and less agreeable and conscientious than the conservatively dressed target. However, "likes" had no effect on personality judgements of extraversion, agreeableness, and conscientiousness which shows that "likes" are not as important as photos. **Liu et al. (2011)** studied the factors that influence adolescents' disclosure of personality identifiable information (PII) on Facebook. They conducted a survey of 780 adolescents between 13 and 18 years old and used structural equation modeling for the analysis of data to obtain an overarching model that included cognitive, personality and social factors that influenced adolescents' PII disclosure. It served as a mediator between personality and social factors. Narcissism as a personality factor was

found to increase PII disclosure directly, whereas social anxiety indirectly decreased PII disclosure by increasing privacy concern. The active potential mediation social factor decreased PII disclosure directly and indirectly by increasing privacy concern. This paper also discussed the consequences of the research findings to parents and policy makers.

A thesis by **Chance William Garrett Johnson (2015)** explored how personality traits affect Facebook use and level of disclosure by users. A survey conducted with 125 staff and undergraduate students at Colorado State University, the aim was to explain why users participate in certain activities and at what level they engage in self-disclosure on Facebook, based on their personality traits and gender. In the first part of the survey, participants were tested for the levels of their personality traits: extroversion, openness to experience, conscientiousness, agreeableness, and neuroticism. In the second part of the survey, participants were asked a variety of questions concerning their Facebook activities related to self-disclosure, and at what level of engagement in each activity. The observed personality traits did not predict the participants' motivations for Facebook use and levels of self-disclosure in a statistically significant manner; however, this study did find that gender was a significant predictor of engagement in certain activities. These results were then used to predict Facebook behaviour by users related to their personality traits. However, In fact, the results suggest that individuals exhibiting traits in an offline environment are likely to engage in the opposite behavior online, perhaps as a means to engage in behaviours they are uncomfortable with in the offline world.

Quintelier, Ellen, and Theocharis, Yannis (2013) investigated the effect of the Big Five personality traits on various forms of online and offline political engagement using undergraduate students as participants. Their findings showed that the effects of the Big Five traits on online forms of political engagement did not differ, this is consistent with long-standing empirical observations in the offline realm. Only openness to experience and extraversion had shown an effect on the online political engagement. Only small effects noticed for conscientiousness, agreeableness and emotional stability. This investigation came after growing literature on the effects of personality traits on political participation in the offline realm.

Mickens, Queamani (2016) xxxx examined the effect of female clothing in Facebook profile pictures and the presence or absence of evaluative cues such as “likes” or comments on the personality. Specifically, he looked at whether photographic or textual comments were more important when making personality judgments on online social networks. The survey conducted using 180 male and female undergraduates as participants. Twelve fictitious Facebook profiles were used as the stimuli. Participant personality factors were measured using a modified version of the Big Five Inventory (BFI). Results were analysed using ANOVA and showed that clothing significantly affected perceived extraversion, agreeableness and conscientious. Clothing was perceived as more associated with extraversion and less with agreeableness and conscientious. These findings are important as they represent how people are affected in the same way about us when we are well dressed in stylish clothing.

Lönnqvist, Jan-Erik and Itkonen, Juha V.A. (2016) examined the hypothesis that Facebook users with similar values and personality traits tend to be friends. They found that those adhering to openness or self-transcendence values had similar friends. The emotionally stable and introverted had similar friends. The main focus of this study was to examine the similarity of personal values and/or personal traits. In a Facebook survey that used 3348 participants, they aimed to find whom in that sample, were friends. They found that, on average, participants had 8.7 friends within that sample. People who had similar personality traits or values tended to be friends. However, the effect of similarity in personal traits or values was not found to be evenly distributed across the value or trait continuums. Those who scored highly on Openness to Change or Self-transcendence values were more likely to be friends. People who scored high in Emotional stability or Openness to experience (or low in Extraversion) tended to have similar friends.

Chen, Jengchung Victor; Widjaja, Andree E.; Yen, David C.(2015) explored the moderating effect of the Big Five personality traits on the relationship between the predictors such as the need for affiliation, need for popularity, and self-esteem on one hand, and self-disclosure on Facebook on the other hand. The sample included 354 Facebook users from five different cultures across East Asia. The data analysed by Partial Least Squares-Structural Equation Modelling (PLS-SEM) technique where the Big Five traits moderated each relationship.

Conscientiousness and Emotional Stability negatively moderated the prediction of the need for affiliation and self-disclosure. Agreeableness negatively predicted self-esteem and self-disclosure. However, Openness to new experience negatively predicted the need for popularity and self-disclosure. The study suggested the necessity of the interaction of personality parameters to grasp the self-disclosure phenomenon on Facebook.

Bai et al. (2012) proposed an approach to predict the 'inner personality' of social network users to explain their 'outer behaviour' using the Big Five model. Their experiment showed that behaviour could be predicted fairly accurately from inner personality. Their study showed that extraversion is positively related to one's status, publishing information and that neuroticism is positively related to the tendency of a person to make others angry. They concluded that the personality-predicting traits could be good for Information Science as well as for Psychology. The social network provider can supply resources to users depending on their personality. The user may show interest in making friends which can be a guide to the networking suppliers. This paper also suggests that the personality prediction can help in targeting psychological treatment and can boost the person's confidence.

A survey that aimed to establish the influence of personality characteristics (neuroticism and extraversion) on the use of 12 Internet services was conducted (**Hamburger and Ben-Artzi, 2000**). Participants comprised 45 male and 27 female students from Bar-Ilan University, Israel, and concluded that more extraversion in men was related to the use leisure services, but men also showed that neuroticism is negatively correlated to the information part of Internet. Extraversion in women was found to be negatively correlated to working in social services. Neuroticism in women was found to be positively correlated to their role in social services. Participants that were high in extroversion and low in neuroticism were found to use the Internet less frequently, in contrast to those with high introversions and neuroticism, who were characterised by the more frequent use of Internet.

(**Hellriegel & Slocum, 2009**) analysed the Big Five traits versus the Internet use. Where they found that extraversion and neuroticism showed different patterns in each of the three types of Internet services, such as social type, information type and leisure services.

An investigation by **Ross et al. (2009)** examined how the Big Five traits model of personality may be related to Facebook use. A survey was conducted using 97 students at the University of Southern Ontario, who completed a 28-item questionnaire. The authors concluded that the Big Five factors have no significant influence on Facebook use, in contrast to previous literature. They concluded that the motivation of users is the main factor regarding Facebook use, and the desire for social interaction and seeking social support might be more influential than the Big Five Model. In a related study, **Steinfeld et al. (2008)** examined the following three factors: intensity of using Facebook, the level of psychological well-being, and level of social capital (a term used to refer to offline friendships). In their survey, the following research questions were considered:

1. How does Facebook use change over time?
2. What is the directionality of the relationship between Facebook use and the development of bridging social capital?
3. How does an individual's psychological well-being influence the relationship between social capital and social network site use?

These research questions were examined via a longitudinal analysis of data acquired from Facebook, data from two surveys one year apart, and in-depth interviews with 18 Facebook users at Harvard University. The following conclusions were drawn:

1. There is clear tendency of the low self-esteem students to gain more social capital outcomes than high self-esteem students by their high intensity of Facebook use.
2. Psychological variables were substantially influencing more gains in social capital.
3. Facebook affordances have helped the low self-esteem to cross barriers that presented challenges in bridging offline social relationships.

To study three personality factors (Emotional Stability, Adaptability, and Need for structure), **Svensson et al. (2009)** conducted a study about teamwork in the coalition (a network of allies). In the investigation of the model, it found that a high rating in Emotional Stability leads to high rating in Adaptability. If the rating in Adaptability is high, it will lead to low rating in Need for Structure. In other analysis of an alternative model to the sequential by **Svensson et al. (2009)**, it found that Emotional Stability significantly influences the Need for Structure and the Adaptability. It was concluded in this paper that

subjects are classified on the Emotional Stability, the Adaptability and the Need of Structure factors. However, they found that Big Five traits are in fact markers of Emotional Stability and Adaptability, which are essential aspects in choosing personnel who can work in stressful environments with high levels of risk. The findings represent reliable measures to predict the performance of people working in coalitions (a network of allies). Investigating the behaviour of Facebook users and their personality using the Big Five traits, **Amichai-Hamburger and Vinitzky (2010)** have found a strong connection. They replaced the self-reporting by the information uploading by users. They criticised the previous study of **Ross et al. (2009)**, who used questionnaire and students' self-report. Their analysis suggested that highly extroverted groups have a larger number of friends in real life than the less extroverted group. They found that those who scored highly in neuroticism are more likely to share personal information on Facebook. They also found that those who scored high in agreeableness (independence) would have more friends on Facebook. Finally, people who scored higher on openness to change (tough-mindedness) were more willing to use Facebook as a communication method with others, and the use of a greater number of features. In their list of limitations, they stated that other factors in addition to a personality, such as social norms, have an influence on Facebook use. They suggested a further research project to investigate what users upload on their profiles and the way they design their profiles on Facebook. To address the relationship between online behaviour and personality, **Yilin et al. (2011)** analysed personality by questionnaire surveys. However, the authors argued that the downside of questionnaire surveys is the fact that they are based on self-report, where the subjective nature of participant's self-assessment may exert a negative effect on the accuracy of results. **Moore and McElroy (2011)** studied why users are inclined to use Facebook more than other social networks. They conducted a survey of 219 undergraduate students that investigated the personality versus the Facebook usage. In parallel to this survey, they used Facebook data. A group of 143 students befriended the investigator to give her access to their data and friend's data. The results showed significant variance between survey users and variance in an actual number of real friends and the nature of their posts.

Five correlations were presented in this paper, which were:

1. considered the extraversion for users who engage strongly in Facebook activities;
2. considered agreeableness that is related to less usage and posting on Facebook;

3. investigates consciousness that is related negatively to Facebook usage;
4. investigates emotional stability that is negatively related to Facebook usage such as people with high level of emotional stability spend less time on Facebook, have a low frequency of use and have a low number of friends;
5. investigates openness which reflects a positive attitude towards Facebook usage.

The testing results of the five hypotheses concluded that the role of personality on Facebook is an influential factor. It found that less neurotic users spent more time on Facebook, while more introverted persons frequently opened their Facebook profiles to stay connected with friends. The study found that all personality traits are related to repentance, as more agreeable, conscientious and emotionally stable users, reported high levels of regret.

In the field of the Big Five traits, **Long and Zhang (2014)**, samples of British and Japanese online social networks users were used to test self-reflecting motives. The attention-seeking, privacy behaviour and self-presenting, constituted the main motives in both samples in their study. The main motivation sources found were self-expression, keeping privacy protected, and seeking attention. Impression issue was less endorsed. However, independent self-construal is found to be the main predictor for these motives and more cautious about their privacy. There were differences in the patterns of prediction between the samples, but in general self-construal measures explained the majority of the motivations, but narcissistic personality variables did not.

The study by **Lima & De Castro (2014)** had not used the traditional method of investigating the social network accounts contents of users such as posts, texts, disclosure information for personality prediction. They used groups of texts instead of single text by extracting meta-attributes of texts without worrying about the contents of the pieces of texts. Then, found the Big Five traits by characterising a multi-label classification which was transferred into a five binary classification and solved by a semi-supervised learning scheme. This new technique trained with three famous machine-learning models. This system tested for predicting the personality factors of Tweets borrowed from three different data groups. The

results gave nearly 83% accurate prediction where some traits gave better classification than other traits.

An investigation by **Li et al. (2011)** was intended to make a proved relationship between behaviour and the Big Five traits as an accepted means of personality assessment for further research. They conducted an exploratory research on online usage behaviour and the Big Five traits. The effort was made to locate specific personality trait by the behaviour features on the Internet. The survey used 571 subjects studying master degree. The regression analysis proved a fundamental relationship between the traits and the online behaviour. This research was built on **Burger et al. (2008)** who concluded that “personality consists of the consistent behaviour patterns and intrapersonal processes originating within the individual”. To prove that the online mood labels are a true representation of what is going on off-line, **Ning et al. (2011)** conducted a survey of online users to find the relationship between the online news mood labels by readers and other readers who never label any news online. The authors wanted to know if there is any consistency between the two types. The study took online news labels and asked others who never practised news labels on the web to vote. The results indicated that there is link and consistency between moods resulted from the online news with the mood practised by the off-line voters.

Researchers in Zhang et al. (2011) have found that there is a correlation between Internet behaviour and the psychological nature of the individual. They proposed an ontology of behaviour by examining the psychological phenomenon index. Their study has used a combination of qualitative and quantitative methods and laid the foundation for other studies. A survey of the online questionnaire was used to collect data about Internet behaviour by using a focus group study. **Zhang et al. (2011)** conducted a survey on mental health subjects who use web services on a large scale to make a basis for diagnosing mentally-ill online users. It was motivated by the aim of authors to replace the current method of diagnosing mental health people by questionnaires completed by the subjects. Examining the online behaviour has supplied researchers in this paper with a way to spot irregular personalities cases under different circumstances. **Zhu et al. (2011)**, attempted to know more about the online users’ psychology, studied web behaviour and its

relationship to people's life and mental health. It originated from their understanding that mental health is reflected directly by the behaviour through choices and preferences. Also, it assumed that the online user's behaviour could detect the user's mental health. In their research, they intended to design a decision tree model to find out the relationship between the online users' mental health and the online behaviour. A survey where subjects were chosen as frequent users of web services and used to extract typical behaviour types that can be matched with virtual society practices and used to predict the subject's degree of mental well-being. Mental health status versus the online behaviour was investigated by **Zhu et al. (2011)** in their other paper. Data was collected from 571 students using Usage Behaviour Check-List (IUBCL) and Psychological scheme (PHI). Six regression models built. The accuracy was found to be 72.9%-83.1% that shows feasibility in identifying the mental health of a user by investigating his/her online behaviour. In designing a mental coach for customers, **Sun et al. (2010)** designed a framework for online psychological counseling called PsyCare which provides several features for psychological problems such as anxiety and oppression. The features include:

1. Automatic self-help;
2. Seamless integration of mobile and web to detect and capture the psychological changes;
3. Multi-dimensional psychological screening;
4. Personalisation that tracks each customer and supplies therapy.

2.3 Personal Data Control Variables

Cluster analysis by **Ryan and Xenos (2011)** showed three types of users which are highly vocal, high communicators and high interactive groups. The nature of Facebook users is the focus of this study by finding the relationship between the Big Five traits and some personal characteristics such as shyness, narcissism, loneliness and Facebook use. The Study by **Ryan and Xenos (2011)** targeted student population only. The main item of the study was how personality affects the use of Facebook. The survey package included the personality traits, Narcissistic characteristics, the Cheek and Buss Shyness Scale and the Social and Loneliness Scale for Adults. Additionally, another questionnaire was completed

by Facebook users. The results showed that Facebook users were mainly extroverted, narcissistic, less conscious and lonely when compared to non-users. Other personality factors were influencing the frequency of Facebook use such as neuroticism, loneliness, shyness, and narcissism. A further research topic suggested by **Ryan and Xenos (2011)** that may include control variables such as age, family size and relationship with friends in other social networks and the factor of addiction of Facebook use. The effects of personality traits, self-esteem, lowliness, and narcissism on Facebook were studied by **Skues et al. (2012)**. They examined the relationships between three combinations of the Big Five traits and Facebook such as neuroticism, extraversion, and openness in one combination and self-esteem, lowliness and narcissism in another. They conducted a survey of 393 undergraduate students from a medium-sized college. The regression they conducted on data showed that students with high openness have more friends and spend more time on Facebook. Ironically, students with high level of loneliness have more Facebook friends than other groups. They concluded that neuroticism, extraversion, narcissism, and self-esteem did not have much connection with Facebook use. Students with high openness use Facebook for longer times and frequently while students with lowliness have more friends on Facebook to compensate for their lowliness and few friends offline (**Skues et al. 2012**).

2.4 Student Psychology & Motivations

Three features of the Facebook use such as personality, behaviour and Facebook activity were investigated in a survey that included 113 undergraduate students by **Underwood et al. (2011)**, where the regression results showed that low mild social deviance predicted the behaviour of the communication group. The communication group was characterised with “white lies”, while the other group (broadcasters) indulged in deception and meant to self-promote the user. Broadcasters were marked out with acceptance of risk and low quality of interaction. Broadcasters’ behaviour increased their attendance to the bad side of the Internet. Considering the factors that make people responding to phishing attacks as part of the user behaviour, **Halevi et al. (2013)**, chose to conduct a pilot study of cyber security and privacy-related behaviour to find the correlation between the Big Five traits and email phishing response by email account holder. In another examination, this paper

considered the user's tendency to share information and the consequences of the revelations on privacy in Facebook. This study had the following studied parts:

1. Personality Traits of participants;
2. Demographic background of the participants;
3. The behaviour of users on Facebook;
4. Investigate the real vulnerability of users to a phishing attack.

This study had shown that when the prize phishing email was used, neuroticism is the factor that is responsible for responding to this attack. The study of **(Halevi et al. 2013)** claimed that there was no correlation between risk awareness by users and users who are being phished. This paper also concluded that the susceptibility to phishing attacks was not related to awareness of risk. The paper, therefore, suggested a need to create an online warning system to warn about these phishing attacks. The researchers did mention that their study was limited and could not include all aspects of human personality and its correlations and therefore, suggested in further research to investigate the correlation in large-scale analysis. Another suggestion in this paper is to create novel privacy settings options.

Two previous studies by **Amichai-Hamburger and Vinitzky (2010)** and **Hamburger and Ben-Artzi (2000)** concluded that people who have a high score in the openness factor tend to post more information on Facebook and have less care about privacy settings which make them more vulnerable to phishing attacks. In the gender effect, they found that neuroticism was correlated to loneliness in women due to their sensitiveness to their emotional requirements. Neuroticism in Men was less correlated to their loneliness.

2.5 Summary of Research Review on Facebook Users and their Psychology Factors

Ross et al. (2009) in their research considered how the personality Traits model is related to Social network use, where the authors concluded that the Big Five factors have no high influence on Facebook use as previous literature would conclude. However, in a related field of study, **Steinfeld et al. (2008)** aimed to make enough analysis for the intensity of

using Facebook, the levels of psychological well-being and the level of social capital, have proved the opposite of what **Ross et al. (2008)** concluded. To study three personality factors of Emotional Stability, Adaptability and Need for structure **Svensson et al. (2009)** conducted a study about teamwork in the coalition. **Amichai-Hamburger and Vinitzky (2010)** have found a strong connection between the Big Five traits and the use of Facebook. They replaced the self-reporting by the information upload by users. The regression analysis by **Li et al. (2011)** proved a fundamental relationship between the traits and the online behaviour. **Burger et al. (2008)** concluded that “personality consists of the behaviour patterns and intrapersonal processes originating within the individual”. **Halevi et al. (2013)** conducted a pilot study of cyber security and privacy-related behaviour to find the correlation between the Big Five traits and the email phishing response by email account holder. In another examination, **Halevi et al. (2013)** investigated the user’s tendency to share information and the consequences of the revelations on user’s privacy in Facebook. The paper, therefore, suggested a need to create an online warning system to warn about these phishing attacks. The researchers did mention that their study was limited and could not include all aspects of human personality and its correlations and therefore suggested to investigate the correlation in large-scale analysis. Another further research topic suggested by **Halevi et al. (2013)** is to create a novel privacy settings options.

2.5.1 General Conclusions on Psychology Factors and Big Five Traits Research

All papers above have investigated different issues of the online social networks such as security, privacy attacks, online challenges, service provider privacy settings, awareness, behaviour and the psychology background factors of the users. The research was progressive with time in harmony with the level of OSNs grow, development of technology and the degree of protection supplied by providers in a shape of privacy settings. Some researchers investigated the behaviour as a factor playing a major role in privacy risks. Some researchers tried to find a link between behaviour and the personality factors and the Big Five traits. However, some investigations contradicted the influence of the Big Five traits while the majority confirmed that there is a strong link. There were limitations in the previous studies as just some of the Big Five traits are considered. In the surveys of **Ross et al. (2009)**, **Underwood et al. (2011)** and **Halevi et al. (2013)** the types of OSN activity questions were limited to 20 to 30 questions. In some cases, the email phishing instead of

Facebook attacks was considered as in **Halevi et al. (2013)**. Most of the personality factors research was carried out in small-scale trend instead of large-scale analysis. In fact, there were few objectives to be tested versus the Big Five traits in each piece of research. Despite these limitations, **Svensson et al. (2009)**, **Skues et al. (2012)** and **Halevi et al. (2013)** confirmed the need for further research in different aspects of the online social networks use.

The following are the main further research fields suggested by previous research activities where any one of these fields will fill the knowledge gap:

1. Include all aspects of human personality factors and all of the Big Five traits in any new research.
2. Extend the analysis of the personality factors to a large-scale analysis.
3. Develop a novel privacy setting options for users.
4. The need to create an online warning system to warn about the online attacks.
5. Create a guidance and training package to develop the security knowledge of users and advise users about best behaviour.
6. Design new requirements that providers have to supply to users before adding new friends
7. Establish a systematic method to control the disclosures.

In this PhD research project, most of these requirements were considered and included. The survey questionnaire includes 163 psychology questions for Raymond Cattell's 16 PF (Personality Factors) and the Big Five traits are extracted from the participant and are under investigation in large-scale research as independent factors versus the disclosures, behaviour, and online practices. Novel privacy settings will finally be established. Clearly, this research project will attempt to identify the at-risk groups can be predicted using personality and therefore supply guidance and training package to OSNs users. After the full analysis of the personality factors and the Big Five traits, a scheme to guide the behaviour will be developed. Service providers will be supplied with specific guidance to modify their current settings and a way to characterise every profile with a security grade for users to decide to add a user or to ignore his/her request. These achievements in the

data analysis stage will make it easier to establish a systematic way to control the disclosures and identify the at-risk groups.

2.6 Awareness of Risks and Behaviour

2.6.1 Research on Self-Awareness

Shin Wonsun and Ismail Nurzali (2014) investigated young adolescents' engagement in risk-taking in social networks by considering the role of parental and peer mediation. They conducted a survey in Malaysia with 469 young users aged 13-14 years old which revealed that the control-based parental mediation might cause negative effects that made young users more inclined to take risks in social networks. The parental mediation was found to be related to disagreement with adolescents' befriending strangers in their social network profiles which did not reduce privacy risks. The study also revealed that peer influence resulted in negative outcomes. The more young adolescents talk to their peers about Internet-related issues, the more they disclose identifiable personality information (PII) on their social networks.

Yao and Flanagin (2006) examined the self-awareness role of individuals, in two experiments where a pilot experiment tested the use of web camera with an online exposure to improve the public self-awareness where self-awareness and privacy of users are oriented for pairs of participants who completed Desert Survival Problem (DSP) via a chat process. Then both participants tested each other on factors such as politeness, intimacy, orientation, and formality. **Yao and Flanagin (2006) and Acquisti and Gross (2006)** analysed the attitudes of users with their usage patterns and the effect of privacy concerns on their behaviour. In their study, they have combined a survey of a similar sample of Facebook customers at US University with data mined from Facebook profiles. They looked for the different motivations driving the behaviours of members and non-members of the network about privacy risks. The risk-taking, trust, and privacy issues were an objective of a survey that was conducted on 205 college students by **Fogel & Nehmad (2008)** using efficient scales and controlled behaviour they found that users who have profiles on OSNs are taking high-risk. Men have a more risky attitude than women. Privacy is a more concern to women than men. Men display more personal information on their profiles than women. **Fogel & Nehmad (2009)** puts emphasis on informing users of the potential privacy concerns and risk-taking that are important and relevant and have to be informed to users even before signing-up for their OSNs sites. To investigate the Facebook awareness of privacy by users and the risks and

benefits of using Facebook, **Debatin et al. (2009)** conducted a quantitative survey with the following results:

1. The respondents (119) were mostly females (68%), and the highest average age group lies between 22 and 24 years old (27%).
2. 37% of respondents checked the accounts daily, and 25% checked their accounts three times a day, and 23% checked their accounts five times a day.
3. The hypothesis test predicted that users have a low understanding of privacy controls and therefore will not use privacy settings properly.
4. However, 91% of users confirmed that they were familiar with privacy settings of Facebook and (77%) claimed that they changed the settings to protect themselves. However, most of the attacks would result from the 9% of those users who were unfamiliar with privacy settings.
5. In fact, 69% said that they changed the default privacy settings and 50% said that they restricted their profiles to “only friends”. Despite the understanding of privacy risks and settings, attacks were reported to be occurring. Therefore, this hypothesis may only be supported partially.

Therefore, **Debatin et al. (2009)** concluded that the reckless attitude could arise from many factors such as high gratification, usage patterns and the psychology of the user. They also concluded that large extent of using Facebook by people through specific routines and rituals had exposed users to many types of attacks. Their investigation found that people who faced privacy attacks are more expected to update their privacy controls than others who have not faced invasion or unaware of it. **Debatin et al. (2009)** stated that attacks originated from large amounts of personal information that users upload to Facebook with their full name, address, date of birth, gender, hometown and real photo were displayed. They concluded that while respondents claim they know about privacy settings, they have a limited understanding of the online privacy risks. On average, 50% of survey participants expended approx. 15 minutes in each Facebook session, with 20% expending approx. 30 minutes. Around 18% reported unhappiness of Facebook, such as bad approaches, stalking, harassment, invented rumors, and information thefts. **(Bilge et al., 2009; and Gao et al., 2010)** Concluded that protecting the privacy of OSN users is of crucial importance, since

social network user profiles may contain information that can be exploited by the unscrupulous for identity theft. The accounts may be used to launch SPAM and phishing attacks. **(Faghani & Saidi, 2009)** Found that many users could be lured into downloading malware and viruses. **Hoadley et al. (2009)** argue that compromising a social network account present a greater threat than email hacking, due to the sensitivity of the information submitted, and the inherent trust between users that may enable one compromised account to be used to harvest information from many others.

(Kamik Kopechy, 2016) Presents the results of his survey Czech Children and Facebook, which was conducted by the Virtual Communication Risks Prevention Centre at Palacky University in Olomouc during 2015. The research which included 1122 respondents aged 8–17 years, aimed to find out about how Czech children use the online social network Facebook if they follow basic safety principles, what is their aim for using Facebook. The research also examined the risky forms of communication with the focus mainly on cyber-bullying, sexting and risky forms of dating.

Researchers divided the risks into several focal areas **(Kamil Kopecky et al., 2015):**

- Risks associated with peer-peer communications (e.g., cyber bullying).
- Risks associated with the spread of inappropriate, objectionable, illegal content.
- Risks associated with the abuse of privacy.
- Risks associated with Facebook overuse (e.g. the emergence of addictions, depression).
- Additional risks (e.g. risks associated with online marketing, online fraud, the spread of computer viruses.).

The risks associated with Facebook overuse include in particular the risk of developing a FAD (Facebook Addiction Disorder) that are associated with addictive behaviour in the use of Facebook. FAD is considered as a subset of Internet addictions focused on a particular Internet service such as Facebook. According to psychologist Amy Summers, there are six basic symptoms associated with FAD **(Summers, 2011)** as follows:

1. Growing tolerance (to achieve the same degree of satisfaction, we have to spend more time on Facebook).
2. Appearance of withdrawal symptoms like stress, irritability, and anxiety
3. A decrease in normal social/recreational activities.
4. Preference of virtual meetings on Facebook to meeting in person.
5. Building a large number of virtual relationships with strangers on Facebook, having more than 80% of unknown users in one's profile.
6. Manifestations of addiction begin to show in a normal non-virtual world. We are experiencing obsession feelings similar to gambling. FAD was also diagnosed by the psychologist Michael Fenichel (**Fenichel, 2009**), who defined the disorder by the following five symptoms:

1. Due to night use of Facebook the person does not sleep enough and is tired the next day.
2. The user spends more than an hour a day on Facebook.
3. Obsession with old flames and ex-partners that are found via Facebook.
4. Use of Facebook at the expense of work and job responsibilities.
5. Separation from the largest social network creates feelings of anxiety and stress.

2.6.2 Security of Facebook:

86% of respondents claim that they know how to secure their Facebook account and adjust privacy settings. 26.7% of the children use the same password on Facebook (i.e. a universal password) as they use for access to email. The use of universal passwords to access multiple services that work with sensitive data poses a risk. However, adults have the same attitude to securing their user profiles (**Kopecky and Szotkowski, 2014**), they use a universal password or very easy-to-guess passwords.

2.6.3 Summary of Research Review on Awareness of Risks and Behaviour

Yao and Flanagin (2004) investigated the self-awareness effects in computer-mediated communication. They examined the self-awareness role of individuals in a time controlled and synchronous communication. To better understand the mechanisms, **Yao and Flanagin**

(2004) and **Acquisti and Gross (2006)** analysed the attitudes of users with their usage patterns and the effect of privacy concerns on their behaviour. The risk-taking, trust, and privacy issues were an objective of a survey that was conducted on 205 college students by **Fogel & Nehmad (2008)** who claimed that efficient scales and reliable behaviour was used. **Debatin et al. (2009)** found that the careless behaviour and attitude could arise from many factors such high gratification, usage patterns and the psychology of the user. **Hoadley et al. (2009)** argue that compromising a social network account present a greater threat to privacy and feeling of the user. Much more than any harm that may result from hacking his email account due to the sensitivity of the information submitted, and the inherent trust between users that may enable one compromised account to be used to harvest information from many others. This group of authors has studied the self-awareness and its relationship to trust, behaviour, usage pattern, privacy concerns, and psychology of the user. The limitation of their work is due to the testing of one factor at a time. All these factors that affect the user are tested and analysed in this Ph.D. research project by asking the right questions in a large-scale survey.

2.7 Personal Information Disclosures

2.7.1 Introduction

Disclosure of personal data such as address, name, contact information, hobbies, religious views, political views, on any online social network poses high privacy risks (**Strater and Richter 2007**). Such a huge amount of personal information data is the most important component for the intruders and criminals for using the data to launch attacks or conduct identity theft (**Faghani & Saidi 2009**).

2.7.2 Research on Disclosures

The role of the online disclosures which has raised concerns about the privacy of Facebook users has been investigated by **Strater and Richter (2007)**. Their study examined the disclosures of college students and their privacy behaviour and their attitude towards the social network. They introduced suggestions for further research into privacy controlling software which allows users to disclose information while keeping their privacy data undisclosed. They suggested research that can produce a user-friendly privacy scheme to increase privacy protection on Facebook. In their three surveys, **Nosko et al. (2009)** examined disclosures in Facebook. In their first survey, the contents of profiles are assessed. In the second survey, information related to identity threat, personal and group threats, was considered. In the third investigation, they developed a grouping strategy to include all information on Facebook. **Nosko et al. (2009)** found that:

1. 25% of all information that could be disclosed by users were disclosed.
2. Personal information such as gender or age were considered as part of sensitive personal data.
3. Age and relationship were important information in deciding disclosure.
4. As age increased, the amount of disclosed information in profiles decreased.
5. Those seeking relationships were categorised as a group of high risk as they disclosed a greater amount of personal data.

A random sample of 400 participants from 8 Canadian Universities in three different studies by **Nosko, Wood & Molema (2010)**, was examined.

1. In study 1, a scoring method was established to effectively summarise different types of personal information that is disclosed on user's profiles.
2. In study 2, three grouping techniques (standard information, sensitive demographics, and highly sensitive data) were adopted to assess the level of risk to the user posed by different personal information that they may have disclosed.
3. In study 3, a technique is adopted in checking the availability of information in OSN to conceptualise the provided information better and to find who may disclose it.

Livingstone (2008) explored teenagers' practices to find connections between opportunities and risks. Younger users make use of the opportunity to create a decorated identity. Older users favor a plain text that supplies the link to other people. One of the different means to shape online privacy and undermine it. **Hoadley et al. (2009)** conducted a survey to investigate the privacy controversy among 172 of Facebook users to understand their usage behaviour. The investigation has taken into account the level of concern that users showed by the changes and the reason for their reaction and how this influenced their behaviour. The lessons learned from this investigation was focussed on how the ease of information access control, is very important that might lead the service providers to develop new security features. The study pointed out that there is a difference between the cyber control and the actual control of the information released. Therefore, this paper concluded that users are encouraged to realise the effects of their data disclosure behaviour. **Nosko, Wood & Molema (2010)** found that age and relationship levels are predictors of information releasing behaviour as users of an older age were associated with being less likely to disclose personal information compared to younger users. Those looking for relationships put themselves at highest risk of a threat, and gave away a high volume of personal information, leading the authors to suggest that the results of their research can be used to create software warning techniques that increase awareness of the OSN users who are at risks. However, the researchers tried to answer the question about what motivates online users to disclose important private information. An empirical test model of self-disclosure were examined on 259 subjects. The result of this test showed that people disclose due to their convenience of keeping and improving their relationships. The risks of disclosure was evaluated, and researchers concluded that the limitation of disclosures could decrease risk.

Amanda Williams and Michael J Merten (2008) A review of online social networking profiles by adolescents: implications for future research and intervention, *Adolescence* 2008; 43(170):253-74, Department of Human Development and Family Science, Oklahoma State University, 1111 Main Hall, Tulsa, Oklahoma 74106, USA.

Amanda Williams and Michael J Merten (2008) explored interactions on adolescent profiles. Despite the fact that blogging soared in its popularity, little research has investigated blog messaging within the adolescent interactions. The survey considered 100 randomly chosen profiles owned by adolescents aged between 16 and 18. Rich thematic elements were identified such as family issues, risky behaviours, the disclosure of Personal Identifiable information (PII) and peer interactions. The survey has identified blogs that contain appropriate images and comments about parents and peers, athletics, risky behaviour and sexual language. Additionally, school type was examined as a factor in finding the differences in posted contents by adolescents. However, no important differences were found. In this paper, implications for parental monitoring and intervention was discussed. Adolescents profile include wealthy intimation and publicly available events of social nature that contribute to the understanding of adolescent nature of life and well-being.

Emily Christofides, Amy Muise and Serge Desmarais (2009) Information disclosure and control on Facebook: are they two sides of the same coin or two different processes? *Journal of Cyber Psychology Behaviour*, 12(3), pp. 341-345. Considering the recent media reports that there were negative consequences to information disclosure on social networks such as Facebook, a study by **Emily Christofides, Amy Muise and Serge Desmarais (2009)** investigated undergraduate students' information disclosure on Facebook and the personality factors that influence the level of information. This survey included 343 undergraduate current Facebook students. Results showed that participants declared that they disclosed information about themselves on Facebook despite their awareness of privacy importance. It found that participants posted information such as their birthday and email address, profile pictures, pictures with friends, pictures at parties and drinking. It revealed that the information disclosure on Facebook correlated to the need for popularity,

the level of trust and self-esteem. Different correlation levels were found and were dependent on different aspects of personality implications

2.7.3 Age and Relationship Predictors

A survey run by **Taraszow et al. (2010)** considered 31 profile accounts which were selected to fit the European Commission age range of 13-30 years old. The results showed that all genders disclose personal information such as address, facial picture, hometown, full name and email. The study found that young users of ages between 18-22 years old are unaware of the dangers they face through the disclosure of their real personal data while they also accept friendship requests from people unknown to them. This paper recommended the investigation of the level of awareness of young people when they disclose their personal information can harm them in different ways. How the social networking sites influenced the method of social relationships was a theme of research by **Betman et al. (2011)**. In their literature review, it found that there were competing perspectives on how these sites impact users through their public nature. It led to a question of how the publicness of social networks has encouraged self-disclosure. Therefore, they conducted an online questionnaire. The collected data showed that the publicness of OSN negatively supports self-disclosure intentions. Also, the survey concluded that disclosure affected users negatively to publish subjects related to friends such as likes they made or groups they were affiliated with.

2.7.4 Summary of Research Review on Personal Information Disclosures

The role of the online disclosures which has raised concerns about the privacy of Facebook 'users, has been investigated by **Strater and Richter (2007)**. They suggested research that can produce user-friendly privacy scheme to increase privacy protection in Facebook.com. **Nosko et al. (2009)** examined disclosures in Facebook in three surveys, by assessing the contents of the profiles. A finding by **Spiekermann et al. (2010)** explained the effect of massive self-disclosure that were exploited for commercial benefits by industry centres. A survey run by **Taraszow et al. (2010)** recommended the investigation of the level of awareness of young people when they disclose their personal information that can harm

them in different ways. A further research suggestion by **Betman et al. (2011)** expressed the need to define the variables that affect giving access to their information in OSNs and create business sites that rely on users willing to engage in propagating personal details.

However, the focus of this Ph.D project will be aimed at the methods of guiding users from disclosing through control of behaviour and the training package that will enhance awareness as none of the listed authors in this section has studied the reasons why users psychologically disclose their information.

2.8 Privacy Protection Research

2.8.1 Protection Models

A model for protecting privacy with a set of related methods for adoption called k-Anonymity was developed by **Sweeney (2002)**. It works by comparing the information released and the difficulty to be identified from k-persons whose details might also contain in the release. This k-Anonymity resembles basis for many other real world protection models such as Datafly, u-Argus, and k-Similar. **Sweeney (2002)** presented different attacks against k-Anonymity. **Sweeney (2002)** paper described the k-Anonymity Model, investigated possible attacks and supplied ways to thwart these attacks. A new scheme which is considered by authors as a step towards federated Online Social network is developed by **Wilson et al. (2011)**. It is a standardised API (Application Protocol Interface) to supply a distributed architecture for the online social networks that improve the privacy of users and at the same time keeps the economical' benefits of service providers. This system will allow users to make a suitable trade-off between privacy, cost, and quality of service.

In **(Ryan M Gabet, 2016)** thesis entitled "a Comparative Forensic Analysis of Privacy Enhanced Web Browsers" in 2016, growing concern about Internet privacy has resulted in the creation of enhanced privacy web browsers to provide better privacy for users who use the same computer by not keeping tracking information about the visited websites. A digital forensic examination of three enhanced privacy web browsers and three commonly used web browsers in private mode to test if these browsers produced residual artifacts and if these artifacts produced provided content about the session. The artifacts produced by the two groups were not seriously different. This study identified the need for future research regarding the Internet browser privacy. This research is triggered by **(Walters, 2015)** who claimed that personal privacy and web presence struggle to converge at a reasonable common ground. The increased public knowledge of Internet privacy has sparked widespread discussion about more enhanced privacy measures. The private websites can be viewed without leaving traces and do not store artifacts such as cookies **(Hoffman, 2012)**. However, it continues to present a problem for digital forensic investigators in determining who was responsible for each browsing for nefarious purposes. Therefore, the significance

of this study was not only benefiting the law enforcement but also benefited the society in the pursuit of the Internet privacy where the cyber crimes in the society are on the rise. This research sought to identify whether enhanced privacy web browsers provided a higher level of privacy compared to the anonymous browsing modes of common browsers based on recovered browser artifacts.

2.8.2 Summary of Research Review on Privacy Protection

Without serious efforts to supply guidance and control of the behaviour as is being done in this Ph.D research, the protection of **Sweeney (2002) and Wilson et al. (2011)** models may become outdated in few years from the date of production. In this Ph.D research, it believed that users need guidance and controlled behavior much more than getting a false feeling of security when relying on the protection models only.

2.9 Privacy Settings Research

2.9.1 User Profile Privacy Settings Research

Privacy settings are a set of options designed by the online social network provider for users to choose their privacy preferences. **Gross & Acquisiti (2005)** and **Boyd and Hargitta (2010)** have performed research in this privacy settings field. Potential attacks on privacy were highlighted and revealed by **Gross & Acquisti (2005)** and found out that minimal number of users changed their settings to suit their privacy protection. **Gross & Acquisti (2005)** investigated the information release and different privacy issues in online OSN with emphasis on Facebook. Their survey included 4000 students from Carnegie Mellon University who joined Facebook. The amount of information were evaluated, and the use of the privacy provided settings were analysed. In privacy implications, **Gross & Acquisti (2005)** found that the way the personal information was generously revealed in Facebook profiles and their visibility, resulted in users put themselves at risk of potential physical and online attacks. This study specified the number of online attacks and quantified the number of users who were at risk of attack. This paper suggested how the third party can know the social security number by knowing the date of birth and the address. **Gross & Acquisiti, (2005)** concluded that online networks are looser than the offline networks. In any person's profile, there are few friends and many strangers. Therefore, many personal details are publicly exposed that could make users prone to many physical and cyber-attacks where third party users can make their dossiers of the targeted user behaviour. In the same area of research **Boyd and Hargitta (2010)** examined his research questions:

1. Has the Facebook user ever changed the privacy settings?
2. What is the relationship between the frequency of using Facebook and changing the privacy settings?
3. Does the confidence in controlling the settings correlate with the practical change?
4. Is gender related to confidence or practical change of settings?
5. Does the Internet skill relate to confidence or the practical alteration of settings?

Boyd and Hargitta (2010) examined these research questions by testing attitudes and behaviour of 18 to 19 years old age sector. The privacy settings were targeted in the survey

in 2009 which was rerun again in 2010. The assumption was widely distributed, according to **Boyd and Hargitta (2010)**, young users were not giving attention to privacy settings. This study concluded the opposite, and it also found that changes to settings on Facebook were triggered in the year when Facebook privacy protection was seriously contested. They also found that Internet skills and frequency of Facebook access and user using Facebook are all correlated with changing the privacy settings. It also found in this paper that 36% of content was matching the default privacy settings. It also found that the match between users' expectations and privacy settings was 37% of the time.

2.9.2 Quantification of Privacy Settings Effect on Security

Investigating the full range of privacy settings by users was investigated by **Liu et al. (2011)**, where a range of the dangers of choosing wrong privacy settings, was highlighted. The incidence of choosing the right settings was also investigated. This intended to quantify the level of difficulty in managing privacy. In future work topic, the paper suggested exploring methods to measure the effect of different privacy violations by asking Facebook users or by machine learning schemes. This survey was conducted on 200 Facebook users. **Christofides et al. (2012)** conducted a survey with the intention to highlight the importance of educating the adolescents in the field of privacy and disclosures. This survey included 256 adolescent users of Facebook. The researchers considered the relationship between three factors of practice which are having a negative experience of any sort, knowledge of privacy and behaviour. Bad experiences included bullying, unwanted contacts, unintentional disclosure, and misunderstanding, are likely to encourage users to protect themselves by changing their privacy settings.

2.9.3 Summary of Research Review on Privacy Settings

Gross & Acquisti (2005) found out that minimal amounts of users changed their settings to suit their privacy protection. In the same area of research **Boyd and Hargitta (2010)** examined the following main research questions:

- To what extent did the Facebook user change the privacy settings

- What is the relationship between the frequency of using Facebook and changing the settings?

It was concluded by **Boyd and Hargitta (2010)** that Internet skills, the frequency of Facebook access and user using Facebook are all correlated with changing privacy settings. Investigating the privacy settings by users in another research by **Liu et al. (2011)**, have highlighted the range of the dangers of wrong choosing of privacy settings. With the intention to highlight the importance of educating the adolescents in the field of privacy and disclosures, **Christofides et al. (2012)** conducted a survey that included 256 adolescent users of Facebook.

The limitations and some of the suggestions for further research topics in the reviewed research papers have assured the researchers in this PhD research project that it is moving in the right direction by assessing the degree of settings change, in addressing a training package to guide the OSN users and suggesting new setting options to providers.

2.10 Privacy Attacks

2.10.1 Automated Attacks

In examining the attacks on social networks, **Bilge et al. (2009)** have investigated the ways the attacker could use to launch his identity theft attack and could collect a large volume of personal information. According to **Bilge et al. (2009)**, the first automated identity theft attack is to clone an existing profile and send requests to the cloned profile friends who normally trust their friend and accept his request. By attracting a group of friends of the victim, the intruder can access the personal details disclosed. In the second type of automated attack, the attacker can forge account of a victim in a site where the victim is waiting to be registered yet and contact the friends of the victim who might be registered on this network. It concluded in this paper that the two automated attacks were effective and the friendship adding the rate for the cloned profiles was over 60%. However, the acceptance rate for the fictitious profiles was over 30%.

2.10.2 Improvement in Security Against Spam and Malware Propagation

Gao et al. (2010) presented an initial study to quantify spam distributors using stolen accounts on social networks. They have investigated a large set of datasets of “wall” messages between Facebook customers. Wall messages received by 3.5 million users were analysed to detect spam groups and their link to each other. 200,000 wall posts was detected that originated from nearly 57,000 user profiles. They found that 70% of the spam accounts are transmitting phishing attacks and the nature of spam accounts was found to be hijacked accounts in more than 97%. Spammers were found to have their post activities in the early morning when other users are sleeping. Considering the nature, dynamics of Malware propagation and the defence implications against it, **Yan et al. (2011)** studied malware propagation in OSNs and considered the user activity pattern effect on the malware propagation. The malware attacks investigated in the OSNs based on location dataset of an OSN that includes the user activity logs. A social structure and user activity styles were analysed. Then conclusions were extracted from the datasets which could be translated into other OSNs. A trace-driven simulation was used in this study to find out the impact of malware infections, the clicking probability of users, and the activity patterns of users. This study also studied defence schemes of users and servers to identify the key factors that can

affect the effectiveness of the defence measures. A year later, **Faghani et al. (2009)** investigated the malware propagation in online social networks. They discussed the speed of the malware spread in online social networks using analytical models and simulation packages. They found that this worm propagation correlated to user's behaviour. However, they found that introducing infected profiles in early stages of Trojan worm does not affect the propagation speed.

2.10.3 Summary of the Research Review in the Field of Privacy Attacks

In examining the identity theft attacks **Bilge et al. (2009)** has investigated the ways the attacker could use to launch his identity theft attack and could collect a large volume of personal information. **Gao et al. (2010)** presented an initial study to quantify spam distributors using stolen accounts on social networks. They have investigated "wall" messages between Facebook customers. **Yan et al. (2011)** studied malware propagation in OSNs and considered the user activity pattern effect on the malware propagation. They investigated the nature of malware cyber-attacks in OSNs based on location dataset of an OSN that includes the user activity logs. **Faghani et al. (2009)** investigated the attack dissipation in online social networks. They discussed the speed of the malware spread in online social networks using analytical models and simulation packages.

These studies stopped short of directing users for how to protect themselves through the online social networks settings and they overlooked the fact that the wrong behaviour of users is the source of the problem. **Controlling the behaviour and investigating the personality factors and the Big Five trait, is the main aim of this PhD research project.**

2.11 Privacy Implications and Identity Theft

2.11.1 Types of Privacy Risks

(Faghani & Saidi, 2009) Argue that protecting the privacy of OSN users is of crucial importance, since social network user profiles may contain information that can be exploited by the unscrupulous for identify theft, accounts may be used to launch SPAM and phishing attacks and users could be lured into downloading malware and viruses. **Hoadley et al. (2009)** also argue that compromising a social network account presents a greater threat than email hacking due to the sensitivity of the information submitted, and the inherent trust between users that may enable one compromised account to be used to harvest information from many others. **(Bilge et al., 2009; Strater et al., 2007; and Gross & Acquisti, 2005)** Explained that despite widespread media coverage of the risks of identity theft and other threats, many OSN users do not properly secure personal information from public view, and engage in risky behaviours. Such as befriending strangers, clicking unknown hyperlinks, 'liking' unknown companies or individuals (rendering profile data visible), and downloading applications from unfamiliar sources.

2.11.2 Privacy Risks

(George, 2006; and Kornblum & Marklein, 2006) Have noted that the popular coverage of online social networks triggered serious privacy risks to users especially to the safety and privacy of teenagers. **Aquisiti & Gross (2006)** claimed the existence of a mismatch between the users' intentions to protect their personal information and their awareness of possible attacks.

2.11.3 Demographic Elements

The demographic elements were studied by **(Barne et al., 2007)** for race and ethnicity and showed how identity were defined within the OSN. **(Nyland & Near, 2007)** Focused on religion, and **(Geidner et al. 2007); (Hjorth & Kim 2005)** focused on gender and sexuality. Future research themes about the privacy of OSNs that were suggested by **Boyd & Ellison (2007)** are related to using comprehensive quantitative and qualitative methods that can answer many questions about users' behaviour and attitude without leaving out surveys that include the non-users of OSNs. **Boyd & Ellison (2008)** recommended ways to decrease

the privacy risks. This paper has discussed trends of future investigations with emphasis on the behaviour. As a response to an article by **Boyd & Ellison (2007)**, **Beer (2008)** offered a study on social networking sites. His response praised **Boyd and Ellison (2007)** work, but **Beer (2008)** explained in detail the reasons for his critical analysis to **Boyd & Ellison (2007)** that included the following main points:

1. We should not just think about those with profiles; we should also be thinking of capitalist interests, of third parties using the data, and of the organising power of algorithms;
2. The welfare issues of privacy made public of the motives and agendas of the way that information is taken out of the system to inform the users.
3. How can OSNs be imagined as databases of nowadays that resemble huge and a source of transactions about a big population of OSN users?

2.11.4 Public and Private Facebook Profiles

Comparing Facebook with MySpace (in its time), **Dwyer et al., (2007)** studied trust between users and the privacy attacks within OSNs where a survey of 117 users (69 Facebook users and 48 MySpace users) was conducted. This study attempts to understand how privacy threats and trust level could affect interactions within OSNs sites. The results developed in this paper were nearly similar to the results of **Lampe et al., (2007)**. The preference for some of Facebook profiles to be private versus other profiles that are public has been investigated by **Lewis et al. (2008)**. Through their analysis which included a population of 1,710 profiles, they found out that there are two factors that dictate the tendency to be private, which are:

1. The social influence means that users will have more inclination to use a private account if their friends do so. The reason of this adoption is that the main source of influence comes from close peers.
2. The personal incentive mechanism means that students who practice easy accessibility on Facebook become more cautious about the possibility of others accessing their profiles, and hence they change their settings for better security. It is found by **Lewis et al. (2008)** that a student is significantly more likely to have a private profile if. (1) the student's friends have private profiles; (2) the student is more active

on Facebook; (3) the student is female; and (4) the student generally prefers music that is relatively popular (high mean).

2.11.5 Summary of the Review in the Field of Privacy Issues and Identity Theft

In the investigations above in sections 7.1, 7.2, 7.3 and 7.4 there are several achievements in the field of controlling privacy. However, there are several suggestions for further research topics regarding the safety and privacy of teenagers. The legality of involvement of police, the use of other languages, users behaviour and attitude, online versus face-to-face trust, gender and age differences, the reasons for the tendency to disclose important information, other psychological factors, and the cross-cultural effects. In many papers, there were limitations spelled out by authors. Another major source of uncertainty is in the contradiction between different researchers investigating the same fields of study.

Further data collection by research is required to determine exactly how the independent variables of the users can affect the behaviour and the disclosure of information level. Researchers concluded that it is not possible to investigate the significant relationships of different effective factors without surveys that had considered in detail all demographic and behavioural motivations. This Ph.D project survey has taken all details in both Facebook user activities and the personal factors that feed into the Big Five traits. With wide ranges of data were collected.

2.12 The Internet and Social Computing Usage

2.12.1 Profile Design

Lampe et al. (2007) have studied the design of profiles and how others are attracted to a specific profile. Different theories were explored in this investigation such as signaling theory, common ground theory and transaction costs theory to find out why some profiles designs are more in friendship articulation. A total of 30,773 profiles were investigated to test their prediction level of attracting more friends. Some types of profiles were strongly linked to the number of friends.

2.12.2 Online and Offline Bonds

A survey at Michigan State University by **Ellison et al. (2006)** was run and completed by 286 students to measure the following broad four topics: Demographic and other descriptive variables, Facebook usage measures, psychological measures such as self-esteem and satisfaction with their life at the university and social capital measures. In looking for a role of Facebook in the creation of offline bonds and if there is a relationship between the Facebook usage and the creation of social capital, the findings showed a strong relationship between the Facebook use and the creation of social capital through bridging and bonding.

2.12.3 Self-esteem and Facebook Changes

One of the main findings in **Ellison et al. (2006)** is that low self-esteem students who use Facebook have a greater chance of improving their social capital when compared to their high self-esteem friends. This study has reported some limitations in that they examined one community and a low number of non-members in the sample. This paper suggested a further research topic combining survey results with actual testing of profiles on the Facebook network. To investigate the role of the online social networks in enabling connectivity in social, educational, commercial and political domains, **(Lampe et al., 2008)** conducted their research. Three research questions were considered mainly in their investigation.

1. How does the use of Facebook change over time?

2. How does the aim of users change over time?
3. How does the attitude of online customers towards Facebook change with time?

Surveys and interviews were used for data collection and results showed that the Facebook feature changed over time as many interface changes were published on the timeline between May 2006 and May 2008. In the field of Facebook changes over time, they found that people were using their accounts to articulate their offline relationship and upgrade this relationship in an online environment. It was concluded that the use of Facebook remains consistent over time. In the context of change in perception of audience and privacy, statistics using chi-square number have shown the degree of statistical difference between years. They reported that in the year 2008, more users have noticed that the high school friends had viewed their profiles. There was a large drop from the year 2006 to 2007 due to two major interface changes that occurred between the two surveys. The first was due to the creation of News Feed option on Facebook and the second was due to the removal of the "browse network". That led to a conclusion that perceptions towards OSNs will change in future.

2.12.4 Internet and Adolescents

In another study targeting a specific type of Internet users, **Valkenburg and Peter (2009)** investigated the consequences of Internet for adolescents. In their study, the focus was on the literature review on consequences of Internet use by adolescents which included several studies in the 1990s saying that Internet use by adolescents is detrimental. However, they mentioned that the recent research and publications showed an opposite fact. Consequently, a hypothesis formed by the researchers which after the investigation it has shown that the Internet enhances the disclosures. In the same field of study, **Lee (2009)** investigated the online communication and adolescent social ties. Displacement hypothesis found a negative correlation between time in online use and time with parents. Investigation of the relationship between earlier social life, online interaction and close friendship supported his hypothesis. He found out that the adolescents were more probably to use online relationships if they had strong relationships at a younger age which was predicted to be more cohesive friendship and a good link to the school. In another

major study in the same field targeting young Facebook users and focused on age group between 18 to 30 years old, **Foster et al. (2010)** have investigated why users participate in online social networks (OSNs). The following two research questions were involved in their study:

1. What factors can motivate involvement in the OSNs
2. What barriers are limiting users' involvement in the OSNs

This research originated from their belief that two-thirds of marketers and agency managers put too much emphasis on customer relationships which could be created by the strategic exploitation of the Internet. Therefore, they went on exploring what motivates and de-motivates users in participation in OSNs. Their study concentrated on factors that drive users to use OSNs in particular. The results showed five key motivators that are involved such as community, friendship, participation confidence, information, and participation concerns. A further research topic was suggested to build on their model of motivation by investigating whether motivations differ within the different sector of age group or to examine how motivation is different by different population or of the pattern of usage. **Toma and Hancock (2012)** proposed ideas about why people like to be strongly involved with social networks. The reason estimated by **Toma and Hancock (2012)** is that they get a fulfillment of ego needs. They applied the self-affirmation theory to make their hypothesis about when and why people use Facebook. The first study confirmed their belief that Facebook profile satisfies their need for self-worth. The second study showed that people refer to their online social network after they have a blow to their ego. They concluded that the self-affirmation works in everyday life for all types of people. Two studies were conducted by **Bryant and Marmo (2012)** to address friendship rules on Facebook, In study 1, the tested group data to create 36 rules of Facebook friendship. In study 2, the survey data was utilised to test the student's endorsement of the rules of friendship such as close, casual and acquaintance types.

2.12.5 Summary of the Research Review in the Field of Internet and Social Computing Usage

Findings by **Ellison et al. (2006)** showed a relationship between Facebook use and the creation of social environment through close contacts. Facebook has shown broad appeal as it is not excluding any social groups. This study has reported some limitations in that they

examined one community and that low number of non-members in the sample. A further research topic suggested combining survey results with actual testing of profiles on the Facebook network.

Valkenburg and Peter (2009) concluded that the adolescents were more probably to use online relationships if they had strong relationships at a younger age which was predicted to be more cohesive friendship and a good link to the school. The results showed five key motivators are involved such as community, friendship, participation confidence, information, and participation concerns. A further research topic was suggested to build on their model of motivation by investigating whether motivations differ within the different sector of age group or to examine how motivation is different by different population or of the pattern of usage. In this Ph.D research project, the above research gaps are complemented by studying the importance of Facebook, detailed testing of profiles, many adult age groups are investigated, and many psychological attitudes and behaviour factors and disclosure levels are surveyed as a step to create the training and behaviour control packages and a novel settings scheme.

2.13 Gap in Knowledge and the Contribution to Knowledge by this Project

In this context, many recent open for research topics that were suggested by different authors, are included in the literature review chapter 2. There are several achievements by other researchers in the field of controlling privacy. However, there are several suggestions for open research topics about the safety and privacy of teenagers, the legality of involvement of police, the use of other languages, users' behaviour and attitude, online versus face-to-face trust, gender and age differences, the reasons for tendency to disclose important information, other psychological factors and the cross-cultural effects. Further data collection is required to determine exactly how the independent variables of the users Facebook activities can lead to the behaviour and the disclosure of information. The emphasis was that it was not possible to investigate the significant relationships of different effective factors without surveys that considered in detail all demographic and behavioural motivations. The role of the online disclosures which has raised concerns for privacy of Facebook users has been investigated by Strater and Richter (2007). They suggested research that can produce a user-friendly privacy scheme to increase privacy protection in

Facebook.com. Nosko et al (2010) examined disclosures in Facebook in three surveys, by assessing the contents of the profiles. These valuable papers investigated the level and the related harm of the disclosures to the users.

However, our focus in this research project is:

- i. On reasons of the poor practices that were related to the personal factors and the equivalent Big Five traits.
- ii. A set of methods of stopping users from disclosing through control of behaviour and the training package that will enhance awareness about other users accounts and
- iii. The best use of the provided settings.
- iv. None of the listed authors in this section has studied the reasons why users psychologically disclose their information in the same way as was performed in this project at large scale by considering every Facebook activity.
- v. The 55 research activities have been complemented by full test and analysis of the personality groups, detailed testing of degree of information disclosure on profiles, while all age groups were investigated, and many attitude and behaviour factors were surveyed.
- vi. The questionnaire activities section has included all sorts of behaviour, disclosure and conduct on Facebook where 55 user activities were considered in this project for investigating the all issues that are representing a knowledge contribution.
- vii. Most of previous research activities in this field rely on extracting information from online social networks, while in this research the personal information and Facebook activities are extracted from the Facebook users themselves. Establishing the personality factors and Big five traits as independent parameters that influence the behaviour and aimed to find correlation between the personality Big Five traits and the poor privacy practices by Facebook users. This has been performed by a thorough and comprehensive online survey that has included 163 psychological questions. The answers of these questions were distributed to the related 16 Personal Factors (16 PF) of Cattell (1978). From the 16 PF results, the Big Five traits were extracted to characterise each participant in the online survey. The Big Five traits were correlated to the 55 Facebook

activity data to test the regression, regression square and the regression index (B) in three different stages by a large-scale testing by the SPSS package. Each stage testing had considered the nature of the questions and the types of the selected choices.

viii. The tested three stages are: The Big Five traits versus the numerical questions, the Big Five stages versus the Categorical (Yes or No) questions and the Big Five traits versus the multinomial (more than two choices) questions. All results were very significant (the non-significance was less than 0.05). Therefore, the gap in knowledge contributions are summarised as follows:

1. The use of the results analysis taken from the quantitative and qualitative research surveys can establish a benchmark method for how to evaluate every profile psychologically based on the type of Facebook activities and the way the disclosure of personal information was presented to other users.
2. Examining how the psychology traits relate to users' tendency to protect or ignore their privacy on Facebook and finding which personality traits can lead to more privacy attacks/bullying on Facebook and relate this to the nature of their Facebook profile. From each Big Five traits correlation to each of the 51 Facebook activities a special clustering analysis is conducted to measure the percentage and size of the at-risk group and their related Big Five traits to quantify the harm and bullying or harassment that this group has gone through as a step to educate the at-risk users of the reasons of their suffering and urge them to adopt private instead of public accounts.
3. Investigating why specific Big Five traits are influencing users to behave without caring to their privacy. This has shown specific facets in each Big five that can lead to the wrong behaviour. This achievement would not be possible without running the quantitative and qualitative surveys that identified the risky Big Five traits.
4. Establishing the at-risk groups in each Big Five trait in correspondence to the specific Facebook activity and show the percentage of the wrong behaving users out of the surveyed population.
5. Developing a novel privacy setting which can be adopted by the OSN providers. An educational package which aims to guide the OSN users as part

of a guiding and controlling behaviour scheme where a set of recommendations will be included to advise Facebook users towards best use of the provided settings and for how to avoid disclosure of sensitive personal information.

6. Exceptionally, new set of interactive predictors are used in this research such as Extraversion*Anxiety, Extraversion*Tough-Mindedness etc. These newly discovered predictors have very serious effects on the behaviour of the participants.
7. This research has put emphasis on how to keep the profiles private and how to quantify the degree of risk of any profile before it can be accepted for friendship or rejected. Additionally, this includes full awareness of privacy settings and measures to protect privacy of Facebook users.

2.14 A Critical Review of the Research Undertaken

This research has identified the personality traits of the participants in the survey that led to vulnerability towards the privacy attacks, hijacking and compromising of profiles, wrong behaviour and careless disclosure of personal information. The following points resemble a critical review of the research undertaken:

- The prediction process has provided 5% non-significance or less. No single predictor was adopted if it is not 95% significant at least.
- Exceptionally, new set of interactive predictors are used in this research such as Extraversion*Anxiety, Extraversion*Tough-Mindedness etc. These newly discovered predictors have very serious effects on the behaviour of the participants.
- This research will supply an original contribution to knowledge by highlighting the personal Big Five traits roles in good or bad behaviour. This has been existed in the right time when many online social networks users are concerned about their privacy.
- The view put forward in this research at early stage is logical as the importance of the personal traits stems from their impact on the human behaviour in a high percentage.

- The validity of the evidence put forward is highly significant and matching other research data when a comparison was done in the personality side. The theoretical framework was very helpful as it included Cattell's 16 personal factors and how the related Big five traits can be produced. The SPSS statistical testing theory is also included in the theoretical framework where all achieved statistical parameters are tested and their significance was evaluated.
- The methodology in designing the questionnaire is appropriate and ethical as can be shown in the methodology chapter that includes the quantitative and qualitative research techniques and their related ethical issues. The research methodology has no weaknesses as the questions were comprehensive in a large scale and all possible choices were included.
- This research has not relied on the online survey only. Another qualitative research by interviewing was conducted to a sample of respondents in the quantitative research survey to ask questions which were not asked in the online survey to cover fully the reasons of poor practices and bad experiences.
- The only problem that faced participants was that the questionnaire was lengthy and it could take more than an hour to be completed.
- The findings and results are tabulated and organised properly and explained clearly in detail. The findings seem sound and are highly significant. The data can be interpreted in different ways for different further studies and different objectives such as health diagnosis and suitability for specific jobs.
- The design of the psychological questions reached 163 to cater for all psychological issues for a purpose of a thorough investigation to be in line with Cattell's 16 PF System. Each PF was included with at least 10 different questions.
- Through the clustering, the at-risk group of Facebook users was defined and the related Big five traits were found to measure the percentage and size of the at-risk group and their related Big Five traits to quantify the harm and bullying or harassment that this group has gone through as a step to educate the at-risk users of the reasons of their suffering and urge them to adopt private accounts instead of public accounts. The Big Five traits of the at-risk group is a major step to characterise

the poor practice users so other users can know them in advance and avoid involving with them in OSNs.

- Comparing the correlation results for validation purposes with other researchers, the results of this research have better validity and significance. The Psychological validation is compared with the radial system and both showed high matching. The planned educational and recommendation package that will make use of the accurate results, will be able to satisfy the users for specific Facebook privacy precautions and valuable interface.
- A novel design of the privacy settings is created and will be offered to the Facebook or OSN providers. The randomisation of the participants was respected as can be seen by the normal distribution in the attached correlational study chapter 4.
- This research has highlighted the risky personal information disclosures which any user should not supply these demographics to avoid privacy, safety and identity thefts such as street address, phone number, email and date of birth etc. Specify the Big Five traits that lead to privacy protection or otherwise to influence users to behave in risky ways.
- Establishing experimentally novel explanation of the effect of the interaction between two Big five traits that leads to influencing Facebook user to behave in risky ways and disclose personal information on public profiles. Identify the risky and favourable characteristics of each Big Five trait in the both range extremes which paves the ground for the exact description of the Big Five traits from the Facebook activity behaviour.
- Quantifying the regression between each Big five trait and any Facebook activity by the regression index (B) through the $EXP(B)$ value which can identify the number of times of the effect in the direct proportionality and through $(1/EXP(B))$ in the inverse proportionality. Famous personality models were investigated to know the facets that lead to influence some participants to behave inappropriately or otherwise sensibly in the both extreme values of each Big five trait.
- The qualitative research by interviewing sample of the online participants has supplied more insight about detailed behaviour in responding to a compromised

profile or the degree of awareness about the Facebook privacy settings. The specific behaviour of males and females has been identified.

Chapter 3: Quantitative and Qualitative Research Methodology

3.1 Quantitative and Qualitative Research Methodology Introduction

In this chapter, the research methods used to realise the aims and objectives of this research project are described. Research into online social networks (OSNs) requires that data are collected from real users. **Facebook has been chosen as the case study OSN for this research project** because it is currently the most widely used (over 3 billion users, Facebook Company Statistics) and enables the disclosure of personal information. Social Network Analysis (SNA) is an analytical tool that can be used to map and measure social relations (Rene and Hulst, 2009). Conversely, the manual examination of OSNs tends to be difficult, time-consuming, and arbitrary (J. A. Johnson et al, 2013), making it more prone to error. SNA enables a systematic approach to be taken in the investigation of the large volume of data relating to interconnected OSN users.

In social sciences, quantitative research is the empirical investigation of observable phenomena via statistical, mathematical or computational techniques. The objective of quantitative research is to develop and employ mathematical models, theories and hypotheses related to phenomena (**MIT Open Course Ware, 2010**). The process of measurement is central to quantitative research because it provides the fundamental connection between empirical observation and mathematical expression of quantitative relationships. Quantitative data is any data that is in numerical form such as statistics. Quantitative research tries to quantify a problem and understand how common it is by looking for projectable results to a larger population.

The data can be collected through:

- Surveys (online, phone, paper)
- Audits
- Points of purchase (purchase transactions)
- Click-streams.

It provides a measure of how many people think, feel or behave in a certain way and uses statistical analysis to determine the results (<https://www.linkedin.com/pulse/qualitative-quantitative-research-which-method-you-duntoye>).

3.1.1 Advantages of Quantitative Research (Hopkins, 2000)

1. Quantitative research allows the researcher to measure and analyse data.
2. The relationship between an independent and dependent variable is studied in detail.
3. This is advantageous because the researcher is aware of the final outcome about the findings.
4. Quantitative research can be used to test hypotheses in experimentally.

3.1.2 Disadvantages of Quantitative Research (Hopkins, 2000)

1. Quantitative research does not study things in a natural setting or discuss the meaning things have for different people as qualitative research does.
2. A large sample of the population must be studied; the larger the sample of people researched, the most statistically accurate the results will be.

3.2 The Survey

Survey research is a quantitative method whereby a researcher prepares some set of predetermined questions to an entire group, or sample, of individuals. In the survey, a researcher aims to describe the features of a very large group. This method may also be used as a way of quickly gaining some general details about one's population of interest to help prepare for a more focused, in-depth study using time-intensive methods such as in-depth interviews or field research. In this case, a survey may help a researcher identify specific individuals or locations from which to collect additional data. Survey research is better suited to answering some kind of research questions more than others (**Amy Blackstone, 2012**).

The design of the online questionnaire survey included three main parts:

- i. The Demographic part of users' details
- ii. The Facebook Activity related to privacy
- iii. The Personality Behaviour Factors and the Big Five traits

It worth noted that the questionnaire was drawn to participant in the duration 2012 to 2015 and the analysis of data by the SPSS was carried out during years 2016 and 2017.

3.3 The Personality Psychological Behaviour Questions in Harmony with Raymond Cattell's 16 PF framework

The Cattell's **16PF Questionnaire** is a self-report assessment instrument that measures the Cattell's 16 Personality Factors. Using client responses to the **questionnaire**, standardized scores (Stens) are derived for each of the sixteen Primary Factors of personality. This questionnaire includes 163 questions where the optional response can be one of the following options which are represented as numbers in the respondent's reply chart.

The questions are mixed up in a way where the same questions are presented in different ways. Some are normal, and some are in negated to excavate for the actual feeling of the respondent. Each Cattell's factor of the 16 PF can be evaluated through a group of questions out of 163 questions. In general, each factor can be evaluated by nearly 5-10 questions. A sample of these questions, for example, is as follows:

The rest of questions are shown in the structure of the questionnaire in the following section of this chapter.

Survey participants were 90 people, mainly undergraduate students, staff from Anglia Ruskin University and society friends in the United Kingdom. The surveyed number of participants has contained 70% males and 30% females. All participants were over 18 years old.

3.4 The Online Survey Process

The experiment included two parts: questionnaire and interview. Each student was supplied with a participant information sheet and a consent form to sign before filling the questionnaire online. The questionnaire was in English; Students were asked if they were residents of the United Kingdom to confirm that they understand the language of the questionnaire. Optionally, they were asked to supply their email, to indicate if they wished to receive the data results at the end of the study.

The participants were given a link to fill the questionnaire online to prevent any in-class collaboration that may bias the results. The questionnaire has two main parts. The first part was asking personal demographic questions and the Facebook activity experiences about the day-by-day use and any privacy concerns and behaviour. In this part, each student was asked to evaluate a 5-point scale (1 = strongly disagree to 5 =strongly agree) to test their level of agreeing or disagreeing about their privacy disclosure and any negative consequences they experienced. Some questions were about uploading photos, posts, their personal information disclosures and the degree of changing their privacy settings.

In the second part of the questionnaire, participants were asked to fill questions where each question belongs to one of the personality factors using the Cattell's 16 PF scheme. For each personal factor, there were around 7 to 10 different questions to cover both extremes of each factor and were distributed in the second part.

The questionnaire was hosted only on the SurveyMonkey website (www.surveymonkey.co.uk). The clicked points in each question of the Psychological part were moved to a new scale with five choices as follows:

1-2, 3-4, 5-6, 7-8, 9-10 which gave each choice its weight in the new scale between the two extremes of each personal factor of the 16 PF Cattell's scheme.

3.5 The Ethical Issues of the Project

The ethical issues relating to this research project are:

- i. The sample will be balanced in gender, profession, geographic location and race in both the online and hard-copy questionnaires.
- ii. The emphasis to involve the over 18 year's old participants will be guaranteed by using the consent form signature for the online and hard-copy questionnaires.
- iii. In accordance with the Data Protection Act (DPA) 1998, the researcher will be actively involved in the selection of Facebook users, that is, no information will be passed on to third parties in such a way that it violates the DPA 1998.

- iv. The procedure to be carried out on participants is as follows:
 - Identify demographic group.
 - Providing the information pack to explain the objectives of the study.
 - Providing the consent form for the user to read and sign.
 - Supplying the user with the questionnaire, the researcher name, address and contact numbers, objectives of the research.
 - Answer any question to participants and store the respondent questionnaire in a safely locked place and on a protected drive.
- v. All consents forms will be signed, and scanned copies will be stored on a protected drive which is to be stored in a locked safe.
- vi. The proposed methodological tools do not bear any risk to the physical or psychological well being of the participants.
- vii. All questionnaire, participants need to have a full understanding of the research purpose.
- viii. Participation must be entirely voluntary.
- ix. Participants will be made aware of the right to withdraw at any stage of the research.
- x. The anonymity of hard-copy questionnaires and online questionnaires participants and confidentiality of all data types will be assured.

There will never be any coercion on participants to behave in a certain way.

The Ethics application form was approved.

3.5 Collected Data Samples from the Social Networking Site (Facebook) Users Using the Anonymised Online Questionnaire

3.5.1 The Demographic Part of Users' Details

1. Year of birth
2. Gender
3. Marital status
4. Employment status

3.5.2 The Facebook Activity Related to Privacy

Facebook Activities and Privacy experiences by Facebook users to cover the following issues:

1. The degree to which they are familiar with the security settings on the product they are using,
2. The degree in which they think that security is a concern, and
3. Did they know the availability of information on their account?
4. Demographic details of users that include: gender, employment status, and marital status.
5. How secure do the users feel?
6. Has anybody accessed his or her account without his/her consent?
7. Does the user remember to log out when he uses a friend's or library's computer?
8. Does the user know that Facebook apps to send messages on behalf of his friends?
9. Does the user use a login button from third party websites?
10. Does the user use apps on his mobile phone?
11. Has the user experienced bullying or harassment due to shared posts or photos?
12. If they use multiple user accounts
13. How frequently the user visits his profile daily
14. If they added a person and met him/her in person
15. What influenced the user when adding a new friend?
16. For the best of the user knowledge, he or she is asked to select the access level for each of Facebook profile fields. This item included questions about accessibility level on: current city, hometown, gender, birthday, interested in, languages, relationship status, family members, employer, current college, secondary school, religion, political views, people who inspire, quotations, music he likes, books he likes, movies he likes, television he likes, games he likes, favourite sports, favourite athletics, activities, interests, emails, phone numbers, street address, websites and IM screen names.
17. How many friends does the user have on Facebook?

18. How many photos does the user upload on his profile?
19. How many apps does the user have on his Facebook profile?
20. Nature of the friends: relatives, same town, same university, etc.
21. Frequency of comments/posts on a daily basis
22. How often the user likes the posts, photos or shares
23. If the user ever reported posts or comments as spam
24. If the user uses the activity log to control what is published on his or her profile
25. If the user ever used applications or groups on his Facebook profile.

3.6 Investigation of the Personality Factors of Facebook Users by Using Cattell's 16 Personality Factors (16 PF) and their Relation to the Big Five Traits

3.6.1 Raymond Cattell's 16 Personality Factor (PF) Technique

The 16PF Questionnaire is a comprehensive and widely used measure of normal, adult personality which was developed from factor-analytic research into the basic structural elements of personality. First published in 1949, and now in its fifth edition, the questionnaire is based on Cattell's multi-level personality theory and measures 16 primary factors, five global or second-stratum factors (the original Big Five), and two third-stratum factors. Although the summary of reliability studies indicates that the questionnaire provides reliable information, and a selection of validity studies illustrates how the instrument is used effectively in a variety of contexts.

For over half a century, the 16PF Questionnaire has proven useful in understanding and predicting a wide range of important behaviours, thus providing a rich source of information about testing users.

3.6.1.1 The 16 Personality Factors (16 PF) Meaning Between Two Extremes is as Follows:

1. **Warmth (A):** Lies between Reserved to Warm
2. **Reasoning (B):** Lies between Concrete to Abstract
3. **Emotional Stability (C):** Lies between Reactive to Emotionally Stable
4. **Dominance (E):** Lies between Deferential to Dominant
5. **Liveliness (F):** Lies between Serious to Lively
6. **Rule-Consciousness (G):** Lies between Expedient to Rule-Conscious
7. **Social Boldness (H):** Lies between Shy to Socially Bold
8. **Sensitivity (I):** Lies between Utilitarian to Sensitive
9. **Vigilance (L):** lies between Trusting to Vigilant
10. **Abstractedness (M):** Lies between Grounded to Abstracted
11. **Privateness (N):** Lies between Forthright to Private
12. **Apprehension (O):** Lies between Self-assured to Apprehend
13. **Openness to Change (Q1):** Lies Between Traditional to Open to Change
14. **Self-reliance (Q2):** Lies between Group-Oriented to Self-Reliant
15. **Perfectionism (Q3):** Lies between Tolerates Disorder to Perfectionistic
16. **Tension (Q4):** Lies between Relaxed to Tense

3.6.1.2 Scaling and Transferring of Personality Factors Questions into Cattell's 16 Personality Factors

Option 1: Strongly Disagree	Option 2: Disagree	Option 3: Neither Agree nor Disagree	Option 4: Agree	Option 5: Strongly Agree
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Table 1 The Five Options for Participants

Option 1: Weight 1 or 9 (Depending on the way the question is formed)

Option 2: Weight 3 or 7 (Depending on the way the question is formed)

Option 3: Weight 5 (Depending on the way the question is formed)

Option 4: Weight 3 or 7 (Depending on the way the question is formed)

Option 5: Weight 1 or 9 (Depending on the way the question is formed)

Personality Factor 5 Different Weights are Shown in Table 2:

1	3	5	7	9
Strongly Agree				

1	3	5	7	9
	Disagree			

1	3	5	7	9
		Neither Agree Nor Disagree		

1	3	5	7	9
			Agree	

1	3	5	7	9
				Strongly Agree

Table 2 Personality Factors Different Weights

3.6.1.3 The 163 Psychology Questionnaire Questions Allocation into the Related Cattell's 16 Personality Factors

This is shown in the following table by allocating related questions to each personality factor and read the respondent chosen an option and give a psychological weight to his option. Two random respondents were chosen for example. For each respondent, Column 1 is the chosen option (1 to 5), and Column 2 is for the related weight (1 to 9). For the Warmth PF (for example), all questions that relate to it are extracted from the 163 psychology questions list. This is why the numbers are random in each table in the far left-hand side column. The following Table 3 shows how each PF is drawn as follows and data responses of two participants are used as an example only.

3.7 Extraction of The Big Five Traits from the 16 Personality Factors (16 PF) for Each Participant

3.7.1 Introduction

The detailed descriptions of the Big Five traits are as follows (**Hellriegel and Slocum, 2009, 2011**):

1. **Extraversion (E):** is directly related to social skills, talkative ability and personal charm and energetic versus shy, unassertive, withdrawn, solitary and reserved.
2. **Independence/Agreeableness (A):** reflects the individual behavioural characteristics, such as conducting help, cooperation and sympathy for others versus unkind, difficult, cold, rude and independent.
3. **Tough Mindedness/Openness (O):** reflects the richness of the individual imagination, aesthetic feelings, degree of dedication, inventive and curious about new things versus dull, unimaginative, literal-minded and cautious.
4. **Self-Control/Conscientiousness (C):** includes elements of self-discipline, organisation and thoroughness of planning, as well as the need for achievement versus impulsive, careless and irresponsible.

5. **Anxiety/Neuroticism (N):** reflects the degree of emotional stability, effective, secure and confined versus moody, self-doubting, nervous, sensitive, depressed and anxious.

3.7.2 Methods of Conversion of the 16 Personality Factors into the Big Five Factors

1. **Extroversion**

Extraversion is directly related to social skills, talkative ability and personal charm

For computation of Extraversion, the following Cattell's Personal Factors are considered:

- I. Warmth: Any Warmth Sten at five plus is Positive
- II. Liveliness: Any Liveliness Sten at five plus is Positive
- III. Social Boldness: Any Social Boldness Sten less than 5 is positive
- IV. Privatness: Any Privatness Sten more than 7 is negative
- V. Self-reliance: Any Self-Reliance Sten less than five is negative.

2. **Independence**

Independence (Agreeableness) reflects the richness of the individual imagination, aesthetic feelings, degree of dedication, and curiosity about new things.

For computation of Independence, the following Cattell's Personal Factors are considered:

- a. Dominance: Any Dominance Sten less than 5 is positive
- b. Social Boldness: Any Liveliness Sten less than 5 is Positive
- c. Vigilance: Any Vigilance Sten less than 5 is positive
- d. Privatness: Any Privatness Sten more than 7 is negative
- e. Openness to Change: Any Openness to Change Sten more than 5 is positive.

3. **Tough-Mindedness**

Tough-Mindedness (Openness) reflects the individual behavioural characteristics, such as conducting help, cooperation and sympathy for others

For computation of Tough-Mindedness, the following Cattell's Personal Factors is:

- a. Warmth: Any Warmth Sten at five plus is Negative
- b. Sensitivity: Any Sensitivity Sten at five plus is Negative
- c. Abstractedness: Any Abstractedness Sten less than five is Negative
- d. Openness to Change: Any Openness to Change Sten more than five is positive.

4. **Self-control**

Self-Control (Conscientiousness) includes elements of self-discipline, organisation and thoroughness of planning, as well as the need for achievement.

For computation of Self-Control, the following Cattell's Personal Factors are considered:

- a. Liveliness: Any Liveliness Sten at five plus is Negative
- b. Rule-Consciousness: Any Rule-Consciousness Sten at five plus is Positive
- c. Abstractedness: Any Abstractedness Sten less than five is Negative
- d. Perfection: Any Perfection Sten at five plus is Positive.

5. **Anxiety**

Anxiety (Neuroticism) reflects the degree of emotional stability and has a close link to mental health (depression and anxiety).

For computation of Anxiety, the following Cattell's Personal Factors are considered:

- a. Emotional Stability: Any Emotional stability Sten at less than five is Negative
- b. Vigilance: Any Vigilance Sten at less than five is Positive
- c. For Apprehension: Any Apprehension Sten at more than five is Positive
- d. Tension: Any Tension Sten less than five is Positive.

3.7.3 Scaling and Transferring of the Scores of the 16 Personality Factors into the Big Five Traits

Each Big Five trait has a group of personality factors. For each respondent, there is one weight for each personality factor. The mean of all personality factor weights represents the Sten for the related Big Five traits. This table is an example of how to find the Sten of the Extroversion personality factor.

3.7.4 Finding the Sten of each Big Five Trait for each Participant using the Personality Factors

3.7.4.1 Scaling of the Facebook Activity from the Participants Responses Data on the Basis of Privacy of Users

Scaling of respondents' opinions in the field of Facebook activities can be subdivided into the following categories:

1. Scaling of two choices only that have a “Yes” or “No”.
In this case, a number is given to each. For example, number 5 is given for “Yes”, and number 10 is given for “No”, this is required to facilitate the comparison.
2. Scaling of Gender as “Male” is given number 10 and “Female” is given number 5.
3. Scaling of Multiple choices.

For example:

Questionnaire options regarding some privacy items which could be shown on the Facebook profile to friends and that take shape as follows:

1. Not Supplied
2. Only Me
3. Custom
4. Friends, Except acquaintances
5. Friends

The replies by respondents are equated in regard of security as follows:

- I. Not Supplied is given a score of 10
- II. Only Me is given a score of 8
- III. Custom is given a score of 6
- IV. Friends, except acquaintances is given a score of 4
- V. Friends is given a score of 2

3.7.4.2 Scaling Ideas in Other Research References

In the article of **T. Halevi, J. Lewis and N. Memon (2013)**, their scaling of the number of photos was using the following formula for the Facebook number of photos and the Facebook number of posts:

FB posts = log₁₀ (Total Entries + 0.001)

The users were asked about six different privacy settings options. Each entry was assigned a value between '0' (for nobody) and '3' (for making the item visible to everybody) to each privacy setting element. These values were then added to create a combined value for the Facebook privacy settings out of $6 \times 3 = 18$. This means any activity of making the item visible somehow is given a number. Any number "0" for nobody will not be counted as a disclosure factor against privacy. It is possible, for example, that we can equate Yes, as "3" and No as "0".

3.8 Overview of Coefficient of Correlation and Logistic Regression

3.8.1 The Correlation Coefficient of a Sample

Pearson's correlation coefficient when applied to a sample is commonly represented by the letter r and may be referred to as the sample correlation coefficient or the sample Pearson correlation coefficient. That formula for r is:

$$r = \frac{\sum_{i=1}^n (X_i - \bar{X})(Y_i - \bar{Y})}{\sqrt{\sum_{i=1}^n (X_i - \bar{X})^2} \sqrt{\sum_{i=1}^n (Y_i - \bar{Y})^2}}$$

An equivalent expression gives the correlation coefficient as the mean of the products of the standard scores. Based on a sample of paired data (X_i, Y_i) , the sample Pearson correlation coefficient is:

$$r = \frac{1}{n-1} \sum_{i=1}^n \left(\frac{X_i - \bar{X}}{s_X} \right) \left(\frac{Y_i - \bar{Y}}{s_Y} \right)$$

Where

$$\frac{X_i - \bar{X}}{s_X}, \bar{X} = \frac{1}{n} \sum_{i=1}^n X_i, \text{ and } s_X = \sqrt{\frac{1}{n-1} \sum_{i=1}^n (X_i - \bar{X})^2}$$

are the standard score, sample mean, and sample standard deviation, respectively.

3.8.2 Logistic Regression

Logistic regression has two types: Binary logistic regression for two categorical cases where the answer is “Yes” or “No”. Multinomial logistic regression for multiple cases (more than two outcomes) where we have cases such as Extremely not agree, not agree, I am not sure, Agree, extremely agree. In linear regression, the outcome variable Y_i :

$$Y_i = b_0 + b_1 X_{1i} + \epsilon_i$$

Where b_0 intercepts Y , b_1 quantifies relationship between the predictor and the outcome, X_{1i} is the value predictor variable and ϵ is an error term. For many predictors, we use:

$$Y_i = b_0 + b_1 X_{1i} + b_2 X_{2i} + \dots + b_n X_{ni} + \epsilon_i$$

where b_n is the registration coefficient of the corresponding variable X_{ni} .

We cannot apply these linear models when the outcome variable is categorical. For linear regression to be a valid model, it is assumed that the observed data should have a linear relationship. If the outcome variable is categorical, this assumption is violated (Berry, 1993). One way around it, is to transform the data using the logarithmic transformation the data using the logarithmic transformation (Berry and Fieldman, 1985). Logistic Regression is based on a principle that this transformation is a way of expressing a non-linear relationship in a linear way. It can express the multiple linear regression equation in logarithmic terms called “**Logit**” and hence to overcome the problem of violating the assumption of linearity. Instead of predicting the value of a variable Y_i from a predictor variable X_1 or several predictor variable (X_s), we predict the Probability (Y) occurring given known values of X_1 (or X_s). For example,

$$P(Y) = \frac{1}{1 + e^{-(b_0 + b_1 X_1)}} \quad \text{for single predictor (or)}$$

$$P(Y) = \frac{1}{1 + e^{-(b_0 + b_1 X_1 + b_2 X_2 + \dots + b_n X_n)}} \quad \text{for multiple regression}$$

The result in these two cases will lie between 0 and 1. In multiple logistic regressions, we look for ‘ b ’ that belongs to the corresponding predictor variable which can be taken from the sample data. Here, the least square method is not valid. We need to apply the maximum-likelihood estimation which selects coefficient that makes the observed values most likely to have occurred. In assessing the logistic regression model, we use a measure called log-likelihood:

$$\text{Log-likelihood} = \sum [Y_i \ln(P(Y_i)) + (1 - Y_i) \ln(1 - P(Y_i))]$$

The log-likelihood is similar to the residue sum of square of logarithmic multiple regression, in a way to indicate how much unexplained information there is after, the model has been fitted. Hence, the large values of the log-likelihood statistics indicate poorly fitting model. However, we can use the deviance statistics in the model.

Deviance = -2X log-likelihood

The deviance is referred to as -2LL. So, we can test the logistic regression where constant is used and compare it with a new model which has one or more predictors.

$$X^2 = (-2LL(\text{baseline})) - (-2LL(\text{new}))$$

$$X^2 = 2LL(\text{new}) - 2LL(\text{baseline})$$

$$df = k_{\text{new}} - k_{\text{baseline}}$$

So, we find the new model deviance minus from the deviance of the baseline model. Normally, K_{baseline} is 1.

Assessing the model: R and R² in linear Regression and R-Statistics and R_L² in Multiple Correlations as Applicable to this Research Modelling:

In linear regression, multiple correlation coefficients R and its squared value R² were good to tell how well the model fits data. The likelihood ratio is based on the level of correspondence between predicted and actual values of the outcome. In multiple correlations in logistic regression, it is possible to use R-statistics where it conveys values between -1 and +1 for correlation between the outcome variable and each of the predictor variables. +1 implies that the predictor variable increases, the likelihood variable increases.

$$\text{R-Statistics} = \sqrt{\frac{Z^2 - 2df}{-2LL(\text{baseline})}}$$

As the -2LL term is the deviance of the original model, Z is the Wald statistics and df is the degree of the freedom. However, R is dependent upon the Wald statistic where the Wald Statistic can be inaccurate in some circumstances. It is not good to square it to get regression as it is done in linear regression. Therefore, R should be treated with caution.

Hosmer and Leneshner (1989) calculated something very near to R² in logistic regression and called R_L² as

$$R_L^2 = \frac{-X_{\text{model}}^2}{-2LL(\text{baseline})}$$

Where R_L^2 is calculated by dividing the model Chi-Square (based on the log-likelihood) by the baseline Chi-Square.

$$\text{In another way, } R_L^2 = \frac{(-2LL(\text{baseline}) - (-2LL(\text{new})))}{-2LL(\text{baseline})}$$

R_L^2 is the proportional reduction in the absolute value of the log-likelihood measure, and hence how much is the badness of fit improves as a result of the inclusion of the predictor variables. It can vary between 0 (no prediction) and 1 (indicating that the model predicts the outcome perfectly).

$$R = \sqrt{\frac{(\text{wald}) - (2df)}{-2LL(\text{baseline})}}$$

where Wald is the variable in the equation

$$R_L^2 = \frac{(-2LL(\text{baseline}) - (2LL(\text{new})))}{-2LL(\text{baseline})}$$

where -2LL (baseline) is from iteration history and -2LL

(new) is from the model summary.

To apply the aforementioned background, many testing cases on SPSS for calculating R and R_L^2 can be found in Chapter 4.

3.9 The Potential of Advisory Monitoring and Guidance in Changing User Behaviour

The need to guide, warn and educate the OSN user has led the researcher in this thesis to establish a recommendation package at chapter 8 that is built on what the quantitative and qualitative surveys have supplied of correlated results with the psychological personal factors and the related Big Five traits for each surveyed Facebook activity. The aim is to guide the Facebook users for better practices and awareness to know how to protect their privacy by adopting private accounts and use the provided Facebook security settings for the maximum privacy protection. Due to poor privacy practices, the protection of privacy has been urged recently by many researchers who showed the need for this effort to be comprehensive and inclusive to all OSN activities. Nosko, Wood & Molema (2010) examined a random sample of 400 participants from 8 Canadian Universities in three different studies.

In study 1, a scoring method was established to effectively summarise different types of personal information which could be disclosed on user's profiles. In study 2, three grouping techniques (standard information, sensitive demographics, and highly sensitive data) were adopted to assess the level of risk to the user posed by different personal information that they may have disclosed. In study 3, a technique was adopted in checking the availability of information in OSN to better conceptualise the provided information and to find who may disclose it. They found that age and relationship, were good predictors of information releasing behaviour; users of an older age were associated with being less likely to disclose personal information compared to younger users. Those looking for relationships put themselves at highest risk of threat, and gave away a high volume of personal information, leading the authors to suggest that the results of their research can be used to create software warning techniques that increase awareness of OSN users of risks. Boyd and Hargittai (2010) examined the perceptions and behaviours of a group of 18 and 19 year-olds assessed in 2009 and then in 2010 on the issue of the privacy settings implemented by Facebook. Researchers in Boyd and Hargittai (2010) found that during the year when Facebook's attitude to protect privacy was strongly contested, an increased number of users changed their privacy settings. They also found that both the regularity of Facebook usage as well as the level of Internet proficiency is linked to privacy setting modifications. The main goal of this research is to supply guidance and educational package of recommendations to:

1. Warn about specific risky behaviour
2. Identify the at-risk groups
3. Guide to how to use the provided settings efficiently
4. Specify the psychology of user who requests to be befriended by considering the disclosed personal details and activity.
5. Describe the dominant Big Five trait(s) per each Facebook activity to characterise the average personality of that activity.
6. Characterise each Facebook activity with a specific Big Five trait (s).
7. Supply structured guidance and recommendations, stemmed from the one-by-one interviews, on how to judge other users' profiles
8. Encourage users to adopt a private account choice and avoid specific disclosures.

3.10 Qualitative Research and Interviewing

Following the quantitative research data collected by the online social network questionnaire of Facebook users in two main fields. The first section of the questionnaire was on the Facebook activities and demographic information. The second section was about the behaviour and its relationship to the personality factors and the psychological Big Five traits. After the detailed description of the quantitative research in section 1 of the research methodology chapter, section 2 will describe and discuss the research methodology of the interviewing process.

The interviews provide a qualitative method of gathering evidence, data or information. Our goal in conducting interviews for the Facebook activities and behaviour project was to enrich our understanding of the importance of privacy by the users, the level of protection they adopted, comparing the survey answers to the settings they set and the impact and efficiency of the supplied resources.

In this research, it is needed to carry out interviews as part of our research project, the first things to consider are who will be interviewed, what kind of information is targeted to be obtained, and the type of interview that will help to do that.

3.10.1 The Approach to Research in this Project

Research is centred on defining a problem and investigates changes and interventions that can solve the problem and underpin the main causes of the problem towards a better quality solution. **(David Silverman, 2005)**. The effective feedback of researchers has to be of good quality at different stages of the research process. The aim is to collect evidence and analyse data collected to find the usefulness of the changes made to the system. In some cases, further research questions can be found. The collected data will be transferred into models to test the hypotheses.

3.10.1.1 Mixed Method Research

While quantitative and qualitative research have been adopted in this research project, the mixed methods research is useful in combining the collection and analysis of both qualitative and quantitative data, in a way that achieves complementary strengths and non-overlapping weaknesses to guarantee that the data collection and the analysis is error free according to **Ranjit Kumar (2014)**. Who concluded that the methodology history of social science research shows three main waves: the dominance of quantitative methods, the emergence of qualitative methods, and the growth of mixed methods.

Mixed methods research is an approach to knowledge (theory and practice) that attempts to consider multiple viewpoints, perspectives, positions, and standpoints (always including the standpoints of qualitative and quantitative research) according to **R. Burke Johnson et al, (2007)**.

“Mixed methods research is a systematic integration of quantitative and qualitative methods in a single study for purposes of obtaining a fuller picture and deeper understanding of a phenomenon. Mixed methods can be integrated in a way that allows qualitative and quantitative methods to retain their original structures and procedures (pure form mixed methods). Alternatively, these two methods can be adapted, altered, or synthesised to fit the research and cost situations of the study (modified from mixed methods).”, Huey Chen was quoted in **R. Burke Johnson et al, (2007)**.

“Mixed methods research is empirical research that involves the collection and analysis of both quantitative and qualitative data” Punch 2009.

There are three dimensions for mixed methods. The timing dimension, the weighting dimension and the mixing dimension are described in **(Punch, 2009)**.

3.10.1.2 Use of Interviews

Interviews allow you to gather a wide range of open-ended, qualitative data. They can provide information about people’s motivations, feelings, desires and needs, attitudes, and what they remember. To do this, it has to deal with the private, intuitive, and symbolic world

of the individual which is not readily accessible to consciousness (**Joanna Chrzanowska 2002**).

“Interviewing is a powerful way to gain insight into educational issues through understanding the experience of the individuals whose lives constitute education. Interviewing as a method of inquiry is most consistent with people’s ability to make meaning through language” as quoted from **I. E. Seidman (1991)**.

Interviews are usually a vital part of any project to investigate the usage and impact of digitised resources according to **Joanna Chrzanowska (2002)**. They provide rich qualitative data about specific projects, about key stakeholders, and end users. Interviews can be conducted face-to-face, by telephone or Skype, or even by email. Interviews can be conducted one-to-one, or in small groups. While each of these modes of interviewing has advantages and disadvantages, the strategy, in general, should be to make your interviewee feel as relaxed as possible, <http://microsites.oii.ox.ac.uk/tidsr/kb/32/why-should-i-conduct-interviews>.

In the process to carry out interviews as part of a research project, the first things to consider are whom we will interview, what kind of information we want to obtain, and the type of interview that will help this research to do that. The different types of interviews are as follows:

- Unstructured interview. The interviewer uses at most, an 'aide memoir' - notes to jog the memory - rather than a list of questions. The interview may be like a conversation, with the interviewer responding to the participants and letting them speak freely. However, unstructured interviews do not reflect any preconceived theories or ideas and are performed with little or no organisation. Such an interview may simply start with an opening question such as 'Can you tell me about your experience of visiting the dentist?' and will then progress based, primarily, upon the initial response. Unstructured interviews are usually very time-consuming (often lasting several hours) and can be difficult to manage, and to participate in, as the lack of predetermined interview questions provides little guidance on what to talk about (which many participants find confusing and unhelpful). Their use is, therefore, generally only considered where significant 'depth' is required (**British Dental Journal 204, 291 - 295 2008**).

- Semi-structured interview. The interviewer has a list of questions or key points to be covered and methodically works through them. Similar questions are asked of each interviewee, although supplementary questions can be asked as appropriate. The interviewee can respond how they like and does not have to 'tick a box' with their answer. The flexibility of this approach, particularly compared to structured interviews, also allows for the discovery or elaboration of information that is important to participants, but may not have previously been thought of as pertinent by the research team (**British Dental Journal 204, 291-295, 2008**).
- Structured interview. The interviewer asks the interviewee a series of specific questions, to which a fixed range of answers is possible ('ticking a box'). This is the typical form of interview used in social survey research and can provide quantitative data, as in a questionnaire, (**The Open University, 2015**).

In this Facebook Activity and privacy project, the structured method is adopted. Structured interviews are, essentially, verbally administered questionnaires, in which a list of predetermined questions is asked, with little or no variation and with no scope for follow-up questions with responses that warrant further elaboration. Consequently, they are relatively quick and easy to administer and may be of particular use if clarification of certain questions is required or if there are likely to be literacy or numeracy problems with the respondents. However, by their very nature, they only allow for limited participant responses.

3.10.1.3 Sampling Framework

“Sampling is a process of selecting a few elements from a sampling population. Sampling is a trade-off between accuracy and resources. Through sampling, you estimate the information of interest. You do not find the true population mean” as quoted from (**Ranjit Kumar, 2014**). In the same reference Kumar went on describing qualitative research sampling as three principles guide it, one of which is that the greater the sample size, the more accurate the estimate of the true population mean, given that everything else remains the same. Sampling size does not occupy a significant place in qualitative research, and it is determined by the data saturation point while collecting data.

Different qualitative sampling strategies may be used at different stages of the research, or for different research purposes. Questions which the researcher should ask themselves at the outset, and which will inform the design of the sampling strategy, are similar for both quantitative and qualitative research as detailed by **(Som R.K, 1996)**. These questions and answers are vital for this research project, and each question requires an answer in this social network project which are:

- What are the research objectives?
- What is the target population?
- Who should be excluded from the sample?
- Who should be included in the sample?
- What is the budget?
- What is the reporting period?
- How many qualified researchers are available to work on the project?
- What sampling technique(s) should be employed?
- How are the data to be analysed?
- What data collection methods, should be employed?
- What are the sample criteria?
- How long will the interview be?
- What size should the sample be?
- What should be used as the sampling frame?
- How should potential respondents/participants be recruited?

From this list, there are significant questions that their answers have a major impact on the Facebook users' behaviour in this study which are:

- What are the research objectives?
- What is the target population?
- Who should be excluded from the sample?
- Who should be included in the sample?
- How are the data to be analysed?
- What data collection methods, should be employed?
- What are the sample criteria?

The sampling frame is a major ingredient of the overall sample design. At a minimum, it provides a means of identifying and locating the population elements, and it usually contains a good deal of additional information that can be used for stratification and clustering. The organisation of the frame also often exerts a strong influence on the sample design. Areal clustering is, for instance, greatly assisted by having a frame arranged in suitable geographic units, and stratification is helped by having a frame separated into groups formed by the relevant stratification factors. Frequently listed frames are stored in computer files, with the considerable benefit that they can be readily rearranged to meet sampling requirements **(Graham Kalton, 1983)**.

3.11 Chapter 3 Summary

In this chapter, the research methods used to realise the aims and objectives of this research project are described. Research into online social networks (OSNs) requires that data are collected from real users. Facebook has been chosen as the case study OSN for this research project. Social Network Analysis (SNA) is an analytical tool that can be used to map and measure social relations (Rene and Hulst, 2009). Conversely, the manual examination of OSNs tends to be difficult, time-consuming, and arbitrary (J. A. Johnson et al, 2013), making it more prone to error. SNA enables a systematic approach to be taken in the investigation of the large volume of data relating to interconnected OSN users.

The Survey

Survey research is a quantitative method whereby the researcher prepared some set of predetermined questions to an entire group, or sample, of individuals. In the survey, a researcher aimed to describe the features of a very large group. This method may also be used as a way of quickly gaining some general details about one's population of interest to help prepare for a more focused, in-depth study using time-intensive methods such as in-depth interviews or field research. In this case, the survey might help a researcher to identify specific individuals or locations from which to collect additional data.

The design of the online questionnaire survey included three main parts:

1. The Demographic part of users' details
2. The Facebook Activity related to privacy
3. The Personality Behaviour Factors and the Big Five traits

The Personality Behaviour Questions in the Survey

The Cattell's **16PF Questionnaire** is a self-report assessment instrument that measures the Cattell's 16 Personality Factors. Using client responses to the **questionnaire**, standardized scores (Stens) are derived for each of the sixteen Primary Factors of personality. This questionnaire includes 163 questions where the optional response can be one of the following options which are represented as numbers in the respondent's reply chart.

The questions are mixed up in a way where the same questions are presented in different ways. Some are normal, and some are in negated to excavate for the actual feeling of the respondent. Each Cattell's factor of the 16 PF can be evaluated through a group of questions out of 163 questions. In general, each factor can be evaluated by nearly 5-10 questions.

Survey participants were 90 people, mainly undergraduate students, staff from Anglia Ruskin University and friends in the United Kingdom. The surveyed number of participants has contained 70% males and 30% females. All participants were over 18 years old and living in the United Kingdom.

The Online Survey Process

The experiment included two parts: questionnaire and interview. Each student was supplied with a participant information sheet and a consent form to sign before filling the questionnaire online. The questionnaire was in English; Students were asked if they were residents of the United Kingdom to confirm that they understand the language of the questionnaire.

In the second part of the questionnaire, participants were asked to fill questions where each question belongs to one of the personality factors using the Cattell's 16 PF scheme. For each personal factor, there were around 7 to 10 different questions to cover both extremes of each factor and were distributed in the second part.

The questionnaire was hosted only on the SurveyMonkey website (www.surveymonkey.co.uk).

Raymond Cattell's 16 Personality Factor Technique

The 16PF Questionnaire is a comprehensive and widely used measure of normal, adult personality which was developed from factor-analytic research into the basic structural elements of personality. First published in 1949, and now in its fifth edition, the questionnaire is based on Cattell's multi-level personality theory and measures 16 primary factors, five global or second-stratum factors (the original Big Five), and two third-stratum factors.

The Extracted Big Five Traits from the 16 Personality Factors (16 PF) for Each Participant

Extraversion (E): is directly related to social skills, talkative ability and personal charm and energetic versus shy, unassertive, withdrawn, solitary and reserved.

Independence/Agreeableness (A): reflects the individual behavioural characteristics, such as conducting help, cooperation and sympathy for others versus unkind, difficult, cold, rude and independent.

Tough Mindedness/Openness (O): reflects the richness of the individual imagination, aesthetic feelings, degree of dedication, inventive and curious about new things versus dull, unimaginative, literal-minded and cautious.

Self-Control/Conscientiousness (C): includes elements of self-discipline, organisation and thoroughness of planning, as well as the need for achievement versus impulsive, careless and irresponsible.

Anxiety/Neuroticism (N): reflects the degree of emotional stability, effective, secure and confined versus moody, self-doubting, nervous, sensitive, depressed and anxious.

The Use of Logistic Regression in the Survey Analysis

Logistic regression has two types: Binary logistic regression for two categorical cases where the answer is “Yes” or “No”. Multinomial logistic regression for multiple cases (more than two outcomes) where we have cases such as Extremely not agree, not agree, I am not sure, Agree, extremely agree. In linear regression, multiple correlation coefficients R and its squared value R^2 were good to tell how well the model fits data. The likelihood ratio is based on the level of correspondence between predicted and actual values of the outcome. In multiple correlations in logistic regression, it is possible to use R -statistics where it conveys values between -1 and $+1$ for correlation between the outcome variable and each of the predictor variables. $+1$ implies that the predictor variable increases, the likelihood variable increases.

Qualitative Research and Interviewing

Following the quantitative research data collected by the online social network questionnaire of Facebook users, the interviews provide a qualitative method of gathering evidence, data or information. Our goal in conducting interviews for the Facebook activities and behaviour project was to enrich our understanding of the importance of privacy by the users, the level of protection they adopted, comparing the survey answers to the settings they set and the impact and efficiency of the supplied resources.

In the process to carry out interviews as part of a research project, the first things to consider are whom we will interview, what kind of information we want to obtain, and the type of interview that will help this research to do that. In this Facebook Activity and privacy project, the structured method is adopted. Structured interviews are, essentially, verbally administered questionnaires, in which a list of predetermined questions is asked, with little or no variation and with no scope for follow-up questions with responses that warrant further elaboration. Consequently, they are relatively quick and easy to administer if clarification of certain questions is required or if there are likely to be literacy or numeracy problems with the respondents. However, by their very nature, they only allow for limited participant responses.

The Approach to Research in this Project

Research is centred on defining a problem and investigates changes and interventions that can solve the problem and underpin the main causes of the problem towards better quality solution. The effective feedback of researchers had to be of good quality at different stages of the research process. The aim is to collect evidence and analyse data collected to find the usefulness of the changes made to the system. In some cases, further research questions can be found. The collected data will be transferred into models to test the hypotheses.

**Chapter 4: A correlational
Study that Relates
Personality Traits to Online
Social Network Privacy
Practices**

4.1 Introduction

Online social networks (OSN) have an important role in enabling connectivity in social, educational, commercial and political domains (Lampe et al., 2008). The use of social networking systems has seen a meteoric rise in popularity over the last decade, and their use among the young is particularly pervasive. Protecting the privacy of OSN users is of crucial importance, since social network user profiles may contain information that can be exploited by the unscrupulous for identity theft, accounts may be used to launch SPAM and phishing attacks (Bilge et al., 2009; Gao et al., 2010), and users may be lured into downloading malware and viruses (Faghani & Saidi, 2009). Hoadley et al. (2009) argue that compromising a social network account presents a greater threat, even than email hacking, due to the sensitivity of the information submitted, and the inherent trust between users that may enable one compromised account to be used to harvest information from many others. The personality of the user can be defined as a set of characteristics that makes someone unique. The personality factors are presenting a method for global analysis that impacts the offline and the online behaviour. This research examines the correlation between the Big Five personality traits and the privacy behaviour and possible attacks on users' Facebook profiles.

The hypotheses that motivated the researcher stemmed from a generic hypothesis which states: Certain personality traits will lead to more or less of a certain online activity.

A survey is conducted with consenting users to measure the degree of their awareness of the security settings that are provided to them in one hand and to define the personality of the respondent in the other hand. In the first section, demographics, online practices, Disclosure of information, privacy experiences and behaviour were tested. In the second section, the Raymond Cattell's 16 psychology, Personality Factors (16 PF) were investigated that has led to the extraction of the Big Five traits per person that has been correlated with the other Facebook activity practices. In this context, certain personality traits will correlate to using the "Report Story or Spam" on Facebook wall posts and the impact on users' behaviour and the degree of feeling secure due to the level of awareness of the security settings provided by Facebook. The design of the quantitative research questionnaire

included 67 questions about the demographics, personal information exposing and practices by the participants on the Facebook. In the same questionnaire, a group of 163 questions about the personal factors, behaviour was included and the results from the questionnaire were transferred into the equivalent Big Five traits. This has characterised each respondent with a value to each of the Big Five traits which are: Extraversion, Tough-Mindedness, Independence, Self-Control and Anxiety. Then, the five values of traits are correlated with the respondent's score in each of the Facebook activity questions.

The Facebook activity and behaviour questions have three Types of questions: quantitative type where numbers are involved, the categorical type where the answer is Yes or No and multinomial questions where the answers have more than 2 choices. The majority of the questions on the Facebook activity part are multinomial questions. The final testing results included one or more dominating Big Five traits corresponding to each Facebook activity choice. Therefore, results interpretation was supplied for each test in the comments area and a detailed analysis will be supplied in chapter 5.

Investigating the Facebook practices and the personality factors will be explained in the Method section which will include the type of participants, the description of the design and contents of the survey, the statistical design and the procedure. The results will be included in detail in the appendices, but the description, interpretation of results and comments are shown after each experiment. The Discussion section and the conclusion will be presented at the end of this chapter.

4.2 Survey Methods

Facebook as prominent online social networking, is chosen to investigate the privacy and behaviour because it is a popular online site for college students, where users can make their profiles with their personal information. In early times, any user could see the personal details and activities, including university personnel or others who are signed users. However, with time, the site developed ways for users to control who can view their profiles. A quantitative research survey has been conducted by an online questionnaire where the participants can go online to this link: <https://www.surveymonkey.com/r/J58ZR75> and fill

the questionnaire that includes three fields: demographic question field, Facebook activities field and the 16 personality factors field. The only counted responses are the fully completed questionnaire. The objective of this research is to find a correlation between the Big Five personality traits as independent predictors and the online social network practices and behaviour as dependent predictors which is a step towards an educational package to guide Facebook users for best practice and behaviour that can protect the privacy and protect against the possible online attacks.

4.2.1 Participants

The survey considered participation number of 90 Facebook users as students from Anglia Ruskin University in the United Kingdom. The surveyed number of participants contained 70% males and 30% females. Their average age was nearly 20 years old. Each student was supplied with a participant information sheet and a consent form to sign prior to filling the questionnaire online. As the questionnaire was in English, Students were asked if they were residents in the United Kingdom to confirm that they understand the language of the questionnaire. Optionally, they were asked to supply their emails so the survey results will be provided to them at the end of this study. The participants were given a link to fill the questionnaire online to prevent any in-class collaboration that may bias the results.

4.2.2 Materials

The design of the online questionnaire included three main parts:

4.2.2.1 The Demographic part of users' details such as

5. Year of birth
6. Gender
7. Marital status
8. Employment status

4.2.2.2 The Facebook Activity Related to Privacy

- i. The degree to which they are familiar with the security settings on the product they are using,
- ii. The degree to which they think that security is a concern, and
- iii. Whether they know the availability of information on their own account.

- iv. Demographic details of users that include: gender, employment status, and marital status.
- v. How secure makes the user feel?
- vi. Has anybody accessed their account without his/her consent?
- vii. Does the user remember to logout when he uses a friend's or library's computer?
- viii. Does the user know that Facebook apps to send messages on behalf of his friends?
- ix. Does the user use a login button from third party websites?
- x. Do the user use apps on his mobile phone?
- xi. Has the user experienced bullying or harassment due to shared posts or photos?
- xii. If they use multiple user accounts
- xiii. How frequently the user visits his profile daily
- xiv. If they added a person and met him/her in person
- xv. What influenced the user when adding a new friend?
- xvi. For the best of the user knowledge, he is asked to select the access level for each of your Facebook profile fields. This item included questions about accessibility level on: current city, hometown, gender, birthday, interested in, languages, relationship status, family members, employer, current college, secondary school, religion, political views, people who inspire, quotations, music he likes, books he likes, movies he likes, television, he likes, games he likes, favourite sports, favourite athletics, activities, interests, emails, phone numbers, street address, websites and IM screen names.
- xvii. How many friends does the user have on Facebook?
- xviii. How many photos does the user upload on his profile?
- xix. How many apps does the user have on his Facebook profile?
- xx. Nature of the friends: relatives, same town, same university..... etc..
- xxi. Frequency of comments/posts on a daily basis
- xxii. How often the user likes the posts, photos or shares
- xxiii. If the user ever reported posts or comments as spam
- xxiv. If the user uses the activity log to control what is published on his/her profile
- xxv. If the user ever used applications or groups on his Facebook profile.

4.2.2.3 The Personality Behaviour Factors

Raymond Cattell 16 PF Questionnaire is a way to predict the Facebook user's behaviour and the psychological background. This questionnaire includes 163 questions where the optional response can be one of the following options which are represented as numbers in the respondent's reply chart as shown in the following table 4.1:

Strongly Disagree	Disagree	Neither Agree Nor Disagree	Agree	Strongly Agree
1	2	3	4	5

Table 4.1 The Participant's Options

The questions are mixed up in a way where the same questions are presented in different ways. Some are normal questions, and some are in negated to dig for the actual feeling of the respondent. Each Cattell's factor of the 16 PF can be evaluated through a group of questions out of 163 questions. In general each factor can be evaluated by nearly 5-10 questions. A sample of these questions, for example, is as follows:

- 1) I take time out for others
- 2) I know that I am not a special person.
- 3) I take control of things.
- 4) I try to forgive and forget.
- 5) I keep in the background.
- 6) I can't do without the company of others.
- 7) I trust others.
- 8) I am not easily frustrated.
- 9) I cheer people up.
- 10) I cheer people up.

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. .
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Up to question 163.

The rest of questions are shown in the structure of the online questionnaire in the Appendix A3.0.

The questionnaire was hosted on SurveyMonkey.com website:
<https://www.surveymonkey.com/r/J58ZR75>

For over half a century, the 16PF Questionnaire has proven useful in understanding and predicting a wide range of important behaviours, thus providing a rich source of information about testing users.

4.2.2.4 The Big Five Traits of the 16 Personality Factors:

The detailed descriptions of the Big Five traits are as follows (Hellriegel and Slocum, 2009, 2011):

1. **Extraversion (E):** is directly related to social skills, talkative ability and personal charm and energetic versus shy, unassertive, withdrawn, solitary and reserved. Extraversion has the following factors out the 16 PF scheme: Warmth, Liveliness, Social Boldness, Privateness and Self-Reliance.
2. **Independence/Agreeableness (A):** reflects the individual behavioural characteristics, such as conducting help, cooperation and sympathy for others versus unkind, difficult, cold, rude and independent. Independence/Agreeableness has the following factors out the 16 PF scheme: Dominance, Social Boldness, Vigilance and Openness to Change.
3. **Tough Mindedness/Openness (O):** reflects the richness of the individual imagination, aesthetic feelings, degree of dedication, inventive and curious about new things versus dull, unimaginative, literal-minded and cautious. Tough-Mindedness/Openness has the following factors out the 16 PF scheme: Warmth, Sensitivity, Abstractedness and Openness to Change.
4. **Self-control/Conscientiousness (C):** includes elements of self-discipline, organisation and thoroughness of planning, as well as the need for achievement versus impulsive, careless and irresponsible. Self-Control/Conscientiousness has the

following factors out the 16 PF scheme: Liveliness, Rule-Consciousness, Abstractedness and Perfectionism.

5. **Anxiety/Neuroticism (N):** reflects the degree of emotional stability, effective, secure and confined versus moody, self-doubting, nervous, sensitive, depressed and anxious. Anxiety/Emotional Stability has the following factors out the 16 PF scheme: Emotional Stability, Vigilance, Apprehension and Tension.

4.2.3 Statistical Design

After the Big Five traits were defined from the 16 PF questions, a value for each user of the Big Five traits has been allocated. In the same way a value of the respondent's answer to each activity in question has been given. In examining the correlation between the Big Five psychological traits and the Facebook activity questions, each trait in the Big Five traits is considered as an Independent variable or predictor. The Facebook activity questions are considered as Dependent variables. The next step is to transfer the data to the SPSS package. Each column in the package represents question responses by respondents in both the Facebook activity side and the Big Five traits side. The total of the numbers in each column represents the number of participants in the survey. The whole data file is uploaded on the IBM SPSS as (.SAV) file. Each participant is given an Identification number. The total number of the data columns is 67 (62 columns for the Facebook activity and behaviour and 5 columns for the Big Five traits) plus one column for the participants IDs.

4.2.4 Procedure

4.2.4.1 Survey Procedure

The questionnaire was placed online on the SurveyMonkey website on this link: <https://www.surveymonkey.com/r/J58ZR75>

4.2.4.2 Sample Size in Regression

It is better to have bigger sample sizes to obtain a reliable regression model. There are many rules of thumb but the two most common say you should have size 10 for each predictor or size 15 for each predictor. So, with five predictors a size of 50 or 75 is needed. However, for a sample of 21 cases at 6 predictors we get are $k/(N-1) = 6/(21 - 1) = 0.3$ (medium effect)

where k is the number of predictors, N is the sample size and R is the regression. But if the sample is 100 then $R = 6/(100 - 1) = 0.06$ (better). In general, the sample over 55, therefore, is sufficient.

For Example:

1. Small size where $R^2 = 0.02$ with 6 predictors or less while using a sample of 100.
2. Medium Size where $R^2 = 0.13$ with 20 predictors while using a sample of 160.
3. Large size where $R^2 = 0.26$ with 20 predictors while using a sample of 77.

Sample size depends on the number of predictors (slopes). For 1 predictor you need to have a sample of 25 for large effect and sample of 55 for medium effect. From the above argument, a sample size in this research can be good at 77 and better at 90 and best at 100 (Andy Field 2005).

4.3 Discussion on Results

1. The 16 Personality Factors Test Results Chart Shows a match between the Open Psychology Research Data and the findings of this survey as shown in the appendix of chapter 4.
2. The radar Chart shows also a match between the Open Psychology Research Data and the results of the Big Five traits in this research.
3. The participants' data of this survey shown in the Global Factors Descriptive Statistics represent idealized bell-shaped randomisation in a normal distribution with a mean and a standard deviation as also included in detail in the appendix of chapter 4.
4. The survey participants' data are shown in the histogram charts for the Facebook descriptive statistics giving indication of the trend of choices in the questions as shown in many charts in the appendix of chapter 4.
5. Testing R and R^2 in the **quantitative questions** by using **the Liner Regression** on the SPSS showed the dominating Big Five traits in each question which might be positively or negatively correlated the quantity in the question answer by using the correlation index (B) value which could be negative or negative. The exact effect normally appears in the log (B) value. All conclusion remarks are written under each test.

6. The testing of R and R² in the **Binary logistic categorical regression** test for Yes or No questions has to go through different individual test for each Big Five traits to define the successful model which then is called Model 1. Then all Big Five traits are inserted in Model 2 or Model 3 ...etc until we get the exact significant model. Then the value of R and R² are calculated from the significant model using specific formulae.
7. The questions with many options more than two have been investigated by the **multinomial logistic regression** on the SPSS where the exact outcome results are shown clearly in the "Parameter Estimates" table for the significant values that have the non-significance values equal or less than 0.05 only. Any non-significance more than 0.05 was ignored. In this test, the Big Five traits were taken in Factors side plus the interaction effects of the Big Five traits. The model testing could show the effective interaction traits in each test. And ignore the non-effective ones. The following Factors were involved in each test:

Extraversion, Independence, Tough-Mindedness, Self-Control, Anxiety, Extraversion*Independence, Extraversion*Tough-Mindedness, Extraversion*Self-Control, Extraversion*Anxiety, Tough-Mindedness*Independence, Tough-Mindedness*Self-Control, Tough-Mindedness* Anxiety, Independence*Self-Control, Independence*Anxiety. The significant results for supporting or against each chosen option in the questions are summarised under each test. There should be a reference category in each question which was chosen by the model.

8. There are many other experiments that were conducted and the results are saved in files with the researcher for the planned full analysis in other chapters.
9. The planned analysis will look into each result individually and will look into the big picture as a step to prepare a flowchart to describe each Facebook profile for many possible purposes for the benefit of the guidance in **the recommendation package in Chapter 9 will be established for new Facebook settings, best behaviour and privacy practices and knowing the characteristic of the not well behaving profiles.**

4.4 Conclusions on Each Facebook Activity Questions

In this section, the highly correlated traits with each Facebook activity question are shown about one important issue which is either in favour of giving public a full accessibility or against putting information in public accessibility. The testing results of the Big Five traits correlation with the 49 Facebook activity questions are presented:

1. In the question "How secure do you feel your profile information on Facebook?" the trait is **Extraversion** with negative correlation. The more Extravert the person will be, the less secure he/she feels.
2. In the question "In what year, were you born?" the matching trait is the **Tough-Mindedness** with positive correlation. The more tough-Minded the person is, the younger he/she will be.
3. In the question "How often do you visit Facebook?" the trait is **Tough-Mindedness** with negative correlation. The more the Tough-Minded or self-Controlled the person is, the less he/she visits the Facebook.
4. In the question "How many apps do you currently have?", the trait is **Tough-Minded** with positive correlation. The more Tough-Minded the person is, the more apps he/she has on his profile.
5. In the question "How many uploaded photos do you have?" the trait is **Tough-Minded** with positive correlation. The more Tough-Minded the person is, the more photos he/she has on the profile
6. In the question "How many Facebook friends do you have?" the trait is **Anxiety** with positive effect. The more anxiously relaxed the person is, the more Facebook friends the person has on Facebook.
7. In the question: "Have you ever made friends on Facebook and met them in person?" the trait is **Self-Control** and **Tough-Mindedness** with positive correlation. The more self-controlled the person is, the more he/she makes friends on Facebook and meet them in person.
8. In the question "Are you aware that Facebook apps can send messages on behalf of your friends?" the trait is **Tough-Mindedness** and **Independence** with strong

negative correlation. The more Tough-Minded the person is, the less he is aware that Facebook apps can send messages on behalf of friends.

9. In the question “Do you use the Facebook app on your phone?” the trait is **Tough-Mindedness** with negative correlation. The more Tough-Minded the person is, the less he/she uses the Facebook app on the phone.
10. In the question “Friends and Family I know them in person what influences me to choose my friends?” the trait is **Anxiety** with positive correlation. The more anxious the person is, the more he/she chooses friends whom he/she knows in person.
11. In the question “Do you use Facebook login on 3rd party websites?” the trait is **Tough-Mindedness** with positive correlation. The more Tough-Minded the person is, the more he tends to use login on 3rd party websites.
12. In the question “Have you experienced bullying or harassment due to sharing photos or posts on Facebook?” the trait is **Anxiety and Tough-Mindedness** with positive correlation. The more Anxious the person is, the more he/she experiences bullying or harassment he faces due to sharing photos or posts.
13. In the question “Do you use multiple user accounts on Facebook?” the trait is **Independence** with positive effect. The more Independent the person is, the more he/she uses multiple user accounts on Facebook.
14. In the question “By the way they look in their profile photo, what influences my decision in accepting friends?” the trait is **Tough-Mindedness and Self-Control** with negative correlation. The more Tough-Minded the person is, the less he tends to be influenced by the way other people look in their profile photo when he/she adds them to his profile.
15. In the question “By the way they share the same interest what influences my decision to accept friends?” the trait is **Tough-Mindedness and Self-Control** with negative effect. The more Tough-Minded the person is, the less he/she influenced to accept friends who share the same interest.
16. In the question “Having common friends on Facebook that influences the decision in accepting them?” the trait is **Independence and Tough-Mindedness** with negative correlation. The more independent the person is, the less he/she will be influenced in adding common friends.

17. In the question “Has anybody accessed your Facebook account without your consent?” the **Tough-Mindedness and Independence** support the No choice, but the Yes choice was supported by the Extraversion.
18. In the Question “When accessing Facebook from a friend’s computer university or library, do you remember to logout?” the trait is **Tough-Mindedness** for against “Always”.
19. In the question “How often do you visit Facebook?” the trait is **Tough-Mindedness**.
20. In the question “City Accessibility Level”, the trait is **Extraversion and Self-Control** for supporting “Only Me”.
21. In the question “Hometown Accessibility level”, the trait is **Extraversion and Self-Control** for supporting “Only Me”.
22. In the question “Gender Accessibility”, the trait is **Tough-Mindedness and Extraversion** in the “Only Me” case. This means the Tough-Minded and Extravert may hide his gender. However, the other traits have no correlation with the Gender accessibility.
23. In the question “Birthday accessibility”, the trait is **Independence** which supports the public domain, but the anxiety is strongly against the public domain. This means the Independent person likes to show his real Birthday on the public domain but the Anxious is against showing the real Birthday accessibility.
24. In the question “Interested in Men/Women Accessibility”, the trait is **Independence** in support of public disclosures, but Extraversion is against. In support of “Only Me”, Tough-Mindedness and anxiety are in support, but Extraversion*Anxiety are against. This means the Independent supports showing his/her Interested in Men/Women but the Extravert is against showing this issue. However, the Tough-Minded and the Anxious are supporting the non-accessibility at all but the Extravert*Anxious is against this strictness although this person does not support the public accessibility. This leads to supporting accessibility to friends.
25. In the question “Language accessibility”, the trait is **Independence and Extraversion** in support of public disclosures but Extraversion is against the public choice. This means the Independent person likes to show his language on the public domain but the Extravert person is against.

26. In the question “Relationship Status Accessibility”, the trait is the trait is **Anxiety and Independence** in support of public accessibility and Tough-mindedness and Extraversion are against the public choice. This means the Anxious or Independent person likes to show his relationship status on the public domain but the Tough-Minded and the Extravert are against.
27. In the question “Family Members Accessibility”, the trait is **Tough-Mindedness and Self-Control** are against the public accessibility choice. This means the Anxious person and the Extravert*Self-Controlled are tending to show the family members on the public domain.
28. In the question “Friends Accessibility”, the trait is **Tough-Mindedness and Extraversion** are against the public choice. The Anxious person and the Self-Controlled person like to show their friends on Facebook. However, the Tough-Minded person and the Extravert person are against showing friends publically.
29. In the question “Employer Accessibility”, the trait is **Self-Control** for against the Public accessibility. The Tough-Mindedness, Independence and Extraversion*Self-Control are in support of public accessibility.
30. In the question “College/University Accessibility”, the traits in support of public are **Tough-Mindedness** and Self-Control. But against public accessibility are no traits. The dominant trait is **Tough-Mindedness**.
31. In the question “Secondary School Accessibility”, the dominant traits are: **Tough-Mindedness and Extraversion** in support of the public accessibility.
32. In the question “Religion Accessibility”, the dominant trait is **Self-Control which** is in support of showing religion. Tough-Mindedness (significant) and Extraversion*Anxiety (significant) are in support of the public choice but against the public accessibility are: Anxiety and Extraversion.
33. In the question “Political views Accessibility”, the traits are **Extraversion and Self-Control** for supporting “Only Me” accessibility. The Extraversion*Self-Control trait is in support of the public choice.
34. In the question “People Who Inspire You accessibility”, the dominant trait is **Self-Control** against the public accessibility.
35. In the question “Favourite Quotations Accessibility”, the dominant trait is **Self-Control, which** is in support of public choice but there is no correlation to any trait

to be against. This means the Self-Controlled person supports the public accessibility of the favourite quotations. The other Big Five traits persons do not oppose this accessibility.

36. In the question “Music You like accessibility”, the dominant traits are: **Extraversion** and **Self-Control** and are against the public choice. The only two traits that are in favour of public accessibility are: Extraversion*Anxiety and Extraversion*Self-Control.
37. In the question “Books You like Accessibility”, the dominant trait is **Self-Control** which is against the public choice. The Extravert*Self-Controlled person is in support of the public accessibility.
38. In the question “Movies you Like Accessibility”, the Dominant traits are: **Extraversion and Self-Control** and both are against the public choice. The traits: Extraversion*Anxiety and Extraversion*Self-Control are in support of the public choice.
39. In the question “Television you Like Accessibility”, the dominant trait is **Self-Control, which** is against the public accessibility. The traits Extraversion*Anxiety and Extraversion*Self-Control are in support of the public choice.
40. In the question “Games you Like Accessibility”, the dominant trait is **Self-Control, which** is against the public accessibility choice. ”, the traits in support of public choice are: Independence, Extraversion*Anxiety and Extraversion*Self-Control.
41. In the “Favourite sport accessibility”, the dominant traits against the public choice are: **Extraversion and Anxiety**. The interaction of Extravert*Anxious person is in favour of the public accessibility of the Favourite sport.
42. In the question “Favourite sport team accessibility”, the dominant traits against the public choice are: **Extraversion and Anxiety**. The interaction of Extravert*Anxious person is in favour of the public accessibility of the Favourite sport.
43. In the question “Favourite athletes Accessibility” the dominant traits against the public accessibility are: **Extraversion and Anxiety**. The Independence trait is in support of the public accessibility.
44. In the question “Activity Level accessibility”, the dominant traits are **Self-Control and Tough-Mindedness** against the public choice.

45. In the question “Email Address Accessibility”, the dominant traits are **Extraversion and Anxiety** which are against the public accessibility. The person who is Extravert*Independent supports the public accessibility.
46. In the question “Phone Number Accessibility”, the dominant trait which is against the public choice is: **Self-Control**. However, the traits Extraversion*Self-Control and Extraversion*Anxiety are in support of the public choice.
47. In the question “Street Address Accessibility”, the dominant traits against the public choice are: **Extraversion and Self-Control**. But, the traits Extraversion*Self-Control and Extraversion*Anxiety are in support of the public choice.
48. In the question “IM Screen Names Accessibility”, the dominant traits against the public accessibility are: **Extraversion and Self-Control**. But, Extraversion*Self-Control is in support of the public choice.
49. In the question “Web site accessibility”, the dominant traits against the public accessibility are: **Anxiety and Independence**. The traits Extraversion*Self-Control and Extraversion*Anxiety are in support of the public choice.

4.5 Chapter 4 Summary

Statistical Design

After the Big Five traits were defined from the 16 PF questions, a value for each user of the Big Five traits has been allocated. In the same way a value of the respondent’s answer to each activity in question has been given. In examining the correlation between the Big Five psychological traits and the Facebook activity questions, each trait in the Big Five traits is considered as an Independent variable or predictor. The Facebook activity questions are considered as Dependent variables. The next step is to transfer the data to the SPSS package. Each column in the package represents question responses by respondents in both the Facebook activity side and the Big Five traits side. The total of the numbers in each column represents the number of participants in the survey. The whole data file is uploaded on the IBM SPSS as (.SAV) file. Each participant is given an Identification number.

Regression Sample Size

For a sample of 21 cases at 6 predictors we get $r = k/(N-1) = 6/(21 - 1) = 0.3$ (medium effect) where k is the number of predictors, N is the sample size and R is the regression. But if the sample is 100 then $R = 6/(100 - 1) = 0.06$ (better). In general, the sample over 55, therefore, is sufficient.

The Viability and Validity of the Testing Results

1. The 16 Personality Factors Test Results Chart Shows a match between the Open Psychology Research Data and the findings of this survey.
2. The radar Chart shows also a match between the Open Psychology Research Data and the results of the Big Five traits in this research.
3. The participants' data of this survey shown in the Global Factors Descriptive Statistics represent idealized bell-shaped randomisation in a normal distribution with a mean and a standard deviation.
4. The survey participants' data are shown in the histogram charts for the Facebook descriptive statistics giving indication of the trend of choices in the questions.
5. Testing R and R^2 in the quantitative questions by using the Linear Regression on the SPSS showed the dominating Big Five traits in each question which might be positively or negatively correlated the quantity in the question answer by using the correlation index (B) value which could be positive or negative. The exact effect normally appears in the $\log(B)$ value. All conclusion remarks are written under each test.
6. The testing of R and R^2 in the Binary logistic categorical regression test for Yes or No questions had to go through different individual test for each Big Five traits to define the successful model which then is called Model 1. Then all Big Five traits are inserted in Model 2 or Model 3 ...etc until we get the exact significant model. Then the value of R and R^2 are calculated from the significant model using specific formulae.
7. The questions with many options more than two have been investigated by the multinomial logistic regression on the SPSS where the exact outcome results are shown clearly in the "Parameter Estimates" table for the significant values that have the non-significance values equal or less than 0.05 only. Any non-significance more than 0.05 was ignored. In this test, the Big Five traits were taken in Factors side plus

the interaction effects of the Big Five traits. The model testing could show the effective interaction traits in each test.

Each Facebook Activity Questions Correlation Results

In this section, the highly correlated traits with each Facebook activity question are shown about one important issue which is either in favour of giving public a full accessibility or against putting information in public accessibility. The testing results of the Big Five traits correlation with the 49 Facebook activity questions are presented in chapter 4.

**Chapter 5: The Questionnaire
Data SPSS Testing Analysis
and the Interpretations of
the Facebook Activities in
Correspondence of the
Related Big Five Traits**

5.1 Introduction:

It is vital to introduce again the meaning of each of the Big Five Traits. That were extracted from the personal analysis of the 16 Personal Factors which were translated into the Big Five Traits: Extraversion, Independence (Agreeableness), Tough-Mindedness (Openness), Self-control (Conscientiousness), Anxiety (Neuroticism) and all the interaction Big Five traits where any two Big Five traits interact to yield a new psychological characteristic. These interaction Big Five traits are uniquely discovered and used by the researcher in this thesis. The following interaction Big Five traits are adopted in this research: Extraversion*Independence, Extraversion*Tough-Mindedness, Extraversion*Self-Control, Extraversion*Anxiety. The other possible interactions were tested and found having much less tested correlation index (B) per each Interaction and the models were not significant.

5.2 The B as the Regression Index

The Regression factor (B) is the vital way of showing any correlation between the Big Five trait(s) and the Facebook activity. The effect of the value of the regression index B is represented in the value of (e^B), which indicates the number of times this correlation can be effective. The reference to this effect is when $B = 0$. The $e^0 = 1$. When (e^B)= 1, the conclusion is that there is one effect of correlation. However, B can be any value either positive or negative. When B is positive between 0 and infinity, the correlation effect will be directly proportional between the Facebook activity and one or more of the Big Five traits. In this case the number of times of this effect is (e^B). But if B is negative, the Correlation effect will be equal to the number of times which is = ($1/e^B$). Whenever B is negative, there is an inversely proportional between the Big Five trait (s) and the Facebook activity(s). All details of B and the number of times of its effect are shown in section 5.3 in the tables 5.1 and 5.2.

In the following section (5.3) all testing tables are summarised in one table showing the regression index (B) either positive or negative for each Big Five trait or the interaction trait of Extraversion and any other trait. The dominant Big Five traits are recorded with the second dominant trait. This does not mean other traits are less important, but the idea here is to specify the highest trait and the second high, trait. The description in this chapter for the dominant trait considers the whole population of the participants. The dominant trait in

the population considers the good behaving participants and the participants who are described to be in favour of the “Public” accessibility and against “Only Me” or “Not supplied” Personal information. Looking into each table for each test, it can be easily noticed which trait is in favour of “Public” accessibility or which trait is against “Public” accessibility or in favour of “Friends” or “Only Me”. This has led in the tail of this chapter to organise the results in tables with different colours to discriminate between the quantitative tests, the logistic regression and the multinomial regression. In these tables, the traits that support the “Open” profiles and “Public” accessibility are specified with their related Big Five trait (s). The traits that support the “Friends”, “Only Me”, “Custom” or “Not Supplied” are also specified. The value of the number of times of the effect is always equal to e^B and directly proportional of the effect if B is positive. But, the number of times of the effect is equal to $(1/e^{-B})$ which will be having inversely proportional to the privacy protection issues. If B is negative we can quantify the number of times of effect by $(1/e^{-B})$ as negative B is inversely affecting the result of number of times of the effect $(1/e^B)$ which will be a positive number, but it yields an inversely proportional effect. For example, if $B = 1.549$, the number of times of effect is $e^{1.549}$ which is 4.7 times. If $B = - 0.653$, the value of $(1/e^{-B}) = 1.92$ as a number of times of effect but in the inversely proportional way.

The response regression is calculated in each Dominant model as R^2 but the regression index B is calculated per each trait and with a sign (either + or -).

5.3 Categorical, Quantitative and Multinomial Questionnaire Questions and the Related Big Five Trait (s)

The experimental testing of the categorical type, quantitative type and multinomial type of questionnaire questions are listed in Table A5.1, A5.2 and A5.3 respectively to show in each case the Big Five trait and the related regression index B and the number of times of the b effect as a step before the interpretation of the dominant Big Five traits for each question.

5.4 Interpretation of the Dominant Big Five trait(s) in all Questions

The first step in this context is to connect questions with their dominant Big Five Trait (s) as follows in section 5.4.1:

5.4.1 Dominant Big Five Traits with Corresponding Facebook Activities and the Regression Index (B) and the EXP (B) (Table A5.1 Appendix)

Big Five Trait and Related Activities	The Value of the Regression Index (B)	Description of the effect of Regression and the Number of Times of Effect by EXP (B) = e^B if B is positive and $1/e^B$ if B is negative
Extraversion	B	
How Secure the user feeling is	B = - 0.614	$e^{-0.614} = 0.54$. The number of times of the effect = $1/0.54 = 1.85$ number of times. Low effect Inversely proportional
Friends List Accessibility Level	B = -77	Against "Public" accessibility. Extremely high number of times of effect. Inversely proportional
City Accessibility Level	B = + 57.1	In support of "Only Me" And against "Public" accessibility. Extremely high number of times of effect. Directly proportional
Hometown Accessibility Level	B = + 325.2	In favour of "Only Me" and against "Public" accessibility. For extremely high effect. Directly Proportional
Language Accessibility Level	B = - 6.1	Against "Only Me" and in favour of "Public" accessibility for high effect. Inversely proportional

Music You Like Accessibility Level	B = - 43.7	Against "Public" for extremely high number of times Inversely proportional
Movies You Like Accessibility Level	B = 122.4	In favour of "Only Me" and against "Public" accessibility for extremely high number of times. Directly Proportional
Favourite Sport Accessibility Level	B = - 60.8	Against the "Public" accessibility for extremely high number of times. Inversely Proportional
Favourite Sport Team Accessibility Level	B = - 65.4	Against the "Public" accessibility for extremely high number of times. Inversely Proportional
Athletes Accessibility Level	B = 3128	In favour of "Only Me" and against "Public" accessibility for extremely high number of times. Directly Proportional
Political Views Accessibility Level	B = 18	In favour of "Friends" not "Public" accessibility. For extremely high number of times. Directly proportional
Email Address Accessibility Level	B = + 40.7	In favour of "Only Me" and against "Public" accessibility For extremely high number of times. Directly proportional
Street Address Accessibility Level	B = - 64.6	Against "Public" Accessibility for extremely high number of times. Inversely Proportional

IM Screen Names Accessibility Level	B = 71.1	In favour of "Only Me" and against "Public" accessibility for extremely high effect. Directly Proportional
Independence (Agreeableness)		
The Use of multiple user accounts on Facebook	B = + 2.015	$e^{2.015} = 7.5$ number of times of effect. Directly proportional
Interested in Men/Women Accessibility Level	B = - 17.1	Against "Public" accessibility for extremely high effect. Inversely Proportional
The number of Common friends on Facebook, influences the decision in accepting them	B = - 0.401	$e^{-0.401} = 0.67$. The number of times of effect = $1/0.67 = 1.49$. Low effect. Inversely proportional
Birthday Accessibility	B = 6.5	In favour of "Public" For $e^{6.5} = 665$ number of times of effect. Directly proportional
Tough_Mindedness (Openness)		
Awareness that Facebook apps can send messages on behalf of your friends	B = - 0.653	$e^{-0.653} = 0.52$ $1/0.52 = 1.92$ number of times of effect. Low effect. Inversely proportional

Use of the Facebook App on your phone?	B = - 1.578	4.85 number of times of effect. Medium effect. Inversely proportional
When Accessing a Third Party Computer, Do you Remember to Logout?	B = 428	Exp (428) as Extremely High Number of Times of Effect in favour of "Always" Directly Proportional
Use of Facebook login on 3 rd party websites?	B = + 0.653	1.92 times of effect. Low effect. Directly proportional
The way they look in their profile photo, what influences the decision in accepting friends	B = - 2.067	7.899 times of effect. Medium effect. Inversely proportional
The way they share the same interest what influences the decision to accept friends	B = - 2.122	8.35 number of times of effect. Medium effect. Inversely proportion.
Number of uploaded photos do you have on Facebook?	B = + 205.5	Extremely High Number of times of effect. Directly proportional.
The number of uploaded Apps you currently have	B = + 6.173	Very high number of times of affect. Directly proportional.
Frequency of your visiting Facebook	B = - 0.277	1.32 number of times of effect. Low effect. Inversely proportional.
The Year of Birth	B = + 4.288	72.82 number of times of effect. High effect. Directly proportional but inversely proportional to the age.
Has anybody Accessed your Account without your consent?	B = 1.549	4.7 number of times of effect. Medium effect. Directly proportional

Family Members Accessibility Level	B = - 37	Against “Friends” and against “Public” accessibility. Extremely high number of times of effect. Very high effect. Inversely proportional.
Gender Accessibility Level	B = 15.4	In favour of “Only Me” and against “Public” accessibility. Extremely high number of times of effect. Directly proportional
University/College Accessibility Level	B = 118	In support of “Only Me” And against “Public” accessibility. Extremely high number of times of effect. Directly proportional
Secondary School Accessibility Level	B = 118	In support of “Only Me” And against “Public” accessibility. Extremely high number of times of effect. Directly proportional
Self-control (Conscientious-ness)		
Making friends on Facebook and meeting them in person	B = + 0.243	$e^{+ 0.243} = 1.28$ number of times of effect. Low effect. Directly proportional
Books You Like accessibility	B = 185	In favour of “Only Me” and against “Public” accessibility for extremely high number of times. Directly Proportional
Television You Like Accessibility Level	B = 167.4	In favour of “Only Me” and against “Public” accessibility Directly proportional

Political Views Accessibility Level	B = 18	In favour of "Friends" not "Public" accessibility. For extremely high number of times. Directly proportional
Favourite Accessibility Quotation	B = 17.6	In favour of "Friends" Accessibility. Very high number of times of effect. High effect. Directly proportional
Employer Accessibility Level	B = - 24	Against "Public" accessibility. Extremely high number of times of effect. Inversely proportional
People Who Inspire You Accessibility Level	B = 60.5	In favour of "Custom" accessibility. Extremely high number of times of effect. High effect. Directly proportional
Religion Accessibility Level	B = - 55.3	Against "Public" accessibility. Extremely high number of times of effect. Inversely proportional
Games You Like Accessibility Level	B = + 88.6	In favour of "Only Me" and against "Public" accessibility. Extremely high number of times of effect. High effect. Directly proportional
Activity Level Accessibility Level	B = 116.1	In favour of "Only Me" and against "Public" accessibility. Extremely high number of times of effect. High effect. Directly proportional

Phone Number Accessibility level	B = 20.1	In favour of “Custom” accessibility. Extremely high number of times of effect. High effect. Directly proportional.
Anxiety (Neuroticism)		
Friends and Family I know them in person what influences me to choose my friends	B = + 1.578	$e^{+ 1.578} = 4.89$ number of times of effect. Medium effect. Inversely proportional
Bullying or harassment due to sharing photos or posts on Facebook	B = + 1.334	3.8 times number of times of effect. Medium effect. Inversely proportional
Number of Facebook friends	B = + 277.795	Extremely High number of times. Very high effect. Inversely proportional
Relationship Status Accessibility Level	B = 62.8	The lower the anxiety, the more In favour of “Only Me” and against “Public” accessibility. Extremely high number of times of effect. High effect. Inversely proportional
Website Accessibility Level	B = 1.1	In favour of “Only Me” and against “Public” accessibility. Low number of times of effect. Low effect. Inversely proportional

Table 5.2 Dominant Big Five Traits Corresponding to Facebook Activities, B and EXP (B)

5.5 How do we Interpret People’s Activities on Facebook in Correspondence with their Dominant and Clustered Risky Personality Big Five Traits?

The objective in this section is to specify the dominating Big Five traits and the risky cluster that holds the group of participants who are in favour of showing personal information on

“Public” in an “Open” profile. However, before we proceed to the related Table 5.2, it is important to remind users with the description of what is meant by Big Five traits at low scoring or at high scoring. Then in the second section, the Big Five main risk contributors will be identified, tabled and explained. The Big Five traits, description is shown in Table 5.1 as follows: These are not “types” of personalities, but *dimensions* of personality. So, someone’s personality is the combination of each of their Big Five personality characteristics. For example, someone may be very sociable (High Extraversion), not very friendly (low Agreeableness), hard-working (high Conscientiousness), easily stressed (low Emotional Stability) and extremely creative (high Intellect) (Rentfrow, 2009).

5.5.1 Personality Big Five Traits Risk Contributors

Each Big Five trait has a value which can be theoretically allocated between 2 to 8 according to the measuring scale in this thesis in chapter 3. **These numbers are a chosen scale by the researcher.** So, in this scale, the highest scores of the trait can be between 6 and 8 and the low values can be between 4 and 6 except for the Anxiety which is high at this level. Any group of high values, for example, 6 to 8 were considered serious contributor to the Facebook activity (Anxiety in this level is low) such as having the profile “Public” or has “Public” accessibility in one or more of the personal Facebook information. The group of users who responded with “Public” choices are always attached to one or more of the Big Five traits where the Big Five traits are the independent variables and the Facebook activity is always the dependent variable. In this context, the Big Five trait (s) are the reasons to control the user choice (s). From the previous testing in Chapter 4 and 5 and the clustering in chapter 6, it can be tabled to see to which Big Five trait (s) each activity on Facebook profile belongs to. If there is one predictor in one test that carries regression of 0.3, for example, all other 5 predictors may yield 0.36. This means the dominant predictor carries $0.3/0.36 \times 100\% = 83\%$. Therefore, the dominant cluster of respondents has a big weight despite the fact that the cluster has the other significant Big Five traits even if the dominant is the most influential one. From this understanding, the dominant Big Five traits are considered only. Normally, the – 2 Logical Likelihood (-2LL) is taken to compare between the Big Five traits – 2LL in one model. The trend of R^2_L can be, for example, between 0.65 and 0.89. The average of the effect is 77%, which represents the substantial effect of One Big Five trait followed by the other trait.

It is essential here to mention that all Big Five traits increase in value to give better status of the model except for the Anxiety (Neuroticism) which is worse when its values go up and best for its value to go down for the person to be stable and happy despite the fact that this personality trait can conduct loosely in regard of privacy when it scores down not up.

Facebook Activity (Logistic Regression)	The Influencing Dominant and Clustered Risky Big Five Trait (s)
Have you ever made friends and met them in person?	Dominant Trait: Self-Control Clustered Risky Trait: Tough-Mindedness
<ol style="list-style-type: none"> 1. Are you aware that Facebook apps can send messages on behalf of your friends? 2. Do you use the Facebook app on your phone? 3. Do you use Facebook login on 3rd party websites? 4. By the way they look in their profile photo, what influences my decision in accepting friends? 5. By the way they share the same interest what influences my decision to accept friends 	Dominant Trait: Tough-Mindedness Clustered Risky Trait: Self-Control and Independence
When Accessing a Third-Party Computer, do you remember to Logout?	Dominant Trait: Tough-Mindedness Clustered Risky Trait: Tough-Mindedness and Self-Control
<ol style="list-style-type: none"> 1. Has anybody accessed your Account without your consent? 2. Do you use the Facebook Apps on your phone? 	Dominant Trait: Tough-Mindedness Clustered Risky Trait: Independence

Friends and Family, I know them in person, what influences me to choose my friends	Dominant Trait: Anxiety Clustered Risky Trait: Independence
How often do you visit Facebook?	Dominant: Tough-Mindedness Clustered Risky Trait: Independence
Have you experienced bullying or harassment due to sharing photos or posts on Facebook?	Dominant Trait: Anxiety Clustered Risky Trait: Self-Control and Independence
Do you use multiple user accounts on Facebook?	Dominant Trait: Independence Clustered Risky Trait: Self-Control
Having common friends on Facebook that influences the decision in accepting them	Dominant Trait: Independence Clustered Risky Trait: Tough-Mindedness
1. Current City Accessibility 2. Hometown Accessibility	Dominants: Extraversion and Self-Control Clustered Risky Trait: Independence
Gender Accessibility	Dominant: Tough-Mindedness and Extraversion Clustered Risky Trait: Self-Control
Birthday Accessibility	Dominant: Extraversion, Tough-Mindedness, Self-Control and Anxiety Clustered Risky Trait: Independence
Interested in Men/Women Accessibility	Dominant: Anxiety and Extraversion Clustered Risky Trait: Independence
Language Accessibility	Dominant: Extraversion and Tough-Mindedness Clustered Risky Trait: Independence
Relationship Status Accessibility	Dominant: Anxiety and Extraversion Clustered Risky Trait: Independence

Family Members Accessibility	Dominant: Tough-Mindedness and Self-Control Clustered Risky Trait: Anxiety
Friends List accessibility	Dominant: Extraversion and Tough-Mindedness Clustered Risky Trait: Anxiety
Employer Accessibility	Dominant: Self-Control Clustered Risky Trait: Tough-Mindedness
University/College Accessibility	Dominant: Tough-Mindedness Clustered Risky Trait: Self-Control
Secondary School Accessibility	Dominant: Tough-Mindedness and Extraversion Clustered Risky Trait: Self-Control
Religion Accessibility	Dominant: Self-Control Clustered Risky Trait: Self-Control and Extraversion*Anxiety
Political Views Accessibility	Dominant: Self-Control and Extraversion Clustered Risky Trait: Tough-Mindedness
People Who Inspire You	Dominant: Self-Control Clustered Risky Trait: Self-Control and Extraversion*Self-Control
Favourite Quotation Accessibility	Dominant: Self-Control Clustered Risky Trait: Independence
Music you Like Accessibility	Dominant: Extraversion and Self Control Clustered Risky Trait: Self-Control and Extraversion*Self-Control
Books you Like Accessibility	Dominant: Self-Control and Extraversion Clustered Risky Trait: Self-Control and Extraversion*Self-Control
Movies you Like Accessibility	Dominant: Extraversion and Self-Control

	Clustered Risky Trait: Self-Control and Extraversion*Anxiety
Television you Like Accessibility	Dominant: Extraversion and Self-Control Clustered Risky Trait: Self-Control and Extraversion*Self-Control
Favourite Sport Accessibility	Dominant: Extraversion and Anxiety Clustered Risky Trait: Independence and Extraversion*Anxiety
Favourite Sport Team Accessibility	Dominant: Extraversion and Anxiety Clustered Risky Trait: Independence and Extraversion*Anxiety
Favourite Athletes Accessibility	Dominant: Extraversion and Anxiety Clustered Risky Trait: Independence and Extraversion*Anxiety
Activity Level Accessibility	Dominant: Self-Control and Tough-Mindedness Clustered Risky Trait: Tough-Mindedness and Extraversion*Anxiety
Email Address Accessibility	Dominant: Extraversion and Anxiety Clustered Risky Trait: Independence and Extraversion*Anxiety
Phone Number Accessibility	Dominant: Extraversion and Self-Control Clustered Risky Trait: Self-Control and Extraversion*Self-Control
Street Address Accessibility	Dominant: Extraversion and Self-Control Clustered Risky Trait: Self-Control and Extraversion*Anxiety
IM Screen Names Accessibility	Dominant: Extraversion and Self-Control Clustered Risky Trait: Self-Control and Extraversion*Self-Control
Website Accessibility	Dominant: Anxiety and Independence

	Clustered Risky Trait: Independence
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Table 5.3 Presentation of each Facebook Activity in Correspondence to Dominating or Clustered Big Five Trait(s)

It is necessary to discuss few examples from the table and explain why the corresponding specific Big Five Trait has its effect on people to choose their choices during their Facebook activities:

Example

1. Are you aware that Facebook apps can send messages on behalf of your friends?
2. Do you use the Facebook app on your phone?
3. Do you use Facebook login on 3rd party websites?
4. By the way they look in their profile photo, what influences my decision in accepting friends?
5. By the way they share the same interest what influences my decision to accept friends.

The above mentioned 5 Facebook activities are corresponding to the following dominant and risky Personality Big Five traits:

1. Dominant Trait: Tough-Mindedness and 2. Clustered Risky Traits: Self-Control and Independence.

As 90 participants have responded either “Yes” or “No” for each of the above Facebook activity, the corresponding correlation by the regression index B is highest for the Tough-Mindedness with majority of respondents score more in the Tough-Mindedness in numbers of participants and choose more privacy protection options by being against the “Public” choice or in support of “Only Me” or with “Friends” choice.

There may be a little correlation in the same privacy protection choices in Extraversion or Anxiety traits but with smaller numbers. However, there will be two other traits: Self-Control and Independence in favour of “Open” accessibility or against “Only Me” options. These two traits normally carry a spectrum of participant Big Five traits values. The values that are

exceeding 6 out of the spectrum of values for either Self-Control or Independence are the seriously risky cluster that is dominated by Self-Control and Independence.

This cluster does include the participants who scored high in Self-Control and Independence for group of high values. There is also group on Self-Control and Independence low values. Their number is proportional to the correlation index B out of the total number of the population.

The allocation of the dominant Big Five trait can be read for each activity from the test table of B's as can be seen, for example, in Test number 2 in Chapter 5 appendix: All other empty fields of testing in the tables are non-significant and therefore, were not considered. All inserted results in the tables are significant for a non-significance < 0.05 . Obviously the **B** value for the Tough-Mindedness is 1.549 in favour of the choice "No" while the B value of Self-Control is -1.31 and the **B** value for Independence is -0.67 . Both of the negative values are against the choice "No". In the clustering Chapter 6, there are two clusters of two sets of Big Five traits. Both Clusters are for the choice "No" (which is option 2 in the questionnaire) as seen in **Table A5.4** and **Table A5.5**.

It can be seen in **Table A5.5** that in cluster 1 there is a lower set of scores of all the 5 traits when compared to Cluster 2. However, the 5 traits are dominated by the Tough-Mindedness as can be seen in Table 8.3 which carries $B = 1.549$ in favour of the choice "No". The total number of participants who scored these 5 traits in Cluster 1 is 54 out of 90. In cluster 2 there is a set of the 5 Big Five traits with higher scoring values compared to Cluster 1. These 5 traits resemble the risky group who favours "Open" accessibility but are dominated by two traits: The Self-Control and the Independence.

Their recognition can be seen through Table 8.3. Their **B** values are -1.31 for the Self-Control and -0.67 for the Independence. The "-" sign means that both traits are against the option "No" which means they favour the option "Yes" of the question above. The number of times of the effect of B of the Tough-Mindedness is $e^B = e^{(1.549)} = 4.7$ times. But the effect of B of the Self-Control $= e^B = e^{(-1.31)} = 0.2698$ which has a number of effects $= 1/(0.2698) = 3.7$ times inversely proportional. The effect of $B = -0.67$ of the Independence $= e^{(-0.67)} = 0.5117$ which

has a number of effects = $1/(0.5117) = 1.95$ times inversely proportional. The total number of participants in Cluster 2 is 36 as seen in Table 8.5. These 36 participants contain few Tough-Mindedness persons who score high in the trait and therefore are considered risky, few Anxiety persons, few Extraversion persons, but the majority of the rest in Cluster 2 are nearly two thirds Self-Control persons and nearly one third are Independent persons in harmony with their number of effects of their B. Therefore. These persons can influence negatively most of Facebook activities. The group of 54 participants in Cluster 1 has a mixture of the 5 traits and the group in Cluster 2 has a group of 36 participants.

The only change in every other question is the movement in the numbers from Cluster 1 to Cluster 2 and from cluster 2 to Cluster 1 in a dynamic way. The reason for the change is that some participants who are Self-Control at one time can become affected by the Extraversion influence and therefore bear an interaction of Extraversion and Self-Control. They then become carrying a new trait called Extraversion*Self-Control. The person who has this interaction can become an entirely different person than either the original Extraversion or the original Self-Control. The effect of this new trait always favours "Open" or "Public" accessibility of the private information.

This type of interaction is not occurring in Extraversion*Self-Control only but can be Extraversion*Independence, Extraversion*Tough-Mindedness and Extraversion*Anxiety. These interaction traits are risky and mostly act negatively with one other trait such as Independence or Self-Control. The reason of the interaction occurrence is due to the dominance of two major traits where Extraversion can be one of them.

For example, Extraversion and Independence can yield interaction trait Extraversion*Independence which is opposite to either of the original traits. In this research, other tests for interaction that included, for example, Tough-Mindedness*Independence did not yield effect on results. The four traits that are found during this research to be composing the risk are: Independence, Self-Control, Tough-Mindedness and the interaction of Extraversion*(any other trait) depending on which trait dominating with the Extraversion. In many Facebook activities, the only traits that can be risky is the interaction trait.

The main question which the Facebook users may ask is: How can we know the Personality Big Five trait of a person from his profile management? This question can be answered from the research experience conducted in this thesis. Looking for the behaviour for one case of accessibility is not enough. There should be a specific group of actions by the Facebook user for the user's main trait to be known.

In **Table A5.4** each Facebook activity has one dominating Big Five trait and one risky Big Five traits. The dominating Big Five traits as have been seen in the discussion in Chapter 5, are well-behaving, supportive of privacy and personal information and in some cases, supportive of "Only Me" or at least supportive of "Friends" or "Custom" options. Therefore, to protect Facebook users, it is needed to concentrate on the influencing traits that make Facebook users behave in risky ways by giving access to many Facebook parameters and tend to expose their personal data to the intruders or the cyber-attacks as shown in the clustering process in Chapter 6. In this context, the following table is summarised to focus on the traits that can influence some users to behave in a "Public" accessibility fashion as shown in **Table A5.5** in the Appendix A5.

As **Table A5.5** has included the Big Five traits that are contributing to risk in Facebook activity behaviour by users in the **accessibility** fields of activity, the following **Table A5.5** is showing how the Big Five traits are going to contribute to the risk in all types of the investigated questions. The **Table A5.6** is created to group the Big Five traits as a final step in specifying the contributors to influence Facebook users to be less careful and more supportive to "Public" accessibility.

It is important to note that **Table A5.5** is including the negative contributors only which have been known by clustering in Chapter 6. From **Table A5.5** it is obvious that the Big Five traits, Extraversion and Anxiety, have no negative influence, in general, in supporting the "public" accessibility and choosing any option that can lead to risking the privacy of the Facebook user as can be noticed in the logistic regression type of questions that the choice can be either "Yes" or "No". These two traits (Extraversion & Anxiety) are fully in support of either "Friends", "Custom", or "Only me". It should be noted that Extraversion or Anxiety may influence the user negatively if the score is very low in the Extraversion trait leading to the

Introversion or when the score of Anxiety scores high leading to the person can be Worried, Temperamental, Self-conscious or Emotional. If the experiments in chapter 5 are revised for all Facebook activities in relation to Extraversion it can be noticed that Extraversion predictor was located in the tables of supporting “Friends” or “Only me” and in the worst scenarios to be against the “Public” exposure of the personal data. In most of the studies there were plenty of focus on the relationship between Extraversion and the Anxiety (Neuroticism).

5.5.2 Summary

From the testing results, it is accurately clear that each one of the Big Five traits has specific Facebook activities with specific regression index B and specific numbered level of effect at high significance for each regression index. Any non-significant value of B has not been included in the regression tables and therefore has not been considered in the above table. In the following summary, each Big Five trait as independent factor is considered and is related to specific Facebook activities by thorough and accurate testing in each survey question that can belong to quantitative, categorical and multinomial types of analysis:

Extraversion (E): is directly related to social skills, talkative ability and personal charm and energetic versus shy, unassertive, withdrawn, solitary and reserved.

There are 14 Facebook activities that are related to Extraversion (E). The Extraversion trait is either directly or inversely proportional to any of these 14 Facebook activities. This proportion is controlled by the regression index B. From $\text{Exp}(B) = (e^B)$, the number of times of effect can be specified.

1. The quantitative Facebook activities that are influenced by the Extraversion trait are as follows:
None
2. The categorical Logical Regression Facebook activities questions in the survey that are influenced by the Extraversion trait are as follows:
3. None
4. The Multinomial Facebook questions in the survey that the Extraversion trait influences, are:
 - I. How Secure the user feeling is. For $B = -0.614$, $e^{-0.614} = 0.54$. The number of times of the effect = $1/0.54 = 1.85$ number of times. Low effect.

Inversely proportional. It means the more the Extraversion trait in a person the less he feels secure and vice versa.

- II. Home Town Accessibility Level with extremely high support of “Only Me” and against “Public” accessibility.
- III. City Accessibility Level with extremely high support to “Only Me” and against “Public” accessibility.
- IV. Friends List accessibility Level against “Public” accessibility. Extremely high number of times of effect. Inversely proportional.
- V. Political Views Accessibility Level In favour of “Friends” not “Public” accessibility. For extremely high number of times. Directly proportional.
- VI. Music you Like Accessibility Level with extremely high effect against “Public” accessibility.
- VII. Movies you Like Accessibility Level with extremely high effect against “Public” accessibility.
- VIII. Television you Like Accessibility Level with extremely high effect against “Public” accessibility.
- IX. Favourite Sport Accessibility Level with extremely high effect against “Public” accessibility.
- X. Favourite Sport Team Accessibility Level with extremely high effect against “Public” accessibility.
- XI. Athletes Accessibility Level with extremely high effect against “Public” accessibility.
- XII. Email Accessibility Level with very high effect against “Public” accessibility.
- XIII. Street Address Accessibility Level with very high against “Public” accessibility.
- XIV. IM Screen Names Accessibility Level with very high effect against “Public” accessibility.

Independence (Agreeableness) reflects the individual behavioural characteristics, such as conducting help, cooperation and sympathy for others versus unkind, difficult, cold, rude and independent.

1. The quantitative Facebook activities that are influenced by the **Independence** trait are as follows:
 - None
2. The categorical Logical Regression Facebook activities questions in the survey that are influenced by the **Independence** trait are as follows:
 - I. The Use of multiple user accounts on Facebook with medium directly proportional effect between the **Independence** trait and the use of multiple user accounts on Facebook.
 - II. The number of Common friends on Facebook influences the decision in accepting them with low inversely proportional effect by the **Independence** trait. The more Independence the trait, the less been influenced by common friends in adding them.
3. The Multinomial Facebook questions in the survey that the **Independence** trait influences are:
 - I. The Birthday Accessibility with very high directly proportional effect to show accessibility on “Public” domain.
 - II. Interested in men/women's accessibility which is against “Public” accessibility with extremely high effect. It is Inversely Proportional between the Independence and the “Interested in men/women accessibility”.

Tough-Mindedness (Openness): reflects the richness of the individual imagination, aesthetic feelings, degree of dedication, inventive and curious about new things versus dull, unimaginative, literal-minded and cautious.

1. The quantitative Facebook activities that are influenced by the **Tough-Mindedness** trait are as follows:
 - I. “Number of uploaded photos do you have on Facebook” with extremely high and directly proportional effect. The more the Tough-Mindedness, the more photos are uploaded on Facebook.
 - II. “The number of uploaded Apps you currently have” with extremely high and directly proportional effect. The more the Tough-Mindedness, the more apps are uploaded on Facebook.

- III. “Frequency of you is visiting Facebook” with very low and inversely proportional effect. The more the Tough-Mindedness, the less frequency of visiting Facebook.
 - IV. “The Year of Birth of the person” with high and directly proportional effect. The more Tough-Mindedness the more the year of birth of the person on Facebook, i.e. **the younger the person is.**
2. The categorical Logical Regression Facebook activities questions in the survey that are influenced by the **Tough-Mindedness** trait are as follows:
- I. “Has anybody accessed your Account without your consent?” with directly proportional medium effect for the answer “No”. The more tough-Mindedness the more nobody accessed Facebook account without the person’s consent.
 - II. “Are you aware that Facebook uses apps to send messages on behalf of users” with 1.92 number of times of effect. Low effect. Inversely proportional.
 - III. “Do you use Facebook login on third party websites” with 1.92 times of effect. Low effect. Directly proportional.
 - IV. “The way they look makes you add friends” with 7.899 times of effect. Medium effect. Inversely proportional.
 - V. “The way they share your interest makes you add friends on Facebook” with 8.35 number of times of effect. Medium effect. Inversely proportion.
 - VI. “When access Facebook on third party computers, do you remember to logout” with extremely high and directly proportional effect in favour of “Always”. The more Tough-Minded the person, the more remembering to log out.
 - VII. “Do you use Facebook app on the phone” with 4.85 number of times of effect. Medium effect. Inversely proportional.
3. The Multinomial Facebook questions in the survey that the **Tough-Mindedness** trait influences, are:

- I. Gender Accessibility Level with extremely high and directly proportional effect in favour of “Only Me” which is against “Public” accessibility. The more the Tough-Mindedness the more restriction on **gender** accessibility.
- II. Family Members Accessibility Level with extremely high and directly proportional effect for in favour to “Only Me” and against the “Public” accessibility. The more the Tough-Mindedness the more restriction on **Family Members** accessibility.
- III. University/College Accessibility Level with extremely high and directly proportional effect for in favour to “Only Me” and inversely proportional to “Public” accessibility. The more the Tough-Mindedness the more restriction is imposed on **University/College** accessibility.
- IV. Secondary School Accessibility Level with extremely high and directly proportional effect for in favour to “Only Me” and inversely proportional to “Public” accessibility. The more the Tough-Mindedness the more restriction is imposed on **Secondary School** accessibility.

Self-Control (Conscientiousness): includes elements of self-discipline, organization and thoroughness of planning, as well as the need for achievement versus impulsive, careless and irresponsible.

1. The quantitative Facebook activities that are influenced by the **Self-Control** trait are as follows:
None
2. The categorical Logical Regression Facebook activities questions in the survey that are influenced by the **Self-Control** trait are as follows:
 - I. “Making friends on Facebook and meeting them in person” with low and directly proportional to the answer “Yes”. The more the Self-Control, the more friends is made and are met in person.
3. The Multinomial Facebook questions in the survey that the **Self-Control** trait influences, are:
 - I. Favourite Quotation Accessibility with very high and directly proportional effect in favour of “Friends” and against the “Public” accessibility. The more the Self-Control, the more restriction on Favourite Quotation

accessibility on “Public” is imposed, but is in favour of “Friends” accessibility.

- II. Employer Accessibility Level with extremely high and directly proportional effect against “Public” accessibility. The more Self-Control trait, the more against “Public” accessibility, i.e. the more restriction accessibility on “Public” domain.
- III. People Who Inspire You Accessibility Level with extremely high and directly proportional effect in support of “Custom”. The more Self-Control the more preference to “Custom” and more against “Public” and “Friends” or “Only Me”.
- IV. Religion Accessibility Level with extremely high and directly proportional effect against the “Public” accessibility. The more self-control the more restriction is imposed to the “Public” accessibility.
- V. Games You like Accessibility Level with extremely high and directly proportional effect in support of “Only Me”. The more the Self-Control trait, the more restriction is imposed to the “Public” accessibility.
- VI. Activity Level Accessibility Level with extremely high and directly proportional effect in support of “Only Me”. The more the Self-Control trait, the more restriction is imposed to the “Public” accessibility.
- VII. Phone Number Accessibility Level with Very high and directly proportional effect in favour of “Custom” accessibility. The more the Self-Control trait, the more restriction is imposed to the “Friends”, “Public” and “Only Me” for the purpose of “Custom” accessibility.
- VIII. Books You Like Accessibility: In favour of “Only Me” and against “Public” accessibility for extremely high number of times. Directly Proportional.
- IX. Television You Like accessibility: In favour of “Only Me” and against “Public” accessibility. Directly proportional.
- X. Political Views Accessibility: In favour of “Friends” not “Public” accessibility. For extremely high number of times. Directly proportional.

Anxiety (Neuroticism): reflects the degree of emotional stability, effective, secure and confined versus moody, self-doubting, nervous, sensitive, depressed and anxious.

1. The quantitative Facebook activities that are influenced by the **Anxiety** trait are as follows:
 - I. Number of Facebook friends with extremely high and directly proportional effect. The more the Anxiety, the more the added number of friends due to the low level of Anxiety.
2. The categorical Logical Regression Facebook activities questions in the survey that are influenced by the **Anxiety** trait are as follows:
 - I. “Friends and Family I know them in person what influences me to choose my friends” with medium and directly proportional effect. The more the Anxiety, the more known friends are added.
 - II. “Bullying or harassment due to sharing photos or posts on Facebook” with medium and directly proportional effect. The more the Anxiety, the more bullying occurs due to sharing photos and posts on Facebook.
3. The Multinomial Facebook questions in the survey that the **Anxiety** trait influences, are:
 - I. Relationship Status Accessibility Level with extremely high and directly proportional effect in favour of “Only Me”. The more the Anxiety is, the more restriction is imposed on Relationship Status accessibility by any way.
 - II. Website Accessibility Level with low and directly proportional effect in favour of “Only Me”. The more the Anxiety is, the more restriction is imposed on Website accessibility by any way.

5.5.3 Conclusions

In Chapter 5, each Big Five trait as independent factor is considered and is related to specific Facebook activities by thorough and accurate testing in each survey question that can belong to quantitative, categorical and multinomial types of analysis.

Each Big Five trait has special regression value towards specific Facebook activities in the shape of the regression index B. The value of the effect depends on B and is different in each Facebook activity which can be low, medium, high, very high and extremely high. Saying low

means normal regression, but the medium can go between the one regression and infinity. In other words, it can be 0.4 for example, or can reach 1 (i.e. 100%). There are specific Facebook activities and behaviour dependent on one Big Five trait. Each Big Five trait has been dominant at specific Facebook activities as explained in the summary.

**Chapter 6: Clustering of the
Participants Big Five Traits for
each Facebook Activity to
Identify the At-Risk Groups**

6.1 Introduction

Cluster analysis or **clustering** is the task of grouping a set of objects in such a way that objects in the same group (called a **cluster**) are more similar (in some sense or another) to each other than to those in other groups (**clusters**). K-means clustering is adopted in this clustering analysis due to its simplicity, robustness and relative efficiency. K-means is one of the simplest unsupervised learning algorithms that solve the well-known clustering problem. The procedure follows a simple and easy way to classify a given data set through a certain number of clusters (assume k clusters) fixed in advance. The main idea is to define k centres, one for each cluster. So, the better choice is to place them at a distance from each other. The next step is to take each point belonging to a given data set and associate it to the nearest centre. After we have these K new centroids, a new binding has to be done between the same data set points and the nearest new centre. A loop has been generated. As a result of this loop we may notice that the k centres change their location step by step until no more changes are made or, in other words, centres do not move any more. Finally, this algorithm aims to minimize the objective function as the squared error function given by:

$$J(V) = \sum_{i=1}^c \sum_{j=1}^{c_i} (\|x_i - v_j\|)^2$$

Where,

' $\|x_i - v_j\|$ ' is the Euclidean distance between x_i and v_j .

' c_i ' is the number of data points in i^{th} cluster.

' c ' is the number of cluster centres.

6.2 Identification of the Big Five Traits Values for each Cluster

Clustering of the Big Five traits per each Facebook activity or test is intended to subdivide the group of responds by the participants to homogenous sets and make it easier to describe each cluster relationship with any of the reply options of the participants. From this description, it is clear, then to specify the range of the Big five traits for each cluster. **In this research the number of clusters chosen depends on the number of options in each question. But the chosen number of clusters depends finally on the number that gives**

highest significance (0.00) to the Big Five traits in the ANOVA table. The Table of ANOVA can show the dominant Big Five traits (s). Therefore, the two sets of the dominant Big Five trait (s) will be known and the related choice of the Facebook test or Facebook activity will be identified. From this it is easy then to identify the at-risk group in the Big Five trait (s). The at-risk group is the group of users that tends to give full accessibility of their Facebook activities in the public domain.

The main objectives of the SPSS clustering are as follows:

1. During the SPSS test of clustering, it is also possible to find the percentage of the population in each cluster and the distance between the centres of the two clusters. A centre value of each Big Five trait will be identified.
2. The other direct benefit is to link the results with the interview process by asking the participants, who are part of the “Public” choice, about reasons of putting their personal details on the “Public” or otherwise ask the “Not Supplied”, “Custom”, “Only Me” or “Friends” groups about the reasons for their choices.
3. In fact, the process of finding the dominant Big Five traits from the clustering experiments due to their values and distances between clusters is working as a validation process to the correlation studies in Chapter 4 and Chapter 5 as other data analysis technique is involved in this process which leads to the similar Big five trait (s) in most cases with acceptable significance.
4. While the number of clusters chosen reflects the number of the choices in each Facebook activity question, sometimes more than one cluster can be noticed for one choice due to the availability of all Big Five traits in one choice which can be interpreted by SPSS as two clusters of the Big Five traits. The reason for this is that the main focus is on the Big Five traits highest values cluster, which bears more risk than the lower Big Five trait clusters.
5. It should be clarified that the riskiest group is not only the group who selected “Public” accessibility, but the group of participants which resides around the high Big Five trait values. In each cluster the Big Five trait value is located in the centre. There are a number of participants attached to the centre plus and another number attached to the centre minus. This makes a sub two clusters where the sub cluster above the centre participants are considered more at-risk than the

lower half of the cluster (lower sub cluster). This means clustering is about the independent variables which are the Big Five traits lead by the dominating trait.

This testing process will be able to get the following important tables:

1. Final Cluster Centres
2. Distances Between Final cluster Centres
3. ANOVA Table for the dominant Big Five traits
4. The Number of Cases in each cluster.

6.3 SPSS Clustering Tests and the Output Big Five Clusters Analysis and Conclusions

It is vital to note that the clustering is for clustering the Big Five traits in relation to the Facebook activity choices. The clustering of the Big Five traits for participants will look into the values of the Big Five traits in each cluster of the participant choices of the Big Five traits for the Facebook activity under test. The focus is on the Big Five traits within the “Open” accessibility or the risky choice of the participant. In some cases, more than one cluster is related to one choice. For example, if the choice is “open” then it is a clear risk Big Five traits group. If the choice is “Friends”, more clustering is needed to extract the number of Friends who belongs to the higher values of the Big Five traits in a more focussed consideration of the risk.

Test 1: Clustering of responses to the question: “How Secure Do You Feel your Profile Information on Facebook?”

The test results tables for Test 1 as sample of all results tables are shown in table 6.1, table 6.2, table 6.3 and table 6.4 as follows:

Test Tables for Test 1

Table 6.1 Final Cluster Centers

	Cluster	
	1	2

How secure do you feel your profile information is on Facebook	3	2
Extraversion	5.94	6.10
Independence	5.83	6.02
Tough-Mindedness	6.05	6.03
Self-Control	6.24	6.18
Anxiety	5.13	5.27

Two Clusters show, Cluster 1 relates to less risky participants. Cluster 2 relates to the risky group due to the high Big Five traits.

Table 6.2 Distances between Final Cluster Centres

Cluster	1	2
1		1.906
2	1.906	

Table 6.3 ANOVA

	Cluster		Error		F	Sig.
	Mean Square	Df	Mean Square	df		
How secure do you feel your profile information is on Facebook	163.422	1	.357	185	457.258	.000
Extraversion	1.120	1	.181	185	6.189	.014
Independence	1.525	1	.424	185	3.600	.05
Tough-Mindedness	.017	1	.373	185	.047	.829
Self-Control	.165	1	.380	185	.435	.510
Anxiety	.940	1	.164	185	5.728	.018

The F tests should be used only for descriptive purposes because the clusters have been chosen to maximize the differences among cases in different clusters. The observed significance levels are not corrected for this and thus cannot be interpreted as tests of the hypothesis that the cluster means are equal.

From the ANOVA Table:

- The most significant trait is Extraversion
- The second significant trait is Anxiety

Table 6.4 Number of Cases in each Cluster

	Unweighted	Weighted
Cluster 1	53.000	105.000
Cluster 2	37.000	82.000

Valid	90.000	187.000
Missing	.000	.000

Cluster 1 has 53 Participants and Cluster 2 has 37 Participants out of 90 Participants

Cluster 1: slightly secure (The less risky group)

Cluster 2: Highly Secure (The riskier group)

Test 1 Clustering Conclusions

The dominant Big Five traits in its difference between the two clusters are the **Extraversion** and the second significant trait is the **Anxiety**. Cluster 1 means the response choice was chosen as “Highly Secure” cluster. Cluster 1 Extraversion centre value is 5.94 and for cluster 2 Extraversion value is 6.10. Cluster 1 Anxiety centre value is 5.13 and for cluster 2 Anxiety value is 5.27. The unweighted number in cluster 1 is 53 and in cluster 2 is 37 out of total of 90. Therefore, cluster 1 holds 59% of the respondents and cluster 2 holds 41%. The distance between cluster 1 and 2 is 1.906. Cluster 1 is about the choice 1 (Highly Secure) and cluster 2 is about the choice 2 (slightly Secure) in the options available for the respondent. The risky group is the 1st cluster who responded with “Highly Secure”. The at-risk group (cluster 1) is less extraversion than cluster 2. The less at-risk group (cluster 2) is for people who responded (Slightly Secure) and are more anxious than cluster 1. Therefore, the less extravert people (more introvert) are less cautious about security and feel more secure as in cluster 1 (option 3 (High Secure) in the survey). The more anxious people feel less secure (more cautious) as in cluster 2 (option 2 (slightly Secure) in the survey). Cluster 1 (Less Risky Group) Big Five trait: Lower Extraversion, Lower Anxiety for 53 participants. Cluster 2 (High risk group) Big Five trait: Higher Extraversion and Higher Anxiety for 37 participants. The at-risk group percentage = $37/90 = 41\%$.

The test tables for all clustering tests are shown in A6 Appendix

Test 2: Clustering of Responses to the Question: “Has Anybody Accessed Your Profile Without Your Consent?”

Clustering focuses on the Big Five traits not on the responses of participants

Cluster 1: Choice 1: No for Low Big Five scoring

Cluster 2: Choice 2: No for High Big Five Scoring

Yes, is excluded as realistic and not risky.

Test 2 Clustering Conclusions

The dominant Big Five traits in its difference between the two clusters is the **Independence** and the second trait is the **Extraversion**. Also, Tough-Mindedness and Self-Control have a lower effect on the issue of the level of feeling of having their FB was accessed to without consent. Both traits are significant. Cluster 1 centre value for Independence is 5.53 and for cluster 2 is 6.41. The unweighted number in cluster 1 is 54 and in cluster 2 is 36 out of a total of 90. Hence, the 60% goes to cluster 1 and 40 % goes to cluster 2. The distance between cluster 1 and 2 is 1.515. Cluster 1 is about the choice 2 (No) and cluster 2 is about the choice 2 (No) in the options available for the participants. Any participant who answered “Yes” is excluded as realistic and not at risk. The risky group is actually part of cluster 2. The majority of participants go to the less independent people which is not risky but the more independent people are less in number in cluster 2 but with higher Independence. However, the more independent people are always less cautious and riskier. Therefore, cluster 2 resembles the at-risk group in this issue of the fact if anyone accessed the Facebook account without his/her consent and the percentage of the at-risk group is 40%. The more Independence trait resembles less opposition to the “Public” accessibility. In Cluster 2, not all participants bear high Independence. A smaller number bears a high Extraversion Personalities who also are also risky.

Test 3: Clustering of Responses to the Question: “Have you ever Remembered to Log Out when Accessing Facebook from a Friend’s Computer or Library Computer?”

Cluster 1: Sometimes

Cluster 2: Always

Test 3 Clustering Conclusions

The dominant Big Five traits in its difference between the two clusters are the **Tough-Mindedness** and the second trait is the **Independence**. Both are significant. Also, Extraversion and Self-Control have less effect on the issue of remembering to log out when accessing Facebook from a friend's computer or the library computer. Cluster 1 centre value of Tough-Mindedness is 5.57 and for cluster 2 is 6.37. The unweighted number in cluster 1 is 38 (who answered "Sometimes") and in cluster 2 is 52 (who answered "Always") out of a total of 90 participants. The distance between cluster 1 and 2 is 1.649. Cluster 1 is about the choice 2 and cluster 2 is about the choice 1 in the options available for the participants. The risky group is the one who answered, "Sometimes or No". In this case, the less Tough-Mindedness leads to risk in not logging out, but the more Tough-minded people are less risky. The same applied to less Independent people as Independence comes second in its effect after the Tough-Mindedness trait according to the test. In this test 3, the more Independence the trait, the more cautious the person will be due to choosing "Always". **Therefore, the at-risk group in this question resembles 38/90 = 42% of all participants in this survey.**

Test 4: Clustering of Responses to the Question: "Are you Aware that Facebook can send Messages on behalf of your Friends"

Cluster 1: Yes

Cluster 2: No

Test 4 Clustering Conclusions

The dominant Big Five traits in its difference between the two clusters is the **Independence** and the second trait is the **Extraversion**. Both are significant. Also, Self-Control and Tough-Mindedness have less effect on the issue of awareness that Facebook sends messages on behalf of friends. Cluster 1 centre value is 5.51 and for cluster 2 is 6.41. The unweighted number in cluster 1 is 51 and in cluster 2 is 39 out of a total of 90. The distance between cluster 1 and 2 is 1.48. Cluster 1 is about the choice 1 and cluster 2 is about the choice 1 in the options available for the participants. The risky group is the one who answered "Yes" but at higher Big Five traits. Higher Big Five traits are connected to risky behaviour in

Independence and Extraversion traits. Therefore, the at-risk group that has higher values of the Big Five traits resembles $39/90 = 43\%$.

Test 5: Clustering of Responses to the Question: “Do you ever use the Facebook Login Button on Third Party Websites”

Cluster 1 Choice: Yes

Cluster 2 choice: No

Test 5 Clustering Conclusions

The dominant Big Five traits in its difference between the two clusters is the **Independence** and the second trait is the **Extraversion**. Both are significant. Also, Self-Control and Tough-Mindedness have less effect on the issue of using the login on a third-party website. Cluster 1 centre value is 5.49 and for cluster 2 is 6.34 giving the highest difference of 0.85. The unweighted number in cluster 1 is 47 and in cluster 2 is 43 out of a total of 90. The distance between cluster 1 and 2 is 1.48. Cluster 1 is about the choice 2 and cluster 2 is about the choice 2 (No) in the options available for the participants in the survey. The risky group is the group of respondents who said “No” but with higher Big Five traits especially at Independence. The percentage of the risky group is $43/90 = 48\%$.

Test 6: Clustering of Responses to the Question: “Do you Use the Facebook App on your Phone”

Cluster 1 Choice: Yes, with low Big Five scoring

Cluster2 Choice: Yes, with high Big Five scoring

No, is a safe option

Test 6 Clustering Conclusions

The dominant Big Five traits in its difference between the two clusters is the **Independence** and the second trait is the **Extraversion**. Both are significant. Also, Self-Control and Tough-Mindedness have less effect on the issue of using the Facebook app on the phone. Cluster 1 centre value is 5.50 and for cluster 2 is 6.35. The highest difference in the Big Five traits in

both clusters is 0.85. The unweighted number in cluster 1 is 48 and in cluster 2 is 42 out of a total of 90. The distance between cluster 1 and 2 is 1.477. Cluster 1 is about the choice 1 (Yes) and cluster 2 is about the choice 1 (Yes) in the options available for the respondent. This is due to investigating the risky group who said “Yes” but with higher Big Five traits especially at Independence. The percentage of the risky group is $42/90 = 47\%$.

Test 7: Clustering of responses to the Question: “Have you ever Experienced Bullying or Harassment due to your Shared Photos or Posts”

Cluster 2 Choice: No, for Low Big Five traits scoring

Cluster 2 Choice: No, for high Big Five traits scoring

Yes, means the user is aware of dangers.

Test 7 Clustering Conclusions

The dominant Big Five traits in its difference between the two clusters is the **Independence** and the second trait is the **Extraversion**. Both are significant. Also Self-Control and Tough-Mindedness have less effect on the issue of harassment. Cluster 1 centre value is 5.50 and for cluster 2 is 6.36 giving a Big Five traits highest difference between clusters of 0.86. The unweighted number in cluster 1 is 48 and in cluster 2 is 42 out of a total of 90. The distance between cluster 1 and 2 is 1.477. Cluster 1 is about the choice 2 (who answered No) and cluster 2 is about the choice 2 (who answered No) in the options available for the participants in the survey. This is due to investigating the risky group who said “No” but with higher Big Five traits, especially at Independence, which is directly proportional to the Question above as in Chapter 5. **The percentage of the risky group is $42/90 = 47\%$.**

Test 8: Clustering of responses to the Question: “Do you Use Multiple Accounts on Facebook”

Cluster 1 Choice: Yes, for Low Big Five traits scoring

Cluster 2 Choice: Yes, for high Big Five traits scoring

No, means the user is behaving safely

Test 8 Clustering Conclusions

The dominant Big Five traits in its maximum difference between the two clusters is the **Independence** and the second trait is the **Extraversion** and the second trait is the **Independence**. Both are significant. Also, Self-Control and Tough-Mindedness have less effect on the issue of using multiple accounts. Cluster 1 centre value is 5.73 and for cluster 2 is 6.29 giving the highest Big Five trait difference of 0.58. The unweighted number in cluster 1 is 46 and in cluster 2 is 44 out of a total of 90. The distance between cluster 1 and 2 is 1.481. Cluster 1 is about the choice 2 (who answered Yes) and cluster 2 is about the choice 2 (who answered Yes) in the options available for the participants. This is due to investigating the risky group who said “Yes” but with higher Big Five traits, especially of independence and Extraversion which is directly proportional to the question above as shown in chapter 5. **The percentage of the risky group is 44/90 = 49%.**

Test 9: Clustering of responses to the Question: “How often do you visit Facebook”

Cluster 2 Choice: Daily, for Low Big Five traits scoring

Cluster2 Choice: Daily, for high Big Five traits scoring

Less often to visit Facebook is a safe option.

Test 9 Clustering Conclusions

The dominant Big Five traits in its difference between the two clusters are the **Tough-Mindedness** and the second trait is the **Self-Control**. Both are significant. Also, Extraversion and Independence have less effect on the issue of frequency of visiting Facebook. Cluster 1 centre value is 5.83 and for cluster 2 is 6.70 giving a Big Five trait difference of 0.87. The unweighted number in cluster 1 is 69 and in cluster 2 is 21 out of a total of 90. The distance between cluster 1 and 2 is 1.591. Cluster 1 is about the choice 2 (Daily) and cluster 2 is about the choice 2 (Daily) in the options available for the participants in the survey. This is due to investigating the risky group who said “Daily” but with higher Big Five traits, especially at Tough-Mindedness and Self-Control who are inversely proportional to the Question as shown in chapter 5. **The percentage of the risky group is 21/90 = 23%.**

Test 10: Clustering of Responses to the Question: “Have you ever made new friends on Facebook and Met them in Person”

Cluster1 Choice: No, for Low Big Five traits scoring

Cluster 2 Choice: No, for high Big Five traits scoring

Yes, is a safe option

Test 10 Clustering Conclusions

The dominant Big Five traits in its difference between the two clusters are the **Tough-Mindedness** and the second trait is the **Self-Control**. Both are significant. Also, Extraversion and Independence have less effect on the issue of making friends and meeting them in person. Cluster 1 centre value is 5.82 and for cluster 2 is 6.70 giving highest Big Five trait difference of 0.88. The unweighted number in cluster 1 is 68 and in cluster 2 is 22 out of a total of 90. The distance between cluster 1 and 2 is 1.543. Cluster 1 is about the choice 2 (who answered No) and cluster 2 is about the choice 2 (who answered No) in the options available for the participants. This is due to investigating the risky group who said “No” but with higher Big Five traits, especially at Tough-Mindedness, which is inversely proportional to making friends and meeting them in person. **The percentage of the risky group is 21/90 = 24%.**

Test 11: Clustering of Responses to the Question: “Friends and Family I know them in person what influences your decision making when accepting friend requests on Facebook”

Cluster 1 Choice: Yes, for Low Big Five traits scoring

Cluster 2 Choice: Yes, for high Big Five traits scoring

No, is a less safe option.

Test 11 Clustering Conclusions

The dominant Big Five traits in its maximum difference between the two clusters are the **Self-Control** and the second trait is the **Extraversion**. Both are significant. Also, Tough-Mindedness and Independence have less effect on the issue of friends and family, which

affects in adding friends on Facebook. Cluster 1 centre value is 5.97 and for cluster 2 is 6.83 giving a highest Big Five traits difference of 0.86. The unweighted number in cluster 1 is 66 and in cluster 2 is 24 out of a total of 90. The distance between cluster 1 and 2 is 1.534. Cluster 1 is about the choice 1 (who answered Yes) and cluster 2 is about the choice 1 (who answered Yes) in the options available for the respondents. This is due to investigating the risky group who said “Yes” but with higher Big Five traits, especially at Self-Control, which is directly proportional to the question above as shown in chapter 5. **The percentage of the risky group is $24/90 = 27\%$.**

Test 12: Clustering of Responses to the Question: “By the way they look in profile photo for what influences your decision making when accepting friend requests on Facebook”

Cluster 1 Choice: No, for Low Big Five traits scoring

Cluster 2 Choice: No, for High Big Five traits scoring

Yes, is the less safe option.

Test 12 Clustering Conclusions

The dominant Big Five traits in its difference between the two clusters are **Self-Control** and the second trait is the **Extraversion**. Both are significant. Also, Tough-Mindedness and Independence have less effect on the issue of the look of profile photo which affects in adding friends on Facebook. Cluster 1 centre value is 5.97 and for cluster 2 is 6.83. The unweighted number in cluster 1 is 66 and in cluster 2 is 24 out of a total of 90. The distance between cluster 1 and 2 is 1.533. Cluster 1 is about the choice 0 (No) and cluster 2 is about the choice 0 (No) in the options available for the respondents. This is due to the requirement to know the risk group who said “No” but at higher Big Five traits such Self-Control which is directly proportional to the Facebook question above. **The at-risk group percentage is $(24/90) \times 100\% = 27\%$.**

Test 13: Clustering of Responses to the Question: “They share my interests what influences your decision making when accepting friend requests on Facebook”

Cluster 1 Choice: No, for Low Big Five traits scoring

Cluster 2 Choice: No, for High Big Five traits scoring

Yes, is the less safe option.

Test 13 Clustering Conclusions

The dominant Big Five traits in its difference between the two clusters is **Self-Control** and the second trait is the **Extraversion**. Both are significant. Also, Tough-Mindedness and Independence have less effect on the issue of the look of profile photo which affects in adding friends on Facebook. Cluster 1 centre value is 5.97 and for cluster 2 is 6.83. The unweighted number in cluster 1 is 66 and in cluster 2 is 24 out of a total of 90. The distance between cluster 1 and 2 is 1.533. Cluster 1 is about the choice 0 (No) and cluster 2 is about the choice 0 (No) in the options available for the respondents. This is due to the requirement to know the risk group who said “No” but at higher Big Five traits such Self-Control which is directly proportional to the Facebook question above. **The at-risk group percentage is $(24/90) \times 100\% = 27\%$.**

Test 14: Clustering of Responses to the Question: “We have friends in common what influences your decision making when accepting friend requests on Facebook”

Cluster 1 Choice 0: Yes, for Low Big Five traits scoring

Cluster 2 Choice 0: Yes, for High Big Five traits scoring

Test 14 Clustering Conclusions

The dominant Big Five traits in its difference between the two clusters are the **Tough-Mindedness** and the second trait is the **Self-Control**. Both are significant. Also, Extraversion and Independence have less effect on the issue we have friends in common which affects in adding friends on Facebook. Cluster 1 centre value is 5.82 and for cluster 2 is 6.70. The unweighted number in cluster 1 is 68 and in cluster 2 is 22 out of a total of 90. The distance between cluster 1 and 2 is 1.545. Cluster 1 is about the choice 0 (Yes) and cluster 2 is about the choice 0 (Yes) in the options available for the respondents. **This is due to the requirement to know the risk group who said “Yes” but at higher Big Five traits such as the**

Tough-Mindedness, which is inversely proportional to the Facebook question as shown in chapter 5 tables. The at-risk group of users is $(22/90) \times 100\% = 24\%$.

Test 15: Clustering of Responses to the Question: “City Accessibility Level”

Cluster 1 belongs to “Custom” Option,

Cluster 2 belongs to “Public” Option, for High Big Five traits scoring

Cluster 3 Belongs to “Friends” Option

Test 15 Clustering Conclusions

The dominant Big Five traits in its difference between the two clusters are the **Self-Control** and the second trait is the **Extraversion**. Both are significant. Also, Independence and Tough-Mindedness have less effect on the issue of “City accessibility”. Cluster 1 centre value is 6.25 for the choice number 5 of “custom” choice and for cluster 2 is 6.61 for the “Public” choice. The “Friends” choice is placed in cluster 3 for a value of 5.57. The unweighted number in cluster 1 is 2 and in cluster 2 is 39 and for cluster 3 is 39 out of a total of 90. The distance between cluster 1 and 2 is 3.958. Cluster 1 and cluster 2 distance is 3.769 and between cluster 2 and 3 is 1.484. This is due to the requirement to know the risk group who answered “public”. This group resembles $39/90 = 43\%$ **of all respondents. The risky group is highly related to highest Self-Control people and highest other Big Five traits.**

Test 16: Clustering of Responses to the Question: “Hometown Accessibility”

Cluster 1 belongs to “Custom” Option,

Cluster 2 belongs to “Public” Option, for High Big Five traits scoring

Cluster 3 Belongs to “Friends” Option

Test 16 Clustering Conclusions

The dominant Big Five traits in its difference between the two clusters are the **Self-Control** and the second trait is the **Independence**. Both are significant. Also, Extraversion and Tough-Mindedness have less effect on the issue of “Hometown accessibility”. Cluster 1 centre value is 6.26 for the choice number 5 of “custom” choice and for cluster 2 is 6.59 for the “Public”

choice. The “Friends” choice is placed in cluster 3 for a value of 5.76. The unweighted number in cluster 1 is 12 and in cluster 2 is 42 and for cluster 3 is 36 out of a total of 90. The distance between cluster 1 and 2 is 3.922. Cluster 1 and cluster 3 distance is 3.678 and between cluster 2 and 3 is 1.543. **This is due to the requirement to know the risk group who answered “public”. This group resembles 42/90 = 47% of all respondents. The risky group is highly related to highest Self-Control people. This can be risky.**

Test 17: Clustering of Responses to the Question: “Gender Accessibility”

Cluster 1 belongs to “Public” and Friends option,

Cluster 2 belongs to “Public” and friends Option, for High Big Five traits scoring

Cluster 3 Belongs to “Public” and Friends Option

Cluster 4 Belongs to “Only Me”

Test 17 Clustering Conclusions

The dominant Big Five traits in its difference between the two clusters is the **Self-Control** and the second trait is the **Independence**. Both are significant. Also, Extraversion and Tough-Mindedness have less effect on the issue of “Hometown accessibility”. Cluster 1 centre value is 5.46 for the choice number 1 of “Public” choice and for cluster 2 is 6.67 for the “Public” choice as well. The “Friends” choice is placed in cluster 3 for a value of 6.33 and for cluster 4 of “Only Me” is 6.04. The unweighted number in cluster 1 is 24 and in cluster 2 is 31 and for cluster 3 is 28 and for cluster 4 is 7 out of a total of 90. The distance between cluster 1 and 2 is 1.971. Cluster 1 and cluster 3 distance is 1.117 and between cluster 1 and 4 is 2.936. **This is due to the requirement to know the risk group who answered “public”. This group resembles 42/90 = 47% of all respondents. The risky group is highly related to highest Self-Control people who resemble 31/90 = 34% and similar in all other Highest Big Five traits.**

Test 18: Clustering of Responses to the Question: “Birthday Month and Day Accessibility”

Cluster 1 belongs to “Only Me” option,

Cluster 2 belongs to “Public” option, for Low Big Five traits scoring

Cluster 3 Belongs to “Friends” Option

Cluster 4 Belongs to “Public” option, for High Big Five traits scoring

Test 18 Clustering Conclusions

The dominant Big Five traits in its difference between the two clusters is the **Independence** and the second trait is the **Self-Control**. Both are significant. Also, Extraversion and Tough-Mindedness have less effect on the issue of “Birthday accessibility”. Cluster 1 centre value is 5.63 for the choice number 1 of “Only Me” choice and for cluster 2 is 6.67 for the “Public” choice as well. The “Friends” choice is placed in cluster 3 for a value of 6.38 and for cluster 4 of “Public” is 5.56. The unweighted number in cluster 1 is 16 and in cluster 2 is 26 and for cluster 3 is 27 and for cluster 4 is 21 out of a total of 90. The distance between cluster 1 and 2 is 2.69. Cluster 1 and cluster 3 distance is 1.117 and between cluster 1 and 4 is 2.94. **This is due to the requirement to know the risk group who answered “public”. This group resembles 47/90 = 51% of all respondents. The risky group is highly related to highest Self-Control people and highest Big Five traits and at the same time the lowest Big Five traits. The middle values of the 5 Big Five traits are choosing “Friends” and “Only Me” accessibility.**

Test 19: Clustering of Responses to the Question: “Interested in Men/Women Accessibility”

Cluster 1 belongs to “Not Supplied” option,

Cluster 2 belongs to “Public” option

Cluster 3 Belongs to “Friends” Option

Cluster 4 Belongs to “Only Me” option

Test 19 Clustering Conclusions

The dominant Big Five traits in its difference between the two clusters is the **Independence** and the second trait is the **Extraversion**. Both are significant. Also, Self-Control and Tough-Mindedness have less effect on the issue of “Cluster 1 centre value is 5.85 for the choice number 1 of “Not supplied” choice and for cluster 2 is 6.67 for the “Public” choice. The “Friends” choice is placed in cluster 3 for a value of 7.88 and for cluster 4 of “Public” is 5.56.

The unweighted number in cluster 1 is 13 and in cluster 2 is 2 and for cluster 3 is 65 and for cluster 4 is 21 out of a total of 90. The distance between cluster 1 and 2 is 5.49. Cluster 1 and cluster 3 distance is 4.49 and between cluster 1 and 4 is 2.028. This is due to the requirement to know the risk group who answered “public”. **The risky group resembles cluster 2 and as (21)/90 = 24% of all respondents. The risky group is highly related to highest Big Five traits people where 21 out of 65 friends bear high Independence and high risk in sub clustering of “Friends”. This has been achieved by sub clustering the “Friends”.**

Test 20: Clustering of Responses to the Question: “Language Accessibility”

Cluster 1 belongs to “Not Supplied” option,

Cluster 2 belongs to “Public” option, for Low Big Five traits scoring

Cluster 3 Belongs to “Public” option, for High Big Five traits scoring

Cluster 4 Belongs to “Only Me” option

Test 20 Clustering Conclusions

The dominant Big Five traits in its difference between the two clusters is the **Independence** and the second trait is the **Extraversion**. Both are significant. Also, Self-Control and Tough-Mindedness have less effect on the issue of Language Accessibility. “Cluster 1 centre value is 5.81 for the choice number 1 of “Not supplied” choice and for cluster 2 is 7.88 for the “Public” choice. The “Public” choice is also placed in cluster 3 for a value of 5.93 and for cluster 4 of “Only Me” is 5.60. The unweighted number in cluster 1 is 13 and in cluster 2 is 2 and for cluster 3 is 66 and for cluster 4 is 9 out of a total of 90. The distance between cluster 1 and 2 is 5.48. Cluster 1 and cluster 3 distance is 4.636 and between cluster 1 and 4 is 2.345. This is due to the requirement to know the risk group who answered “public”. This group resembles $68/90 = 76\%$ of all respondents. **The risky group is highly related to highest Big Five traits people. Cluster 3 has included 2 participants only. However, is it possible to consider the accessibility of the language is due to the high Independence number of participants in cluster 3 of sub clustering of the Big Five traits in it. The High Independence number of participants is found to be 52. The percentage ratio of the risk is $(52+2) / 90 = 62\%$.**

Test 21: Clustering of Responses to the Question: “Relationship Status Accessibility”

Cluster 1 belongs to “Not Supplied” option,

Cluster 2 belongs to “Public” option, for Low Big Five traits scoring

Cluster 3 Belongs to “Friends” option, for High Big Five traits scoring only

Cluster 4 Belongs to “Only Me” option

Test 21 Clustering Conclusions

The dominant Big Five traits in its difference between the two clusters is the **Independence** and the second trait is the **Self-Control**. Both are significant. Third trait is Tough-Mindedness, which has less effect on the issue of the Relationship Status Accessibility. “Cluster 1 centre value is 5.89 for the choice number 1 of “Not supplied” choice and for cluster 2 is 7.88 for the “Public” choice. The “Friends” choice is placed in cluster 3 for a value of 5.93 and for cluster 4 of “Only Me” is 5.65. The unweighted number in cluster 1 is 21 and in cluster 2 is 2 and for cluster 3 is 55 and for cluster 4 is 12 out of a total of 90. The distance between cluster 1 and 2 is 5.406. Distance between Cluster 1 and cluster 3 is 4.35 and between cluster 1 and 4 is 1.976. **This is due to the requirement to know the risk group who answered “public” and who scored high Independence at Cluster 3 where 22 participants out of 55 scored high Independence and therefore are risky. This group resembles $(22+2) / 90 = 26\%$ of all respondents. The risky group is highly related to highest Big Five traits (Independence).**

Test 22: Clustering of Responses to the Question: “Family Members Accessibility”

Cluster 1 belongs to “Custom” option

Cluster 2 belongs to “Friends” option

Cluster 3 Belongs to “Friends” option

Cluster 4 Belongs to “Friends” option

Test 22 Clustering Conclusions

The dominant Big Five traits in its difference between the two clusters are the **Extraversion** and the second trait is the **Self-Control**. Both are significant. Third trait is Tough-Mindedness, which has less effect on the issue of the Family Members Accessibility. "Cluster 1 centre value is 6.07 for the choice number 1 of "Custom" choice and for cluster 2 is 6.44 for the "Friends" choice. The "Friends" choice is placed in also in cluster 3 for a value of 5.91 and for cluster 4 of "Friends" is 5.49. The unweighted number in cluster 1 is 26 and in cluster 2 is 19 and for cluster 3 is 30 and for cluster 4 is 15 out of a total of 90. The distance between cluster 1 and 2 is 3.96. Cluster 1 and cluster 3 separation distance is 3.487 and between cluster 1 and 4 is 3.874. This is due to the requirement to know the risk group who answered "public". **This group resembles 19/90 = 21% of all respondents as the highest Extraversion cluster is considered which is noticed in cluster 2. There is no risk group related to high or low Big Five traits people when the dominant Big Five is Extraversion.**

Test 23: Clustering of Responses to the Question: "Friends Accessibility level"

Cluster 1 belongs to "Custom" option

Cluster 2 belongs to "Public" option

Cluster 3 Belongs to "Friends" option, for High Big Five traits scoring only

Cluster 4 Belongs to "Public" option, for Low Big Five traits scoring

Test 23 Clustering Conclusions

The dominant Big Five traits in its difference between the two clusters are the **Extraversion** and the second trait is the **Self-Control**. Both are significant. Third trait is the Independence, which has less effect on the issue of the Friends Accessibility. "Cluster 1 centre value is 6.09 for the choice number 1 of "Custom" choice and for cluster 2 is 6.40 for the "Public" choice. The "Public" choice is also placed in in cluster 3 for a value of 5.92 and for cluster 4 of "Public" is 5.48. The unweighted number in cluster 1 is 16 and in cluster 2 is 23 and for cluster 3 is 36 and for cluster 4 is 15 out of a total of 90. The distance between cluster 1 and 2 is 3.406. Cluster 1 and cluster 3 distance is 2.755 and between cluster 1 and 4 is 3.797. **This is due to the requirement to know the risk group who answered "public". This group resembles (23 + 36/2) /90 = 41/90 = 46% of all respondents. The risky group is highly related to high Big Five traits people in the higher half of the cluster 3. In this case in cluster 2 all numbers of**

participants were taken, in cluster 3 only half of the participants was taken. The reason is that cluster 2 has high trait, cluster 3 lends half of the participants to the risk due to the high value of the Big Five traits. Cluster 4 is not taken due to the low Big Five traits comparatively.

Test 24: Clustering of Responses to the Question: "Employment Accessibility"

Cluster 1 belongs to "Not Supplied" option

Cluster 2 belongs to Public option, for High Big Five traits scoring

Cluster 3 Belongs to Friends option

Cluster 4 Belongs to Public option

Test 24 Clustering Conclusions

The dominant Big Five traits in its difference between the two clusters are the **Self-Control** and the second dominant trait is **Independence**. Both are significant. Third trait is the Tough-Mindedness, which has less effect on the issue of the Employment Accessibility. "Cluster 1 centre value is 6.20 for the choice number 1 of "Not supplied" choice and for cluster 2 is 6.69 for the "Public" choice. The "Public" choice is placed in also in cluster 4 for a value of 5.48 and for cluster 3 of "Friends" is 6.31. The unweighted number in cluster 1 is 27 and in cluster 2 is 22 and for cluster 3 is 23 and for cluster 4 is 18 out of a total of 90. The distance between cluster 1 and 2 is 4.368. Distance between Cluster 1 and cluster 3 is 3.628 and between cluster 1 and 4 is 4.246. This is due to the requirement to know the risk group who answered "public". **This group resembles $22/90 = 24\%$ of all respondents. The risky group is highly related to the cluster of highest Big Five traits (Self-Control). The "Public" cluster 4 is not risky due to the lower Self-Control trait value, therefore it was considered when calculating the risk percentage.**

Test 25: Clustering of Responses to the Question: "College/University Accessibility"

Cluster 1 belongs to "Custom" option

Cluster 2 belongs to "Public" option

Cluster 3 Belongs to "Friends" option, for High Big Five traits scoring only

Cluster 4 Belongs to “Public” option

Test 25 Clustering Conclusion

The dominant Big Five traits in its difference between the two clusters are the **Self-Control** and the second dominant trait is **Tough-Mindedness**. Both are significant. Third trait is the Extraversion which has less effect on the issue of the College/University Accessibility. “Cluster 1 centre value is 6.20 for the choice number 1 of “Custom” choice and for cluster 2 is 6.36 for the “Public” choice. The “Public” choice is placed in also in cluster 4 for a value of 5.38 and for cluster 3 of “Friends” is 5.83. The unweighted number in cluster 1 is 17 and in cluster 2 is 36 and for cluster 3 is 23 and for cluster 4 is 14 out of a total of 90. The distance between cluster 1 and 2 is 4.201. Cluster 1 and cluster 3 distance is 3.375 and between cluster 1 and 4 is 4.540. **This is due to the requirement to know the risk group who answered “public”. This group resembles $(36 + 10) / 90 = 51\%$ of all respondents. The risky group is highly related to highest Big Five traits people with higher number of persons in the highest traits, but also 10 is taken from sub clustering for highest Self-Control in “Friends” cluster 3**

Test 26: Clustering of Responses to the Question: “Secondary School Accessibility”

Cluster 1 belongs to “Custom” option

Cluster 2 belongs to “Public” option, for High Big Five traits scoring

Cluster 3 Belongs to “Friends” option

Cluster 4 Belongs to “Public” option, for Highest Big Five traits scoring (15)

Test 26 clustering Conclusions

The dominant Big Five traits in its difference between the two clusters are the **Self-Control** and the second dominant trait is **Tough-Mindedness**. Both are significant. Third trait is the Independence, which has less effect on the issue of the Secondary School Accessibility. “Cluster 1 centre value is 6.22 for the choice number 1 of “Custom” choice and for cluster 2 is 6.69 for the “Public” choice. The “Public” choice is placed in also in cluster 4 for a value of 5.49 and for cluster 3 of “Friends” is 6.18. The unweighted number in cluster 1 is 17 and in cluster 2 is 30 and for cluster 3 is 23 and for cluster 4 is 20 out of a total of 90. The distance

between cluster 1 and 2 is 4.295. Cluster 1 and cluster 3 distance is 3.485 and between cluster 1 and 4 is 4.428.

This is due to the requirement to know the risk group who answered “public”. This group resembles $(30 + 15) / 90 = 50\%$ of all respondents. The risky group is highly related to high Big Five traits (Self-Control) of cluster 2 and to the highest Self-Control in cluster 3 sub clustering which scored 15. Therefore, the total risky number of participants = 45 persons.

Test 27: Clustering of Responses to the Question: “Religion Accessibility”

Cluster 1 belongs to “Not Supplied” option

Cluster 2 belongs to “Friends” option

Cluster 3 Belongs to “Public” option, for High Big Five traits scoring

Cluster 4 Belongs to “Friends” option

Test 27 Clustering Conclusions

The dominant Big Five traits in its difference between the two clusters are the **Self-Control** and the second dominant trait is **Tough-Mindedness**. Both are significant. Third trait is the Independence, which has less effect on the issue of the Religion Accessibility. “Cluster 1 centre value is 6.10 for the choice number 1 of “Custom” choice and for cluster 2 is 6.82 for the “Friends” choice. The “Friends” choice is placed in also in cluster 4 for a value of 5.60 and for cluster 3 of “Friends” is 6.47. The unweighted number in cluster 1 is 25 and in cluster 2 is 19 and for cluster 3 is 21 and for cluster 4 is 25 out of total of 90. The distance between cluster 1 and 2 is 4.170. Cluster 1 and cluster 3 distance is 4.364 and between cluster 1 and 4 is 4.058. **To know the risk group who answered “public”, Cluster 3 is chosen for participants who selected the “Public” option. This group resembles $21/90 = 23\%$ of all respondents as the Self-Control is high in this cluster.**

Test 28: Clustering of Responses to the Question: “Political Views Accessibility”

Cluster 1 belongs to “Not Supplied” option

Cluster 2 belongs to “Public” option, for High Big Five traits scoring

Cluster 3 Belongs to “Friends” option

Cluster 4 Belongs to “Friends” option

Test 28 Clustering Conclusions

The dominant Big Five traits in its difference between the two clusters are the **Self-Control** and the second dominant trait is **Independence**. Both are significant. Third trait is the Tough-Mindedness, which has less effect on the issue of the Religion Accessibility. “Cluster 1 centre value is 6.17 for the choice number 1 of “Not supplied” choice and for cluster 2 is 6.75 for the “Public” choice. The “Friends” choice is placed in also in cluster 4 for a value of 5.58 and for cluster 3 of “Friends” is 6.45. The unweighted number in cluster 1 is 32 and in cluster 2 is 18 and for cluster 3 is 19 and for cluster 4 is 21 out of a total of 90. The distance between cluster 1 and 2 is 4.618. Cluster 1 and cluster 3 distance is 4.055 and between cluster 1 and 4 is 4.289. **This is due to the requirement to know the risk group who answered “public”. This group resembles 18/90 = 20% of all respondents. The highest Self-Control value cluster is the risky cluster.**

Test 29: Clustering of Responses to the Question: “People Who Inspire You Accessibility”

Cluster 1 belongs to “Not Supplied” option

Cluster 2 belongs to “Friends” option

Cluster 3 belongs to “Friends” option

Cluster 4 belongs to “Friends” option

Test 29 Clustering Conclusions

The dominant Big Five traits in its difference between the two clusters are the **Self-Control** and the second dominant trait is **Independence**. Both are significant. Third trait is the Tough-Mindedness, which has less effect on the issue of the People who inspire you Accessibility. “Cluster 1 centre value is 6.25 for the choice number 1 of “Not supplied” choice and for cluster 2 is 6.66 for the “Friends” choice. The “Friends” choice is placed in also in cluster 4 for a value of 5.50 and for cluster 3 of “Friends” is 6.41. The unweighted number in cluster 1 is 26 and in cluster 2 is 20 and for cluster 3 is 23 and for cluster 4 is 21 out of a total of 90. The distance between cluster 1 and 2 is 4.368. Cluster 1 and cluster 3 distance is 3.869 and

between cluster 1 and 4 is 3.992. **This is due to the requirement to know the risk group who answered “public” which does not include anybody here. This group resembles 0/90 = 0 % of all respondents. But the riskiest group is related to nearly highest Self-Control cluster. Most of the participants prefer to show their friends the people who inspire them. Therefore, the riskiest group is available within “Friends” in cluster 2 who scored high in Self-Control. The number in this case in cluster 2 is 20. The risky group percentage is 20/90 = 22%.**

Test 30: Clustering of Responses to the Question: “Favourite Quotation Accessibility?”

Cluster 1 belongs to “Friends” option

Cluster 2 belongs to “Public” option, for High Big Five traits scoring

Cluster 3 belongs to “Friends” option

Cluster 4 belongs to “Not Supplied” option

Test 30 Clustering Conclusions

The dominant Big Five traits in its difference between the two clusters are the **Self-Control** and the second dominant trait is **Independence**. Both are significant. Third trait is the Tough-Mindedness, which has less effect on the issue of the Favourite Quotations Accessibility. Cluster 1 centre value is 5.52 for the choice number 1 of “Friends” and for cluster 2 is 6.77 for the “Public” choice. The “Not supplied” choice is placed in cluster 4 for a value of 6.07 and for cluster 3 of “Friends” is 6.45. The unweighted number in cluster 1 is 20 and in cluster 2 is 19 and for cluster 3 is 25 and for cluster 4 is 26 out of a total of 90. The distance between cluster 1 and 2 is 2.031. Distance between Cluster 1 and cluster 3 is 1.113 and between cluster 1 and 4 is 4.182. **This is due to the requirement to know the at-risk group who answered “public”. This group resembles 19/90 = 21 % of all respondents. The risky group is related to 19 respondents in the survey who scored a highest Self-Control trait.**

Test 31: Clustering of Responses to the Question: “Music You Like Accessibility”

Cluster 1 belongs to “Not supplied” option

Cluster 2 belongs to “Public” option

Cluster 3 belongs to “Friends” option

Cluster 4 belongs to “Friends” option

Test 31 Clustering Conclusions

The dominant Big Five traits in its difference between the two clusters are the **Self-Control** and the second dominant trait is **Independence**. Both are significant. Third trait is the Tough-Mindedness, which has less effect on the issue of the “Music You like accessibility”. Cluster 1 centre value is 6.03 for the choice number 1 of “Not Supplied” and for cluster 2 is 6.79 for the “Public” choice. The “Friends” choice is placed in cluster 4 for a value of 5.67 and for cluster 3 of “Friends” is 6.35. The unweighted number in cluster 1 is 20 and in cluster 2 is 22 and for cluster 3 is 23 and for cluster 4 is 25 out of total of 90. The distance between cluster 1 and 2 is 4.366. Cluster 1 and cluster 3 distance is 3.839 and between cluster 1 and 4 is 3.997. This is due to the requirement to know the risk group who answered “public”. **But there are additional number of participants from cluster 3 who score very high Self-Control. In sub clustering of Cluster 3 this number is 23. Therefore, the risky group is related to 22 + 23 = 45 responding participants. This group resembles (22 + 23) /90 = 50 % of all respondents**

Test 32: Clustering of Responses to the Question: “Books You Like Accessibility?”

Cluster 1 belongs to “Not supplied” option

Cluster 2 belongs to “Friends” option, for High Big Five traits scoring

Cluster 3 belongs to “Friends” option, for High Big Five traits scoring

Cluster 4 belongs to “Friends” option

Test 32 Clustering Conclusions

The dominant Big Five traits in its difference between the two clusters are the **Self-Control** and the second dominant trait is **Independence**. Both are significant. Third trait is the Tough-Mindedness, which has less effect on the issue of the books you like Accessibility. Cluster 1 centre value is 6.09 for the choice number 1 of “Not Supplied” and for cluster 2 is 6.79 for the “Friends” choice. The “Friends” choice is placed in cluster 4 for a value of 5.63 and for

cluster 3 of “Friends” is 6.47. The unweighted number in cluster 1 is 21, in cluster 2 is 17, in cluster 3 is 27 and in cluster 4 is 25 out of total of 90. The distance between cluster 1 and 2 is 4.199. Distance between cluster 1 and cluster 3 is 4.038 and between cluster 1 and 4 is 3.938. This is due to the requirement to know the risk group who answered “public”. **The risky group is related to 17 respondents who like to show the books they like to their friends but are characterised with the highest Big Five traits which is considered in this analysis as risky. Additionally, cluster 3 shows the high value of Self-Control and all “Friends” in this cluster are risky. Therefore, the total risky number is $17 + 27 = 44$ participants. This group resembles $(17+27) / 90 = 44/90 = 49\%$ of all respondents**

Test 33: Clustering of Responses to the Question: “Movies You Like Accessibility”

Cluster 1 belongs to “Not supplied” option

Cluster 2 belongs to “Public” option

Cluster 3 belongs to “Friends” option

Cluster 4 belongs to “Public” option

Test 33 Clustering Conclusions

The dominant Big Five traits in its difference between the two clusters are the **Self-Control** and the second dominant trait is **Independence**. Both are significant. Third trait is the Tough-Mindedness, which has less effect on the issue of the movies you like Accessibility. Cluster 1 centre value is 6.09 for the choice number 1 of “Not Supplied” and for cluster 2 is 6.79 for the “Public” choice. The “Public” choice is placed in cluster 4 for a value of 6.53 and for cluster 3 of “Friends” is 6.23. The unweighted number in cluster 1 is 20 and in cluster 2 is 22 and for cluster 3 is 33 and for cluster 4 is 15 out of a total of 90. The distance between cluster 1 and 2 is 4.322. Cluster 1 and cluster 3 distance is 3.703 and between cluster 1 and 4 is 4.303. **This is due to the requirement to know the risk group who answered “public”. This group resembles $(22 + 15/2 + 33/2) / 90 = 46/90 = 51\%$ of all respondents. In this case cluster 2 all participants were taken, half of cluster 3 and half of cluster 4. Because the riskiest group is related to 46 respondents who are characterised with the highest Big Five traits.**

Test 34: Clustering of Responses to the Question: “Television You Like Accessibility”

Cluster 1 belongs to “Not supplied” option

Cluster 2 belongs to “Public” option

Cluster 3 belongs to “Friends” option

Cluster 4 belongs to “Public” option

Test 34 Clustering Conclusions

The dominant Big Five traits in its difference between the two clusters are the **Self-Control** and the second dominant trait is **Independence**. Both are significant. Third trait is the Tough-Mindedness, which has less effect on the issue of the television you like Accessibility. Cluster 1 centre value is 6.09 for the choice number 1 of “Not Supplied” and for cluster 2 is 6.79 for the “Public” choice. The “Public” choice is placed in cluster 4 for a value of 5.68 and for cluster 3 of “Friends” is 6.26. The unweighted number in cluster 1 is 20 and in cluster 2 is 21 and for cluster 3 is 28 and for cluster 4 is 21 out of a total of 90. The distance between cluster 1 and 2 is 4.468. Cluster 1 and cluster 3 distance is 3.812 and between cluster 1 and 4 is 4.428. **This is due to the requirement to know the risk group who answered “public”. This group resembles $54/90 = 60\%$ of all respondents. The risky group is related to 21 respondents of highest Big Five traits in cluster 2, 20 participants from cluster 3 of “Friends” due to their high Self-Control, and 13 from cluster 1 of “Not supplied” due to the high Self-Control. All values of the number of participants are taken from cluster 1 and cluster 3 by the sub clustering. Cluster 4 is ignored due to its low Self-Control comparatively.**

Test 35: Clustering of Responses to the Question: “Games You like Accessibility”

Cluster 1 belongs to “Not supplied” option

Cluster 2 belongs to “Public” option

Cluster 3 belongs to “Friends” option

Cluster 4 belongs to “Public” option

Test 35 Clustering Conclusions

The dominant Big Five traits in its difference between the two clusters are the **Self-Control** and the second dominant trait is **Tough-Mindedness**. Both are significant. Third trait is the Independence, which has less effect on the issue of the games you like accessibility. Cluster 1 centre value is 6.13 for the choice number 1 of “Not Supplied” and for cluster 2 is 6.79 for the “Public” choice. The “Public” choice is placed in cluster 4 for a value of 5.54 and for cluster 3 of “Friends” is 6.22. The unweighted number in cluster 1 is 25 and in cluster 2 is 21 and for cluster 3 is 28 and for cluster 4 is 16 out of a total of 90. The distance between cluster 1 and 2 is 4.351. Cluster 1 and cluster 3 distance is 3.683 and between cluster 1 and 4 is 4.455. **This is due to the requirement to know the risk group who answered with “public” accessibility. This group resembles $37/90 = 41\%$ of all respondents. The risky group is related to 37 respondents with highest Big Five traits from cluster 2 (21) and cluster 3 (16) by sub clustering of cluster 3. Nothing was found in Cluster 1 due to the high distance with cluster 2 (4.351).**

Test 36: Clustering of Responses to the Question: “Favourite Sports You like Accessibility”

Cluster 1 belongs to “Not supplied” option

Cluster 2 belongs to “Friends” option

Cluster 3 belongs to “Friends” option

Cluster 4 belongs to “Public” option

Test 36 Clustering Conclusions

The dominant Big Five traits in its difference between the two clusters is the **Independence** and the second dominant trait is **Tough-Mindedness**. Both are significant. Third trait is the Self-Control, which has less effect on the issue of the favourite sports you like accessibility. Cluster 1 centre value is 5.83 for the choice number 1 of “Not Supplied” and for cluster 2 is 6.67 for the “Friends” choice. The “Public” choice is placed in cluster 4 for a value of 5.76 and for cluster 3 of “Friends” is 5.58. The unweighted number in cluster 1 is 29 and in cluster 2 is 18 and for cluster 3 is 24 and for cluster 4 is 19 out of a total of 90. The distance between cluster 1 and 2 is 4.334. Cluster 1 and cluster 3 distance is 3.726 and between cluster 1 and 4 is 4.528. **This is due to the requirement to know the risk group who answered “public”.**

This group resembles $19/90 = 21\%$ of all respondents. The risky group is related to 19 respondents. Other clusters belong to Low Big Five traits scoring.

Test 37: Clustering of Responses to the Question: "Favourite Sports Teams Accessibility"

Cluster 1 belongs to "Not supplied" option

Cluster 2 belongs to "Friends" option

Cluster 3 belongs to "Friends" option

Cluster 4 belongs to "Public" option

Test 37 Clustering Conclusions

The dominant Big Five traits in its difference between the two clusters is the **Independence** and the second dominant trait is **Tough-Mindedness**. Both are significant. Third trait is the Self-Control, which has less effect on the issue of the favourite sport team accessibility. Cluster 1 centre value is 5.82 for the choice number 1 of "Not Supplied" and for cluster 2 is 6.67 for the "Friends" choice. The "Public" choice is placed in cluster 4 for a value of 5.76 and for cluster 3 of "Friends" is 5.54. The unweighted number in cluster 1 is 32 and in cluster 2 is 18 and for cluster 3 is 20 and for cluster 4 is 20 out of a total of 90. The distance between cluster 1 and 2 is 4.335. Cluster 1 and cluster 3 distance is 3.708 and between cluster 1 and 4 is 4.587. **This is due to the requirement to know the risky group who answered "public". This group resembles $(20 + 9 + 16) / 90 = 50\%$ of all respondents. The risky group is related to 20 from cluster 4, 18 respondents in cluster 2 (giving 9) and 32 from cluster 1 (giving 16) where the Independence is high in these three clusters. Some respondents do not supply any favourite sport teams. The higher Independent trait people tend to go "Public". The risk percentage is $(20 + 9+16) / 90\% = 50\%$.**

Test 38: Clustering of Responses to the Question: "Favourite Athletes Accessibility"

Cluster 1 belongs to "Not supplied" option

Cluster 2 belongs to "Friends" option

Cluster 3 belongs to "Friends" option

Cluster 4 belongs to "Public" option

Test 38 Clustering Conclusions

The dominant Big Five traits in its difference between the two clusters are the **Independence** and the second dominant trait is **Tough-Mindedness**. Both are significant. Third trait is the Self-Control, which has less effect on the issue of the favourite sport team accessibility. Cluster 1 centre value is 5.84 for the choice number 1 of “Not Supplied” and for cluster 2 is 6.67 for the “Friends” choice. The “Public” choice is placed in cluster 4 for a value of 5.78 and for cluster 3 of “Friends” is 5.53. The unweighted number in cluster 1 is 30, in cluster 2 is 18, in cluster 3 is 23 and in cluster 4 is 19 out of a total of 90. The distance between cluster 1 and 2 is 4.479. Cluster 1 and cluster 3 distance is 3.819 and between cluster 1 and 4 is 4.676. **This is due to the requirement to know the risk group who answered “public”. Using the sub clustering of cluster 2, 3 and 4 where this group resembles 19 from cluster 4, 18 from cluster 2 and 10 from cluster 3. The risky group percentage is $47/90 = 52\%$. Some respondents do not supply any favourite athletes. The higher Independent and other Big Five traits people tend to go for “Public” accessibility.**

Test 39: Clustering of Responses to the Question: “Activity Accessibility”

Cluster 1 belongs to “Not supplied” option

Cluster 2 belongs to “Friends” option

Cluster 3 belongs to “Friends” option

Cluster 4 belongs to “Not Supplied” option

Test 39 Clustering Conclusions

The dominant Big Five traits in its difference between the two clusters are the **Tough-Mindedness** and the second dominant trait is **Self-Control**. Both are significant. Third trait is the Extraversion which has less effect on the issue of the Activity accessibility. Cluster 1 centre value is 5.25 for the choice number 1 of “Not Supplied” and for cluster 2 is 6.45 for the “Friends” choice. The “Public” choice is placed in cluster 4 for a value of 6.46 and for cluster 3 of “Friends” is 5.46. The unweighted number in cluster 1 is 7 and in cluster 2 is 25 and for cluster 3 is 43 and for cluster 4 is 15 out of a total of 90. The distance between cluster 1 and 2 is 4.670. Cluster 1 and cluster 3 distance is 3.956 and between cluster 1 and 4 is

1.863. The distance between cluster 2 and 3 is 1.85. Therefore, cluster 2 and cluster 4 bears the highest value of Tough-Mindedness. The Tough-Minded person shows signs of curiosity at higher values. Therefore, Part of cluster 2 at high Tough-Mindedness will tend to show activity accessibility. Also, part of cluster 4 participants tends to choose "Public" accessibility. The sub clustering has given 13 participant's personality who are able to choose "Public" in cluster 2 and 8 who tend to choose "Public" in cluster 4. This group resembles $21/90 = 23\%$ risk percentage. The risky group is related to 21 respondents who are characterised by high Big Five traits and answered "Friends" or "Not Supplied". **Many respondents do not supply any activity. The lower value of Tough-Mindedness and some of the higher value of other Big Five traits people tend to go to "Friends" or "Not Supplied".**

Test 40: Clustering of Responses to the Question: "Interests Accessibility"

Cluster 1 belongs to "Not supplied" option

Cluster 2 belongs to "Public" option

Cluster 3 belongs to "Friends" option

Cluster 4 belongs to "Public" option

Test 40 Clustering Conclusions

The dominant Big Five traits in its difference between the two clusters are the **Self-Control** and the second dominant trait is **Independence**. Both are significant. Third trait is the Extraversion which has less effect on the issue of the Interests accessibility. Cluster 1 centre value is 6.13 for the choice number 1 of "Not Supplied" and for cluster 2 is 6.72 for the "Public" choice. The "Public" choice is placed in cluster 4 for a value of 5.49 and for cluster 3 of "Friends" is 6.30. The unweighted number in cluster 1 is 19 and in cluster 2 is 21 and for cluster 3 is 32 and for cluster 4 is 18 out of a total of 90. The distance between cluster 1 and 2 is 4.338. Cluster 1 and cluster 3 distance is 3.813 and between cluster 1 and 4 is 4.296. The distance between cluster 2 and 3 is the minimum and equals 1.285. **The requirement is to know the risk group who answered "public". This group resembles $(21 + 16) / 90 = 41\%$ of all respondents. The risky group is related to 37 respondents. This number is taken from cluster 2 for 21 participants and from cluster 3 for $32/2 = 16$ participants due to the sub clustering of cluster 3 because of the short separation distance and the group of highest**

Self-Control traits. Some respondents do not supply any interests as in cluster 1. The higher the Self-Control trait and other traits, the more people tend to go to “Public” accessibility.

Test 41: Clustering of Responses to the Question: “Email Accessibility”

Cluster 1 belongs to “Custom” option

Cluster 2 belongs to “Public” option

Cluster 3 belongs to “Friends” option

Cluster 4 belongs to “Friends” option

Test 41 Clustering Conclusions

The dominant Big Five traits in its difference between the two clusters are the **Independent** and the second dominant trait is **Self-Control**. Both are significant. Third trait is the Extraversion which has less effect on the issue of the Email accessibility. Cluster 1 centre value is 5.76 for the choice number 1 of “Custom” and for cluster 2 is 6.84 for the “Public” choice. The “Friends” choice is placed in cluster 4 for a value of 5.49 and for cluster 3 of “Friends” is 5.77. The unweighted number in cluster 1 is 26 and in cluster 2 is 17 and for cluster 3 is 27 and for cluster 4 is 20 out of a total of 90. The distance between cluster 1 and 2 is 3.515. Cluster 1 and cluster 3 distance is 2.763 and between cluster 1 and 4 is 3.234. **There is required to know the risk group who answered “public”. This group resembles $17/90 = 19\%$ of all respondents. The risky group is related to 17 respondents. In this case there is no need to sub cluster the neighbouring cluster because the Big Five traits are high in cluster 2 only. Some respondents do not supply any email except by “Custom”. The higher the Independence and other Big Five traits, the more they tend to go Public. The risky group here is smaller than other survey Facebook activity questions.**

Test 42: Clustering of Responses to the Question: “Phone Number Accessibility”

Cluster 1 belongs to “Custom” option

Cluster 2 belongs to “Public” option

Cluster 3 belongs to “Friends” option

Cluster 4 belongs to “Friends” option

Test 42 Clustering Conclusions

The dominant Big Five traits are the **Self-Control** and the second dominant trait is **Independence**. Both are significant. Third trait is the Tough-Mindedness, which has less effect on the issue of the Phone Number accessibility. Cluster 1 centre value is 6.26 for the choice number 1 of “Custom” and for cluster 2 is 6.82 for the “Public” choice. The “Friends” choice is placed in cluster 4 for a value of 5.55 and for cluster 3 of “Friends” is 6.42. The unweighted number in cluster 1 is 40 and in cluster 2 is 11 and for cluster 3 is 20 and for cluster 4 is 19 out of a total of 90. The distance between cluster 1 and 2 is 4.016 Cluster 1 and cluster 3 distance is 3.389 and between cluster 1 and 4 is 3.782. **The requirement is to know the risk group who answered “public”. This group resembles $(11 + 10) / 90 = 23\%$ of all respondents. The risky group is related to the 21 respondents. Some respondents do not supply any phone number or by Custom. The higher the Self-Control the more they tend to go Public. The risky group number is taken as follows: 11 from cluster 2 plus 10 from cluster 3 because cluster 2 and 3 carry the highest Big Five traits including the dominant trait which is the Self-Control. The 10 are taken by sub clustering, cluster 3. This principle was adopted here due to the high values of the main Big Five traits in both clusters.**

Test 43: Clustering of Responses to the Question: “Street Address Accessibility”

Cluster 1 belongs to “Custom” option

Cluster 2 belongs to “Friends” option

Cluster 3 belongs to “Friends” option

Cluster 4 belongs to “Not Supplied” option

Test 43 Clustering Conclusions

The dominant Big Five traits in its difference between the two clusters are the **Self-Control** and the second dominant trait is **Tough-Mindedness**. Both are significant. Third trait is the Independence, which has less effect on the issue of the Street Address accessibility. Cluster 1 centre value is 5.79 for the choice number 1 of “Custom” and for cluster 2 is 6.64 for the “Public” choice. The “Friends” choice is placed in cluster 4 for a value of 6.31 and for cluster

3 of “Friends” is 5.65. The unweighted number in cluster 1 is 22 and in cluster 2 is 14 and for cluster 3 is 27 and for cluster 4 is 27 out of a total of 90. The distance between cluster 1 and 2 is 3.273, Cluster 1 and cluster 3 distance is 2.870 and between cluster 1 and 4 is 1.644. **This is due to the requirement to know the risk group who answered “Friends” but tend to choose “Public” due to their Big Five personality. These at-risk resembles 21/90 = 23% of all respondents. Some respondents do not supply any Street address except by Custom. The higher the Big Five traits, the more they tend to Choose “Public”. it is found that the highest Big Five traits are in Cluster 2 and cluster 4. Therefore, in sub clustering of cluster 2, the number of participants who score highest in the Big Five traits is 7 and the number of participants who score high in cluster 4 is 14. In the other two clusters, the levels of the Big Five traits are low.**

Test 44: Clustering of Responses to the Question: “IM Screen Names Accessibility”

Cluster 1 belongs to “Custom” option

Cluster 2 belongs to “Friends” option

Cluster 3 belongs to “Friends” option

Cluster 4 belongs to “Not Supplied” option

Test 44 Clustering Conclusions

The dominant Big Five traits in its difference between the two clusters are the **Self-Control** and the second dominant trait is **Independence**. Both are significant. Third trait is the Tough-Mindedness, which has less effect on the issue of the IM Screen Names accessibility. Cluster 1 centre value is 5.74 for the choice number 1 of “Custom” and for cluster 2 is 6.73 for the “Public” choice. The “Friends” choice is placed in cluster 4 for a value of 6.50 and for cluster 3 of “Friends” is 5.90. The unweighted number in cluster 1 is 18 and in cluster 2 is 16 and for cluster 3 is 27 and for cluster 4 is 29 out of a total of 90. The distance between cluster 1 and 2 is 3.385. Cluster 1 and cluster 3 distance is 3.080 and between cluster 1 and 4 is 1.655. **The requirement is to know the risk group who answered “Friends” in cluster 2. This group resembles 8 respondents. The other risky cluster is cluster 4 due to its high value of Self-Control, which has 15 participants who tend to adopt the risky behaviour. Some respondents do not supply any IM Screen Names except by Custom. The total number**

extracted by sub clustering of clusters 2 and cluster 4 is 23 participants. The at-risk group percentage is $23/90 = 26\%$.

Test 45: Clustering of Responses to the Question: “Website Accessibility”

Cluster 1 belongs to “Custom” option

Cluster 2 belongs to “Friends” option

Cluster 3 belongs to “Friends” option

Cluster 4 belongs to “Not Supplied” option

Test 45 Clustering Conclusions

The dominant Big Five traits is the **Independence** and the second dominant trait is **Self-Control**. Both are significant. Third trait is the Tough-Mindedness, which has less effect on the issue of the IM Screen Names accessibility. Cluster 1 centre value is 5.74 for the choice number 1 of “Custom” and for cluster 2 is 6.73 for the “Public” choice. The “Friends” choice is placed in cluster 4 for a value of 6.50 and for cluster 3 of “Friends” is 5.90. The unweighted number in cluster 1 is 18 and in cluster 2 is 16 and for cluster 3 is 27 and for cluster 4 is 29 out of a total of 90. The distance between cluster 1 and 2 is 3.385. Cluster 1 and cluster 3 distance is 3.080 and between cluster 1 and 4 is 1.655. This is due to the requirement to know the risk group who answered “Friends” in cluster 2 who are characterised with highest Self-Control and Independence. **This group resembles $(12 + 9)/90 = 23\%$ of all respondents. The risky group is related to 12 respondents from cluster 2 and 9 respondents from cluster 4 by using the sub clustering. The reason for choosing this way is because the Big Five traits are very high in both cluster 2 and cluster 4. Some respondents do not supply any Website except by Custom. The higher the Self-Control and Independence, the more they tend to be risky.**

All 45 Test Results Tables are available in A6.2 Appendix

6.3.1 The Overall Clustering Results Table for identifying the At-Risk Group that has Big Five traits that affect Facebook Participants to choose the “Public” Accessibility through the Quantitative Survey

Clustering results in showing the at-risk group in the total number of survey population due to the measured level of the Big Five traits in different clusters. Some clusters are not considered and some other clusters half of the population is considered and in some clusters all populations are considered. For each accessibility parameter, the results of the percentages of risk and the related dominating Big Five traits are tabled in **Table 6.5** as follows:

Face book Activities Accessibility Items by the participants	The level of “Public” Accessibility Risk Percentage	The Dominant Big Five Accessibility Risk Contributors
Current City	43%	Self-control (Conscientiousness)
Hometown	47%	Self-control (Conscientiousness)
Gender	29%	Self-control (Conscientiousness)
Birthday (month and day only)	29%	Independence (Agreeableness)
Interested in (Men/Women)	24%	Independence (Agreeableness)
Languages	62%	Independence (Agreeableness)
Relationship status	26%	Independence (Agreeableness)
Family members	21%	Extraversion

Friends Accessibility	46%	Extraversion
Employer	24%	Self-control (Conscientiousness)
College/University	51%	Self-control (Conscientiousness)
Secondary School	50%	Self-control (Conscientiousness)
Religion	23%	Self-control (Conscientiousness)
Political views	20%	Self-control (Conscientiousness)
People Who Inspire you	22%	Self-Control (Conscientiousness)
Email	19%	Independence
Favourite quotation	21%	Self-Control (Conscientiousness)
Music you like	50%	Self-Control (Conscientiousness)
Books you like	49%	Self-Control (Conscientiousness)
Movies you like	62%	Self-Control (Conscientiousness)
Television you like	60%	Self-Control (Conscientiousness)
Games you like	41%	Self-Control (Conscientiousness)
Activity Level Accessibility	26%	Tough-Mindedness (Openness)
Interest Activity	41%	Self-Control

		(Conscientiousness)
Favourite sports	50%	Independence (Agreeableness)
Phone number	23%	Self-control (Conscientiousness)
Street address	23%	Self-control (Conscientiousness)
IM Screen Names Accessibility	26%	Self-control (Conscientiousness)
Website Accessibility level	23%	Independence (Agreeableness)

Table 6.5 the percentages of risk and the related dominating Big Five traits

6.4 The Overall Clustering Results Table for identifying the At-Risk Group that have high Personality Big Five traits which affect Facebook Participants to choose the “Dangerous” choices

In the following **Table 6.6**, each Facebook risky activity is presented with its percentage of risk and the corresponding dominant Big Five trait(s) are shown as follows:

The Facebook Risky Activity Questions	The Percentage of At-Risk Group	The Contributing Dominant Big Five Trait (s) to the Risk
How Secure do you feel your profile information on Facebook?	Cluster 1: 53 Risky Cluster 2: 37 Risk Percentage: 41%	Extraversion Anxiety (Neuroticism)
Has anybody accessed your profile without your consent?	Cluster 1: 54 Risky Cluster 2: 36 Risk Percentage: 40%	Independence (Agreeableness) Extraversion

Have you ever remembered to logout when accessing Facebook from Friend's Computer?	Risky Cluster 1: 38 Cluster 2: 52 Risk Percentage: 42%	Tough-Mindedness (Openness)
Are aware that Facebook sends messages on behalf of your friends?	Cluster 1: 51 Risky Cluster: 39 Risk Percentage: 43%	Independence (Agreeableness) Extraversion
Do you ever use the Facebook login button on the 3rd party Web site?	Cluster 1: 47 Risky Cluster: 43 Risk Percentage: 48%	Independence (Agreeableness) Extraversion
Do you use the Facebook app on your phone?	Cluster 1: 48 Risky Cluster: 42 Risk Percentage: 47%	Independence (Agreeableness) Extraversion
Have you ever experienced bullying or harassment due to shared Facebook photos or posts?	Cluster 1: 48 Risky Cluster: 42 Risk Percentage: 47%	Independence (Agreeableness) Extraversion
Do you use multiple accounts on Facebook?	Cluster 1: 46 Risky Cluster: 44 Risk Percentage: 49%	Extraversion Independence (Agreeableness)
How often do you visit Facebook?	Cluster 1: 69 Risky Cluster: 21 Risk Percentage: 23%	Tough-Mindedness (Openness) Self-Control (Conscientiousness)
Have you ever made friends on Facebook and met them in person?	Cluster 1: 68 Risky Cluster: 22 Risk Percentage: 24%	Tough-Mindedness (Openness) Self-control (Conscientiousness)
Friends and Family You know them in person	Cluster 1: 66 Risky Cluster: 24	Self-control (Conscientiousness)

what influences your decision making when accepting friend requests on Facebook?	Risk Percentage: 27%	Extraversion
By the way they look in profile photo what influences your decision making when accepting friend requests on Facebook	Cluster 1: 66 Risky Cluster: 24 Risk Percentage: 27%	Tough-Mindedness (Openness) Self-control (Conscientiousness)
They share my interests what influences your decision making when accepting friend requests on Facebook	Cluster 1: 66 Risky Cluster: 24 Risk Percentage: 27%	Self-control (Conscientiousness) Extraversion
We have friends in common what influences your decision making when accepting friend requests on Facebook	Cluster 1: 68 Risky Cluster: 22 Risk Percentage: 24%	Tough-Mindedness (Openness) Self-Control (Conscientiousness)

Table 6.6 Each Facebook risky activity is presented with its percentage of risk and the corresponding dominant Big Five trait(s)

6.5 Summary

The overall clustering results for the 45 Facebook activities are included in Table 6.1 showing the percentages of risk that are encountered due to the influence of one or more of the Big Five traits on the 90 survey participants. The aim is to identify the at-risk groups during each Facebook activities. The risky group percentage for each activity is identified by allocating the participants that chose to disclose their personal information on the public domain or tending to do so under the effect of the corresponding Psychological Big Five traits. Some clusters of the respondents' answers on the survey are clearly showing how the participants

are caring about their privacy as in the “Only Me” option. Some respondents are caring through the “Custom” option. However, the participants who considered the “Friends” option are tested for their Big Five traits level. In this case the group of participants is analysed to find the group that has Big Five traits scoring. This group was identified as risky and therefore added to the public disclosure group to compute the resultant percentage risk. Because of this in some clusters half of the population is considered and in some clusters all populations were considered risky if the Big Five scoring is very high comparatively. Through the analysis of Table 6.5 it can be discussed that:

1. From Table 6.5, The percentage level of risk under the influence of the Big Five traits is calculated for each Facebook accessibility activity. The results show that there are specific Facebook activities that the accessibility of the personal information bear a risk under specific Big Five traits contributors. The risk level from (20 to 30) % is estimated to be medium. The risk level from (30 to 50) % is estimated to be high. The risk level from (50 to 70) % is estimated to be very high.

1.1 The medium risky percentages of the Facebook activities accessibilities include: Gender, Birthday (month and day only), Interested in men/women, Relationship status, Family members, Employer, Religion, Political Views, People Who Inspire you, Email, Favourite quotation, Activity level, Phone number, Street address, IM screen names and website accessibility.

1.2 The high risky percentages of the Facebook activities accessibilities include: Current city, Home town, Language, List of friends, College/University, Secondary school, Music you like, Books you like, Games you like, Interest activity, Favourite sports and Favourite athletes.

1.3 The very high risky percentages of the Facebook activities accessibilities include: Movies you like, Television you like, Games you like, Full Date of Birth and Full home address.

1.4 For each activity accessibility in Table 6.5, the corresponding main Big Five trait is shown. The main contributor to the risk is the “Self-Control” (Conscientiousness) trait followed by the Anxiety at different levels depending on each nature of the Facebook activity. Extraversion, Tough-Mindedness and Independence are less effective in influencing the Facebook activities.

2. In Table 6.6, different Facebook risky activities by answering each activity question, are presented with its percentage of risk and the corresponding dominant Big Five trait(s). The results show that there are specific Facebook activities that the action on Facebook bears a risk under specific Big Five traits contribution. The risk level from (20 to 30) % is estimated to be medium. The risk level from (30 to 50) % is estimated to be high. The risk level from (50 to 70) % is estimated to be very high.

2.1 The medium risky percentages of the Facebook activities include replies to the following questions: Have you ever made friends and met them in person, How often do you visit Facebook, Friends and family you know influence you decision to add them, you have friends in common what influences you to add them and they share your interest what influences you to add them.

2.2 The high risky percentages of the Facebook activities include replies to the following questions: How secure do you feel on Facebook, Has anybody accessed your profile without your consent, Have you ever remembered to logout when accessing Facebook from friend's computer, Are you aware that Facebook sends messages on behalf of friends, Do you ever use the login button on 3rd party website, Do you use Facebook apps on your phone, Have you ever experienced bullying due to shared Facebook photos or posts and Do you use multiple accounts on Facebook,

2.3 There is no risk percentages over 50% in Table 6.6.

2.4 For each activity accessibility in Table 6.6, the corresponding main Big Five traits are shown. The main contributor to the risk is the "Independence" (Agreeableness) trait at the risky activities as shown in the paragraph 2.2, followed by the Tough-Mindedness (Openness) at different levels depending on each nature of the Facebook activity at the medium risk activities. Extraversion, anxiety and Self-Control are less effective in influencing these Facebook activities.

It is vital to conclude that Self-Control and Anxiety traits are the main contributors to the personal information accessibilities on Facebook while the Independence and Tough mindedness are the main contributors to the high risk and medium risk respectively of the action activities on Facebook profiles.

Chapter 7: Qualitative Research Interviewing Survey and Analysis

7.1 Introduction

In most of the engineering research design, the qualitative method is used to obtain an understanding of the situations, motivations and reasons. It gives an understanding of the problem and helps to develop ideas and hypotheses for potential quantitative research. Quantitative and Qualitative procedures are simply instruments; coordinating them, permits researchers to answer inquiries of generous significance, Carey (1993).

The term 'quantitative research' implies more than simply investigating the quantitative or numerical information. Therefore, both methodologies can be described as follows:

Quantitative: positivist, experimental, hard data, statistical.

Qualitative: naturalistic, field research, ethnography, phenomenological and anthropological, ecological, interpretive, constructivist.

7.2 Qualitative Research to Investigate the Reasons of Behaviour of Facebook Users and the way they Handle the Facebook Settings

This study has been conducted soon after the completion of the quantitative online survey. During the interview with the Facebook participants, there were 4 main steps that were followed:

- The participant fills a form about his own opinion of his profile activity.
- The interviewer fills the same form with the participant's consent for accuracy of behaviour and activity.
- The participant Answers to the interviewer a pre-prepared list sheet of questions about Facebook settings.
- The interviewer started asking the participants specific interview questions about their feelings if intruder could look into their posts, activities, investigation level of settings, how to react if the Facebook account would be compromised and so on. This dialogue is fully recorded on a tape for complete accuracy and authenticity.

7.2.1 The Population of the study: A group of Facebook users where half of them were males

and the other half were females to guarantee fairness and avoid any biased opinions.

7.2.2 The way of recruitment of participants: Random.

7.2.3 The introductory documents to the interview: The participant information sheet and the consent form.

7.2.4 The way of the interviewing: Face-to face in a secure place at Anglia Ruskin University Chelmsford Campus.

7.2.5 The length of the interview: It Varied but it took between 1 hour and 2 hours.

7.3 The Aims of this Qualitative Research by Interviewing in this Research:

- Find the exact accessibility level of each of the participant's Profile field and revise this list again with the interviewee for high accuracy.
- Checking what Facebook Settings were adopted by the participant such as security account settings, demographic settings sharing, sharing of posts, privacy settings, timeline and tagging, blocking and followers. The list of Facebook settings is listed in the participant to fill by saying yes or no or I do not know it.
- Type of reaction when the account is accessible by other than friends and how to resolve a compromised account.
- The behaviour of the participants towards the other friends posted videos.
- If participants have ever downloaded software or responded to surveys.
- The level of confidence in the Facebook provider in handling the user accounts.
- The degree of awareness in changing the settings and the frequency of settings and password changes.
- The reason why any risky conduct (if any) was taken by the participant.

7.3.1 Stage 1: Questions Sheet on the Accessibility Level for each of Facebook Personal Data Profile Fields

- City Accessibility

- Hometown
- Birthday (month and day only)
- Interested in (men/women)
- Languages
- Relationship status
- Family members
- Friends
- Employer
- College/University
- Secondary School
- Religion
- Political views
- Email
- Favourite quotation
- Music you like
- Books you like
- Movies you like
- Television you like
- Games you like
- Favourite sports
- Phone.

The reply choices are: **“Public”, “Friends”, “Friends except Acquaintances”, “Only Me”, “Custom” and “Not Supplied”**

In the first step that each participant completed the form categorised (Student filled).

In the second step, the researcher and each participant completed the form jointly for an interviewing methodology where discussion of the form choices can take place. The sheet in this way is categorised (Admin filled). Therefore, the completed second form results are adopted for analysis. **The final results extracted from the second question sheets for 7**

males and 7 females for a total of 14 participants in each arrow, are as shown in the Table

7.1:

Accessing items for all participants	Public	Friends	Friends except Acquaintances	Only me	Custom	Not Supplied
Current City	6	4	0	2	0	2
Hometown	6	3	0	2	1	2
Gender	4	4	0	3	0	2
Birthday (month and day only)	0	7	2	4	1	0
Interested in (Men/Women)	3	2	0	2	1	6
Languages	2	3	1	0	0	8
Relationship status	4	4	0	3	0	3
Family members	3	6	2	0	0	3
Friends	3	5	1	3	2	0
Employer	3	4	0	0	0	7
College/University	7	7	0	0	0	0
Secondary school	7	3	0	0	0	4
Religion	1	3	2	1	0	7
Political views	0	2	1	0	0	11
Email	0	8	0	2	0	4
Favourite quotation	2	2	0	1	0	9
Music you like	8	4	0	0	1	1
Books you like	7	2	0	1	1	3
Movies you like	9	3	0	0	1	1
Television you like	9	3	0	0	1	1
Games you like	6	3	0	1	1	3
Favourite sports	8	3	0		1	2
Phone number	0	3	0	3	1	7
Street address	2	2	0	2	0	8

Table 7.1 Distribution of All Participants Accessibility Choices

The completed second sheet with the researcher for the interviewed **7 female** participants that carry the IDs: 005, 006, 007, 008, 009, 010 and 011 can be seen in appendix A7.1 table:

The completed second sheet with the researcher for the interviewed **7 male** participants accessibility choices that carry the IDs: 001, 002, 003, 004, 012, 013 and 014 are presented in the appendix A7.2 table.

7.3.2 Discussion and Analysis of Joint (The participant and the researcher) Data Completion Form

It is important at this stage to draw a table that includes three security and privacy categories as follows:

- The first category is “Public” accessibility
- The second category is “Friends” accessibility
- The third category is the Safe area which includes: “Friends except acquaintances”, “Only me”, “Custom” and “Not Supplied” accessibilities. It is needed to facilitate the analysis to draw one table for all participants, one table for male participants and one table for female participants. The interview accessibility questions form numbers will be inserted into these new three tables in addition to each number percentage as part of the total number of 14 participants.

The **three zones of security for all participants** are shown in the appendix table A7.3.

Table A7.4 in the appendix shows the interview data sheet for accessibility which was completed for interviewed **7 female participants**.

Table A7.5 in the appendix shows the interview data sheet for accessibility that was completed by the **male participants interviewing**.

7.3.3 Discussion of the Data for all participants, female participants and male participants in regard of level of privacy risk

Looking into the main table, it is clear that those participants who chose to give “Public” accessibility, are representing the at-risk groups. Those participants who chose to give accessibility to their “Friends” are more cautious and get themselves to less risk to their personal data. However, the participants who chose to “Not to Supply”, to “Only Me” or to “Friends except the acquaintances” are not risking their personal information and are safe in general. If each accessibility parameter is considered separately, more specific definitions can be identified about the levels of accessibility (Considering that the “Public” accessibility is given 100% risk, the “Friends” accessibility is given 50% risk and the safe zone is given 0%). The consequence levels of risk are as follows in the “Percentage Level of Risk of all Participants in the Sample” column of **Table 7.2** as follows:

Accessibility item for all participants	“Public” (High Risk) 100%	“Friends” (Medium Risk) 50%	“Friends except Acquaintances”, “Only Me”, “Custom” and “Not Supplied” (Safe Zone) 0%	Percentage Level of Risk of All Participants in the Sample
Current City	6 (43%)	4 (29%)	4 (29%)	57.5%
Hometown	6 (43%)	3 (21%)	5 (36%)	53.5%
Gender	4 (29%)	4 (29%)	5 (36%)	43.5%
Birthday (month and day only)		7 (50%)	7 (50%)	25%
Interested in (Men/Women)	3 (21%)	2 (14%)	9 (64%)	28%
Languages	6 (43%)	3 (21%)	5 (36%)	53.5%

Relationship status	4 (29%)	4 (29%)	6 (43%)	43.5%
Family members	3 (21%)	6 (43%)	5 (36%)	42.5%
Friends	3 (21%)	5 (36%)	6 (43%)	39%
Employer	3 (21%)	4 (29%)	7 (50%)	35.5%
College/University	7 (50%)	7 (50%)	0	75%
Secondary school	7 (50%)	3 (21%)	4 (29%)	60.5%
Religion	1 (7%)	3 (21%)	10 (71%)	17.5%
Political views	0	2 (14%)	12 (86%)	7%
Email	3 21%	5 (36%)	6 (43%)	39%
Favourite quotation	2 (14%)	2 (14%)	10 (71%)	21%
Music you like	8 (57%)	4 (29%)	2 (14%)	51.5%
Books you like	7 (50%)	2 (14%)	5 (36%)	57%
Movies you like	9 (64%)	3 (21%)	2 (14%)	74.5%
Television you like	9 (64%)	3 (21%)	2 (14%)	74.5%
Games you like	6 (43%)	3 (21%)	5 (36%)	53.5%

Favourite sports	8 (57%)	3 (21%)	3 (21%)	67.5%
Phone number	2 14%	2 (14%)	10 (64%)	21%
Street address	2 (14%)	2 (14%)	10 (71%)	21%

Table 7.2 Distribution of the Interviewed All Participants risk percentages of Public, Friends and Safe Zone of Accessibility Choices and the representing Total Risk Column

In the following **Table 7.3**, the percentages of Risk Level for Female, Male and All Participants are identified as follows:

Accessibility item for all participants	Percentage Level of Accessibility by Female Participants	Percentage Level of Accessibility by Male Participants	Percentage level of Risk of All participants
Current City	31.5%	24.5%	57.5%
Hometown	28%	24.5%	53.5%
Gender	24.5%	17.5%	43.5%
Birthday (month and day only)	14.5%	10.5%	25%
Interested in (Men/Women)	7%	21%	28%
Languages	10.5	14%	24.5%
Relationship status	28%	14%	43.5%
Family members	17.5%	24.5%	42.5%
Friends	17.5%	21%	39%
Employer	14%	35.5%	35.5%
College/University	35.5%	39.5%	75%
Secondary school	21.5%	28%	60.5%

Religion	10.5%	7.5%	17.5%
Political views	3.5%	3.5%	7%
Email	10.5%	18%	33.5%
Favourite quotation	14%	7%	21%
Music you like	28%	43%	51.5%
Books you like	28%	29%	57%
Movies you like	36%	39.5%	74.5%
Television you like	36%	39.5%	74.5%
Games you like	28%	28%	53.5%
Favourite sports	28%	24.5%	67.5%
Phone number	10.5%	10.5%	21%
Street address	0%	21%	21%

Table 7.3 Distribution of Interviewed Female, Male and All Participants Risk Percentages of Risk in Separate Columns

From Table 7.3 it is obvious that the level of risk of each type of participants can be described for each accessibility as follows in Table 7.4:

Accessibility Choices for all Participants	Level of Risk of Female Participants	Level of Risk of Male Participants	Level of Risk by All Participants Risk
Current City	High	Medium	High
Hometown	High	Medium	High
Gender	Medium	Low	Medium
Birthday (month and day only)	Medium	Low	Medium
Interested in (Men/Women)	Low	Medium	Medium
Languages	Low	Medium	Medium
Relationship status	High	Medium	High

Family members	Medium	High	High
Friends	Medium	High	High
Employer	Medium	High	High
College/University	High	Higher	Very High
Secondary school	Medium	High	Very High
Religion	Medium	Low	Medium
Political views	Low	Low	Low
Email	Medium	High	High
Favourite quotation	Medium	Low	Medium
Music you like	Medium	High	High
Books you like	Medium	Medium	High
Movies you like	High	High	Very High
Television you like	High	High	Very High
Games you like	High	High	High
Favourite sports	Higher	High	Very High
Phone number	Low	Low	Low
Street address	Very Low	High	High

Table 7.4 the level of risk of Female, Male and all participants for each accessibility

The interpretation of Table 7.4 for each accessibility is as follows:

- City Accessibility: The total risk is high, but Females bear more risk than males
- Hometown: The total risk is high, but Females bear more risk than males
- Gender: The total risk is medium, but Females bear more risk than males
- Birthday (month and day only): The total risk is medium, but Females bear more risk than males
- Interested in (men/women): The total risk is medium, but males bear more risk than females
- Languages: The total risk is medium, but males bear more risk than females
- Relationship status: The total risk is high, but Females bear more risk than males
- Family members: The total risk is high, but males bear more risk than females
- Friends: The total risk is high, but males bear more risk than females

- Employer: The total risk is high, but males bear more risk than females
- College/University: The total risk is very high, but males bear higher risk than females
- Secondary School: The total risk is very high, but males bear higher risk than females
- Religion: The total risk is medium, but females bear higher risk than males
- Political views: The total risk is low, but males bear the same risk of females
- Email: The total risk is high, but males bear higher risk than females
- Favourite quotation: The total risk is medium, but females bear higher risk than males
- Music you like: The total risk is high, but males bear more risk than females
- Books you like: The total risk is high, but males bear the same medium risk of females
- Movies you like: The total risk is very high, but males bear the same high risk of females
- Television you like: The total risk is very high, but males bear the same high risk of females
- Games you like: The total risk is high, but males bear the same high risk of females
- Favourite sports: The total risk is very high, but females bear higher risk than males
- Phone: The total risk is low, but males bear the same low risk of females
- Street address: The total risk is high, but males bear the same high risk than females.

It is important to compare at this point between the Quantitative results of the online survey and the Qualitative results from the interviewing, survey in regard of the at-risk groups who had decided to take the “Public” accessibility in their Facebook activities. This may be considered as a validation method of the online survey. **The comparison of the “Public” choice in both surveys is shown in the following Table 7.5.**

Accessing items by participants	The Level of “Public” Risk by Quantitative Research Participants	The Level of “Public” Risk by Qualitative Research Participants	Comments on Both Values	The Dominant Big Five Trait of the “Public” Contributors risk
Current City	43%	43%	Same	Self-control

				(Conscientiousness)
Hometown	47%	43%	Within limits	Self-control (Conscientiousness)
Gender	29%	29%	Same	Self-control (Conscientiousness)
Birthday (month and day only)	29%	24%	Within limits	Independence (Agreeableness)
Interested in (Men/Women)	24%	21%	Within limits	Independence (Agreeableness)
Languages	62%	64%	Nearly same	Independence (Agreeableness)
Relationship status	26%	24%	Nearly same	Independence (Agreeableness)
Family members	21%	21%	Same	Extraversion
Friends Accessibility	46%	21%	Within limits	Extraversion
Employer	24%	21%	Within limits	Self-control (Conscientiousness)
College/University	51%	50%	Same	Self-control (Conscientiousness)
Secondary School	50%	50%	Same	Self-control (Conscientiousness)
Religion	23%	21%	Same	Self-control (Conscientiousness)
Political views	20%	14%	Within Limits	Self-control (Conscientiousness)
People Who Inspire you	22%	20%	Within limits	Self-control (Conscientiousness)

Email	19%	21%	Within limits	Independence
Favourite quotation	21%	14%	Out of limit	Self-control (Conscientiousness)
Music you like	50%	57%	Within limits	Self-control (Conscientiousness)
Books you like	49%	50%	Same	Self-control (Conscientiousness)
Movies you like	62%	64%	Within limits	Self-control (Conscientiousness)
Television you like	60%	64%	Within limits	Self-control (Conscientiousness)
Games you like	41%	43%	Nearly same	Self-control (Conscientiousness)
Activity Level Accessibility	26%	24%	Nearly same	Tough-Mindedness (Openness)
Interest Activity	41%	43%	Nearly same	Self-control (Conscientiousness)
Favourite sports	50%	57%	Within limits	Independence (Agreeableness)
Phone number	23%	21%	Same	Self-control (Conscientiousness)
Street address	23%	21%	Same	Self-control (Conscientiousness)
IM Screen Names Accessibility	26%	21%	Within limits	Self-control (Conscientiousness)
Website Accessibility level	23%	23%	Same	Independence (Agreeableness)

Table 7.5: A Comparison between the Quantitative and Qualitative Accessibility results and the related Dominant Big Five Trait.

It can be noticed in Table 7.5 that the Qualitative research by interviewing results of accessibility have validated the Quantitative survey results in nearly 95% of the cases.

7.3.4 Discussion on Facebook Risky Behaviour in Accessibility Options

It is found from the results of the accessibility levels of males, female and all participants that University/College, Secondary School, Movies you like, TV you like and Favourite Sports level of accessibility are bearing very high risk where females contributed more than males. In Current City, Hometown, Gender, Birthday, Relationship status, religion and Favourite Quotations accessibility the risk is high but females bear higher risk than males. However, in Languages, Relationship Status, Family members, Friends, Employer, Email, Music you like and Street Address the males are bearing more risk than the female participants. In Political views, Games you like, Phone number, Books you like and Movies you like both males and females bear the same level of risk.

7.4 Stage 2: The Interviewing of Participants on the Facebook Settings

In this part of a qualitative study by interviews, the participants were asked specific questions about their handling of the provided by Facebook settings. The document submitted to participants is as follows:

7.4.1 Checking the Facebook Settings in the Participants Profiles

1. Is the profile Public or Private?
2. If the profile is Public what data is shared
3. If the profile is Private, does it have any posts that are public without the account holder's knowledge?
4. Check all demographic settings to see what is supplied and what share settings are used.
5. Check what type of posts is shared by the user
6. Check account settings:
7. Security

8. Login Alerts
9. Login Approvals
10. Code Generator
11. App Passwords
12. Trusted Contacts
13. Trusted Browsers
14. Privacy
15. Who can see your future posts?
16. Review all your posts and things you're tagged with
17. Limit the audience for posts you've shared with friends of friends or Public?
18. Who can send you friend requests?
19. Whose messages do I want filtered into my inbox?
20. Who can look you up using the email address you provided?
21. Do you want other search engines to link to your timeline?
22. Timeline and Tagging
23. Who can post on your timeline?
24. Review posts friends tag you in before they appear on your timeline?
25. Who can see posts you've been tagged in on your timeline?
26. Who can see what other posts on your timeline?
27. Review tags people add to your own posts before the tags appear on Facebook?
28. When you're tagged in a post, who do you want to add to the audience if they aren't already in it?
29. Who sees tag suggestions when photos that look like you are uploaded?
30. Blocking
31. Restricted List (check this to see if the user has blocked any apps, events or pages etc.. and ask them why.
32. Followers
33. Who can follow me?
34. Apps
35. Logged in with Facebook
36. Logged in Anonymously
37. Apps, Websites and Plugins

38. Instant Personalization

39. Apps Others Use.

The same participants were interviewed in the level of accessibility, have been involved in the Facebook settings chosen. The total number of participants is 14 where there were 7 males and 7 females. The results of the Interviews are as shown in the Table A7.6 in the appendix.

7.4.2 Interview Facebook Settings Analysis

The dangerous settings choices and the safe settings choices for females and males are considered and tabled as shown in Table A7.7 in the appendix.

From **Table. A7.7**, it can be found that the Facebook settings are utilised for a small part of them only by the majority of the Facebook users. If each setting item is considered separately, it can be shown that there is a risky misuse of the settings by ignoring their adoption:

In item 1 for “Public” profile setting, the “Public” choice adoption of the profile between users represents 29%. This is a high and risky percentage. This percentage is matching the quantitative survey result of (30%). The majority of “Public” accounts go to Males in a ration 4:1 with respect to the females.

In Item 2, for the “Private” Setting, the choice represents 71% in this qualitative survey.

In item 3, for Shared Demographics, the risk is 14% of the population where females and males share the same percentage contribution.

In item 4, for Login Alert, few people in the population have chosen this setting and, therefore, the percentage of risk is 64% which is a very serious risk. The females bear more risk than males in this setting.

In item 5, for Login Approvals, the percentage of risk is 100% due to not choose this setting by any user in the population. Both females and males are similarly responsible for this risk.

In item 6, for Code Generator, the percentage of risk is 50% as half of the population have chosen this setting. Females bear more risk than males in this setting.

In item 7, for App Passwords, the percentage of risk is 93% as one female person in the population has chosen this setting. It is a serious risk and in general both males and females bear the risk.

In item 8, for Trusted Contacts, the percentage of risk is 93% as one female person in the population has chosen this setting. It is a serious risk and in general both males and females bear the risk.

In item 9, for Trusted Browsers, the percentage of risk is 79% which is a serious risk. Three persons (2 males and 1 female) have chosen this setting. Females bear more responsibility than males in this risk.

In item 10, for Public Key, the percentage of risk is 100% as no one in the population replied that he uses this setting. This is a serious risk.

In item 11, "Who can see your future posts?", (0%) as most of respondents in this interview, replied that they allow "friends" or "Only me" to see their future posts. The risk in this question arises, if any user responded by saying he/she allows "Friends of Friends". In this survey one replied saying he allows: Friends of friends.

In item 12, for "Do you review posts and tags?", the percentage of risk is 58% as four male and four female participants replied that they do not review their posts and tags. Both males and females bear the same responsibility in this risk.

In item 13, "Do you Limit the audience for posts?", the percentage of risk is 50% as 4 male respondents and 3 female respondents replied that they do not limit the audience for posts which is the half of the population. This is a serious risk by not using this provided Facebook setting. Males and females bear nearly same responsibility in this risk.

In item 13, for “Who can send you friend requests?”, the percentage of risk is very high as it reaches 86%. 6 males and 6 females relied that they allow “All” to send a friend request instead of “Friends of Friends”. Both females and males bear the same responsibility in this risk.

In item 14, “Whose messages do you want filtered into your inbox?”, the percentage of risk is 21% as only 3 persons (2 males and 1 female) replied that they do not filter messages into their inbox. The level of this risk is medium.

In item 22, “Who can look you up using the email address you provided?”, the percentage of risk is 36% as 2 males and 3 emails replied that they allow “Anyone” to look them up using the email address they provided. The level of this risk is high.

In item 23, “Do you want other search engines to link to your timeline?”, the percentage of risk is 36% as 3 males and 2 females replied that they allow other search engines to link to their timelines. The level of this risk is high.

In item 24, “Who can post on your timeline?”, the percentage of risk is 36% as 3 males and 2 females replied that they allow “anyone” to post on their timeline. The level of this risk is high.

In item 25, “Do you review posts friends tag you in before they appear on your timeline?”, the percentage of risk is 43% as 3 males and 3 females replied that they do not review posts friends’ tag them in before they appear on their timelines. The level of this risk is very high.

In item 26, “Who can see posts you've been tagged in on your timeline?”, the percentage of risk is 0% at all replied that their “friends”, “Friends of friends” or “Custom” can see the posts they are tagged on their timeline.

In item 27, “Who can see what others post on your timeline?” the level of risk is 0% as all replied they just allow “Friends”, “Friends of friends” or “Custom” to see other posts on their timelines.

In item 28, "Do you review tags people add to your own posts before the tags appear on Facebook?", the level of risk is 43% as 4 females and 2 males replied with not reviewing tags that people add to their posts before the tags appear on Facebook. The level of risk is high.

In item 29, "When you're tagged in a post, who do you want to add to the audience if they aren't already in it?", the level of risk is 0% as no one replied of adding to the audience if they are not already in it.

In item 30, "Who sees tag suggestions when photos that look like you are uploaded?", there is here no level of risk because this item is Unavailable in the Facebook settings.

In item 31, "Restricted List (check this to see if the user has blocked any apps, events or pages and so on)", the level of risk is 43% as 3 females and 3 males said that they have no blocking lists. The level of this risk is high.

In item 32, "Who can follow you?", the level of risk is 21% as 1 female and 2 males replied that they allow anyone to follow them. This level of risk is low.

In item 33, "Number of Apps Logged in with Facebook", the level of risk is 72% as 5 females and 5 males replied that they have high numbers of apps logged in with Facebook. This level of risk is very high.

In item 34, "Apps, Websites and Plugins", the level of risk is 64% as 3 females and 6 males replied that they allow many apps, websites and plugins to their Facebook profiles. This level of risk is very high.

In item 35, "Apps Others Use", the level of risk is 50% as 2 females and 5 males replied they allow apps from other users to be used by them. This level of risk is high.

7.4.3 Summary and Discussion on the Settings

7.4.3.1 The very high risky Facebook Settings Ignored by the Participants and the Setting

Gender Effect:

1. Public Key (100%), both males and females responsible
2. Login Approvals (100%), both males and females are responsible
3. App Passwords (93%), males are slightly more responsible
4. Trusted Contacts (93%), males are slightly more responsible
5. Who can send friend request (86%), both males and females are responsible?
6. Trusted Browsers (79%), females are slightly more responsible
7. Number of Apps Logged in with Facebook (72%), both males and females are responsible.
8. Login Alerts (64%), females are slightly more responsible
9. Apps, websites and Plugins (64%),
10. Do you review posts and tags (58%), both males and females are responsible for not reviewing their posts and tags before posting.
11. Do you limit the audience (50%), females are slightly more to blame than males?
12. Apps others use (50%), males are more responsible than females.

7.4.3.2 The High-Risk Facebook Settings Ignored by the Interview Participants and Gender

Effect:

- Do you review posts friends tag you before they appear in the timeline (43%), both females and males are responsible?
- Restricted List (check this to see if the user has blocked any apps, events or pages and so on) (43%), both males and females are responsible
- Do you review tags people add to your own posts before the tags appear on Facebook (43%) females are more to blame than males?
- Do you have blocking list (43%), both females and males are responsible
- Who can look you up using your email address you provided (36%), females are more responsible than males?
- Do you want other search engines to link to your timeline (36%), females are slightly more to blame than males

- Who can post on your timeline (36%), males are more responsible than females.
- The use of “Open” accounts risk is (29%), males are more to blame than females.
- Whose messages do you want filtered into your inbox (21%), males are more to blame than females.
- Who can follow you (21%) males are slightly more to blame than females.

The main result, we have concluded is that many Facebook Settings provided by Facebook are underutilised in a 100% level in some cases and in more than 505 levels in many other cases. Both males and females contribute similarly in many setting choices.

7.4.3.3 Females are bearing slightly riskier in specific setting choices than males such as:

- Login Alerts
- Code Generator
- Trusted Browsers
- Limiting Audience
- Who can look you up using the email?
- Reviewing tags before they arrive to the timeline.

7.4.3.4 Males are bearing slightly more risk in specific setting choices than females such as:

- Public accounts
- Shared data
- App Passwords
- Trusted Contacts
- Filtering data
- Others look you up by search engines
- Who can post on your timeline?
- Who can follow you?
- Apps, Websites and Plugins
- Other Apps Use.

For investigating the 14 participants individual personal characteristics, it is required to get Table 7.6 where each participant has a code and a response to the accessibility level and a response to the setting level. Then in stage 3 investigation of the interviews, it is possible to hear their opinion on different social network issues which can lead to specifying the personality characters from which a nearest Big Five trait can be defined:

Individual Participant Code	Participant's score on Accessibility	Participant's Score on Settings
Male Participant 001	Public: 12, Friends: 7, Safe options: 6	Public: 0, Private: 1, Yes: 8, No: 13, Apps: 45
Male Participant 002	Public: 7, Friends: 7, Safe options: 11	Public: 0, Private: 1, Yes: 11, No: 10, Apps: 0
Male Participant 003	Public: 5, Friends: 6, Safe options: 14	Public: 0, Private: 1, Yes: 13, No: 8, Apps: 9
Male Participant 004	Public: 12, Friends: 4, Safe options: 9	Public: 1, Private: 0, Yes: 12, No: 9, Apps: 17
Male Participant 005	Public: 9, Friends: 6, Safe options: 10	Public: 0, Private: 1, Yes: 14, No: 7, Apps: 0
Female Participant 006	Public: 7, Friends: 3, Safe options: 15	Public: 0, Private: 1, Yes: 15, No: 6, Apps: 0
Female Participant 007	Public: 0, Friends: 15, Safe options: 10	Public: 0, Private: 1, Yes: 13, No: 8, Apps: 0

Female Participant 008	Public: 6, Friends: 12, Safe options: 7	Public: 0, Private: 1, Yes: 13, No: 8, Apps: 0
Female Participant 009	Public: 7, Friends: 3, Safe options: 15	Public: 0, Private: 1, Yes: 14, No: 7, Apps: 0
Female Participant 010	Public: 13, Friends: 4, Safe options: 9	Public: 1, Private: 0, Yes: 11, No: 10, Apps: 39
Female Participant 011	Public: 7, Friends: 7, Safe options: 11	Public: 1, Private: 0, Yes: 11, No: 10, Apps: 52
Female Participant 012	Public: 3, Friends: 9, Safe options: 13	Public: 0, Private: 1, Yes: 15, No: 6, Apps: 10
Male Participant 013	Public: 17, Friends: 8, Safe options: 0	Public: 1, Private: 0, Yes: 6, No: 15, Apps: 1
Male Participant 014	Public: 8, Friends: 4, Safe options: 13	Public: 0, Private: 1, Yes: 11, No: 10, Apps: 134

Table 7.6 Summary of each coded participant responds to the accessibility level and the setting level.

There is a direct correlation between the participant's accessibility level and the participant's setting choices on Facebook. There is a correlation between the number of public accessibility choices and the number of "No" settings by the same participant. Also, it is noticed that females have a smaller number of "Public" accessibilities when compared to males. Clearly the average number of "Yes" choices is nearly equal to the number of "No" choices.

Males and females in general bear the same responsibility either in accessibility choices or settings choices. They differ in accessibility or settings choices.

7.5 Stage 3 Interviewing

In this stage, the same 14 participants were interviewed individually at specific dates and times. Each participant has to go through answering all questions and the interviewer used to clearly record the whole dialogue on a tape. The interviewing questions are presented in the following sheet in section 7.5.1:

7.5.1 The Interview Questions Sheet

1. How would it make you feel if somebody, other than your Facebook friends, was looking at your Facebook photos and posts?
2. Has your Facebook account ever been used by somebody other than you without your permission (e.g., posts from a third party appearing on your Newsfeed, or friends posting on your profile as a joke?). If not, do you know people who this has happened to?
3. Have you spent time investigating the settings on your Facebook profile to ensure that your profile is visible only to those that you wish it to be visible? If so, what was the main reason that you wanted to secure your profile? (Examples: not wishing to share personal activities with ex-friends, colleagues, boss, and employees).
4. Do you know what you would need to do if your Facebook account was compromised to make it secure?
5. Are you confident that Facebook takes the security of your personal information sufficiently seriously? Have you ever an experience where your settings appear to have changed without your consent (e.g., due to a Facebook update or change in policy)?

6. Have you ever downloaded software or filled out a form presented on Facebook as a link (e.g., a contest, survey or psychological test)?

If No, have you ever seen those types of links shared by friends and what prevented you from clicking them?

If Yes, did you experience any negative outcome (Examples: the results being posted without your consent, unsolicited emails, link not what you thought it was, sales pitch masqueraded as contest and so forth).

7. How confident are you that you understand the implications of the security settings on Facebook? (E.g., do you understand the information presented, and what each setting will produce as an outcome?).

8. Have you ever changed your Facebook password, and if so, how frequently and for what reason?

9. If you had access to software that could improve your understanding of the Facebook security settings, would you use it and why? If not, then why?

10. How confident are you that you know and understand your current security settings on Facebook, and that your personal information is only visible to those people that you wish it to be visible?

7.5.2 What are the benefits of the 10 interview questions?

1. Get live reply from participants instead of filling a form
2. Make sure that each participant understands the question
3. Get a real impression supported by the tone and body language about different Facebook experiences

4. Put the question in a way different than the way in the online survey and get the reply in an analogue way instead of a discrete way as in online surveys
5. Ask what was not asked anywhere in the previous quantitative or qualitative methods in this research
6. Include many questions related to future behaviour.
7. The participant needs to understand the value of good settings, the importance of security and accessibility
8. Need to know the next step action if the account is compromised
9. Emphasize on the implications when dealing security and any software download”
10. Ask why the “Public” Facebook profile owner chooses it “Public”
11. Extract the nature of the personality factors of each participant’s interview, in addition to other qualitative test parameters and Facebook activity choices, can figure out one or more of the participant’s Big Five traits.

During the hearing process of the recorded oral replies by each participant, **Table A7.8** and **Table A7.9** are presented as shown in the appendix.

Oral Question to the Interviewed Female Participants and their responses	Yes	No	% of Risk
1. How would it make you feel if somebody, other than your Facebook friends, was looking at your Facebook photos and posts?	4 Annoyed	1 Careless	20%
2. Has your Facebook account ever been used by somebody other than you without your permission (e.g., posts from a third party appearing on your Newsfeed, our friends posting on your profile as a joke?). If not, do you know people who this has happened to?	2	3	40%
3. Have you spent time investigating the settings on your Facebook profile to ensure that your profile is visible only to those that you wish it to be	4	1	20%

visible? If so, what was the main reason that you wanted to secure your profile? (Examples: not wishing to share personal activities with ex-friends, colleagues, boss, and employees).			
4. Do you know what you would need to do if your Facebook account was compromised to make it secure?	2.5	2.5	0%
5. Are you confident that Facebook takes the security of your personal information sufficiently seriously? Have you ever an experience where your settings appear to have changed without your consent (e.g., due to a Facebook update or change in policy)?	1	4	20%
6. Have you ever downloaded software or filled out a form presented on Facebook as a link (e.g., a contest, survey or psychological test)?	2	3	40%
7. How confident are you that you understand the implications of the security settings on Facebook? (E.g., do you understand the information presented, and what each setting will produce as an outcome?).	4	1	20%
8. Have you ever changed your Facebook password, and if so, how frequently and for what reason?	3	2	40%
9. If you had access to software that could improve your understanding of the Facebook security settings, would you use it and why? If not, then why?	2	3	40%

10. How confident are you that you know and understand your current security settings on Facebook, and that your personal information is only visible to those people that you wish it to be visible?	4	1	20%
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Table 7.7 the Recorded Responses from the 5 Female Participants during the Interviews and their Average Percentages of Risk

Oral Question to Male and Female Participants and the Average Percentage of Risk	% Males Risk	% Females Risk	Total % Risk
1. How would it make you feel if somebody, other than your Facebook friends, was looking at your Facebook photos and posts?	20%	20%	20%
2. Has your Facebook account ever been used by somebody other than you without your permission (e.g., posts from a third party appearing on your Newsfeed, our friends posting on your profile as a joke?). If not, do you know people who this has happened to?	20%	40%	30%
3. Have you spent time investigating the settings on your Facebook profile to ensure that your profile is visible only to those that you wish it to be visible? If so, what was the main reason that you wanted to secure your profile? (Examples: not wishing to share personal activities with ex-friends, colleagues, boss, and employees).	30%	20%	25%
4. Do you know what you would need to do if your Facebook account was compromised to make it secure?	40%	20%	30%

5. Are you confident that Facebook takes the security of your personal information sufficiently seriously? Have you ever an experience where your settings appear to have changed without your consent (e.g., due to a Facebook update or change in policy)?	10%	20%	15%
6. Have you ever downloaded software or filled out a form presented on Facebook as a link (e.g., a contest, survey or psychological test)?	40%	40%	40%
7. How confident are you that you understand the implications of the security settings on Facebook? (E.g., do you understand the information presented, and what each setting will produce as an outcome?)	40%	20%	30%
8. Have you ever changed your Facebook password, and if so, how frequently and for what reason?	40%	40%	40%
9. If you had access to software that could improve your understanding of the Facebook security settings, would you use it and why? If not, then why?	20%	40%	30%
10. How confident are you that you know and understand your current security settings on Facebook, and that your personal information is only visible to those people that you wish it to be visible?	40%	20%	30%

Table 7.8 the Recorded Responses from the 10 Male and Female Participants during the Interviews and their Average Percentage of Final Risk

7.5.3 Discussion on the Recorded Oral Responses by the Interviewed Male and Female Participants

From Table 7.8, it is easy to compare between the Male and the Female oral responses by the participants as follows:

1. In Question 1 during the recorded responses, it is found that male and female participants share the same feeling towards the fact that their private posts and photos are seen by others who are supposed not to see or access their profile. The average percentage of risk is 20%. This means 4 out of 5 will be annoyed if any person sees their private posts or photos.
2. In Question 2, about if the profile were accessed by an intruder, it is noticed that females face more attacks or trial of attacks than males. The average percentage of risk is 30%. This means 3 out of 10 of Facebook users have been estimated that they had their profiles compromised through the life time of the profile.
3. In Question 3, if the participants have looked in the Facebook settings to make them harder for the unwanted people to see, females are more interested in protecting their personal information than males. The average percentage of risk is 25%. This means 1 user out of 4 users fails to check and tighten the possible access by intruders.
4. In Question 4, the male participants were less knowledgeable about what to do if their account would be compromised than the females. The average percentage of risk is 40% for the males but it is 20% for the females. The average percentage of risk of all participants is 30%. This means that approximately one third (1 out of 3) of Facebook users do not know what to do if their accounts would be compromised.
5. In Question 5, the male participants in general do not believe that Facebook takes security seriously. Only 10% of participants believe that Facebook takes security seriously which is a lower percentage than the female participants who are more trusting of Facebook (20% trusting). The overall risk percentage of all participants is 15%. This means 15 participants out of 100 believe that Facebook takes the security of users seriously.
6. In Question 6, both males and females bear the same responsibility for downloading software, link or game through the Facebook. The percentage of risk in both groups is 40%. This means that 4 out of 10 Facebook users download software, link or game

which can be infected somehow and can be a way to facilitate attacks on Facebook profiles.

7. In Question 7, Males are less understanding of the implications of the Facebook settings as the percentage of risk is 40%. Females understand the Facebook settings better than males as the percentage of risk is 20%. However, the estimated general percentage of risk for all users is 30%. This means 3 out of 10 do not understand the implications of not knowing how to use the settings for their own Facebook protection.
8. In Question 8, both males and females bear the same risk for not changing the Facebook password frequently. 2 out of 5 in each group have said that they never changed Facebook password since they opened their Facebook accounts many years before. The risk percentage is 40% in each group which means 2 out of 5 Facebook users have never changed their Facebook password since they opened their accounts.
9. In Question 9, Males are more cautious than females in their attitude towards any new software which can help in understanding of the Facebook security settings. The percentage risk of males is 20 % but the percentage risk of females is 40 %. The estimated total percentage of risk by all Facebook users is 30 %. This means that 3 out of 10 of Facebook users tend to use the suggested software programmes that claim that these programmes can help in understanding the Facebook security settings.
10. In Question 10, Males are less confident that they know and understand their current security settings on Facebook, and that their personal information is only visible to those people that they wish it to be visible. The percentage of risk is 40 %. However, females are more confident that they know and understand their current security settings on Facebook. Their percentage of risk is 20 %. The overall percentage of risk of Facebook users is estimated to be 30%. This means that 3 out of 10 users do not understand their current security settings on Facebook.

7.5.4 Summary of the Total Risk Percentage of Responses by the Male and Female Facebook Users:

Considering the average percentages of all male and female participants in their responses to the interviewer, the final estimated risk percentage can be found as follows:

(The sum of the individual risk percentages) %/10 = (20 + 30 + 25 + 30 + 15 + 40 + 30 + 40 + 30 + 30) %/10 = 29 %. This percentage means that approximately 3 out of 10 Facebook users are not aware or understand the importance and the implications of the Facebook security settings on their privacy protection and are not aware of how to protect themselves from privacy attacks. However, this percentage of risk is not including the other risks that are stemmed from the accessibility of the Facebook user' information accessibilities which have been dealt with in Chapters 4, 5 and 6.

**Chapter 8: Identification of
How and why A Big Five Trait
Leads to Risky Behaviour in
Major Personality Models
and Recommendations for
Risk Awareness**

8.1 Introduction

In this chapter, two important issues need to be addressed, on the basis of what has been investigated either in the online quantitative survey or in the qualitative research interviews for the allocation of the independent personality Big Five traits that affect the behaviour of the Facebook users. To behave in a risky way, it involves favouring the “public” accessibility and “Open” Facebook profiles. To behave in a safe way, it involves favouring “Friends” or “Custom” accessibility or favouring the “Only me” or “Not Supplied” choice. Therefore, the first issue is the exact and accurate allocation of the risky Big Five in correspondence to each Facebook activity to make Facebook user aware of the risky personality by referring to the personal information accessibility method and behaviour on Facebook. This means it is important to know how and why the risky Big Five trait can influence the Facebook user to act in a risky way. So far three Big five traits are identified from clustering testing to be riskier than the other two Big Five traits. In other words, it is found in this research that Tough-Mindedness, Self-Control and Independence are bearing risks on behaviour. The Extraversion and Anxiety personality traits are less influencing the behaviour on Facebook activities subject to the value of the trait.

The second important issue is the educational recommendations for the Facebook users in the field of awareness of the profile settings and the behaviour in regard of a wide range of recommendations on how to protect the profile through following a group of actions and precautions such as how to respond to friendship requests and the awareness of the level of risk before clicking on other friends’ posts which may hide viruses inside.

8.2 The summary of the effect of Extraversion on Facebook activities is as follows:

8.2.1 Extraversion (E): is directly related to social skills, talkative ability and personal charm and energetic versus shy, unassertive, withdrawn, solitary and reserved.

There are 14 Facebook activities that are related to Extraversion (E). The Extraversion trait is either directly or inversely proportional to any of these 14 Facebook activities. This

proportion is controlled by the regression index B. From $\text{Exp}(B) = (e^B)$, the number of times of effect can be specified.

1. The quantitative Facebook activities are not influenced by the Extraversion trait.
2. The categorical Logical Regression Facebook activities questions in the survey are not influenced by the Extraversion trait are as follows:
3. The Multinomial Facebook questions in the survey that the Extraversion trait influences, are:
 - I. How Secure the user feeling: For $B = -0.614$, $e^{-0.614} = 0.54$. The number of times of the effect = $1/0.54 = 1.85$ number of times. Low effect. Inversely proportional. It means the more the Extraversion trait in a person the less he feels secure and vice versa.
 - II. Home Town Accessibility Level with extremely high support of "Only Me" and against "Public" accessibility.
 - III. City Accessibility Level with extremely high support to "Only Me" and against "Public" accessibility.
 - IV. Friends List Accessibility Level against "Public" accessibility. Extremely high number of times of effect. Inversely proportional.
 - V. Political Views Accessibility Level In favour of "Friends" not "Public" accessibility. For extremely high number of times. Directly proportional.
 - VI. Music you Like Accessibility Level with extremely high effect against "Public" accessibility.
 - VII. Movies you Like Accessibility Level with extremely high effect against "Public" accessibility.
 - VIII. Television you Like Accessibility Level with extremely high effect against "Public" accessibility.
 - IX. Favourite Sport Accessibility Level with extremely high effect against "Public" accessibility.

- X. Favourite Sport Team Accessibility Level with extremely high effect against “Public” accessibility.
- XI. Athletes Accessibility Level with extremely high effect against “Public” accessibility.
- XII. Email Accessibility Level with very high effect against “Public” accessibility.
- XIII. Street Address Accessibility Level with very high against “Public” accessibility.
- XIV. IM Screen Names Accessibility Level with very high effect against “Public” accessibility.

From the testing results in Chapter 4 and 5, it can be seen clearly that Extraversion has contributed by influencing users who are characterised with this trait to behave sensibly and in most cases to be against the “Public” accessibility. The main Extraversion Facets in NEO PI-R and NEO IPIP are as follows in **Table. 8.1:**

Extraversion NEO PI-R Model Facets	Extraversion NEO IPIP Model Facets
Warmth	Friendliness
Gregariousness	Gregariousness
Assertiveness	Assertiveness
Activity	Activity Level
Excitement-seeking	Excitement-seeking
Positive Emotions	Cheerfulness

Table 8.1 List of facets for the Extraversion trait in NEO PI-R model and NEO IPIP model

From **Table 8.1** it can be noticed that at high scoring of Extraversion, there is no negative influence on Facebook users to behave through a careless cluster. This high scoring cluster was not found in cluster testing.

The results of the experiments on the Anxiety (Neuroticism) are summarised as found in Chapter 5, as follows:

8.2.2 Anxiety (Neuroticism): reflects the degree of emotional stability, effective, secure and confined versus moody, self-doubting, nervous, sensitive, depressed and anxious. The high score belongs to the mood and depressed status, but the low scoring is related to emotional stability.

1. The quantitative Facebook activities that are influenced by the **Anxiety** trait are as follows:

Number of Facebook friends with extremely high and directly proportional effect. The more the Anxiety (Low emotional stability), the more the added number of friends, due to the low level of Anxiety.

2. The categorical Logical Regression Facebook activities questions in the survey that are influenced by the **Anxiety** trait are as follows:

- I. "Friends and family, I know them in person, what influences me to choose my friends" with medium and directly proportional effect. The more the Anxiety, the more known friends are added which belongs to low level of Anxiety (when Anxiety is scoring high).
- II. "Bullying or harassment due to sharing photos or posts on Facebook" with medium and directly proportional effect. The more the Anxiety, the more bullying occurs due to sharing photos and posts on Facebook in the existence of low Anxiety when it scores high (low emotional stability).

3. The Multinomial Facebook questions in the survey that the **Anxiety** trait influences, are:

1. Relationship Status Accessibility Level with extremely high effect and inversely proportional in favour of "Only Me" or inversely proportional to the "Public" accessibility. The more the Anxiety is, the more restriction is imposed on Relationship Status accessibility by any way.
2. Website Accessibility Level with low Anxiety (Positive status) and inversely proportional effect in favour of "Only Me". The more the Anxiety is, the more restriction is imposed on Website accessibility by any method.

It can be noticed that in all clustering tests in Chapter 6, Anxiety was scoring in the lowest value (emotional stability) and the participants who are characterised with high emotional stability (low scoring in Anxiety) are always part of the safe cluster.

The main Anxiety Facets in NEO PI-R and NEO IPIP are as follows:

Anxiety (Emotional Stability) NEO PI-R Model Facets	Anxiety (Emotional Stability) NEO IPIP Model Facets
Anxiety	Anxiety
Hostility	Anger
Depression	Depression
Self-consciousness	Self-consciousness
Impulsiveness	Immoderation
Vulnerability	Vulnerability

Table 8.2 List of facets for the Extraversion trait in NEO PI-R model and NEO IPIP model

From Table 8.2 it can be noticed that at high scoring of Anxiety (Neuroticism), there is the negative influence of Facebook users to behave through a careless cluster. However, this cluster of high scoring was not found in the cluster testing except for two cases where the scoring was high (Low Emotional Stability) as follows:

1. Family Members Accessibility: Due to the Anxiety facet effect in both NEO PI-R and NEO IPIP models.
2. Friends List accessibility: Due to the Anxiety facet effect in both NEO PI-R and NEO IPIP models.

The question that can be asked is: is there any special relationship between the Extraversion and the Anxiety (Neuroticism)?

1. The answer to this question of this research is due to the tendency to influence Facebook users to behave in a risk-free fashion in their Facebook activity. When an Extraversion group is mixed with an Anxiety group the result will be risk free in choices and behaviour of the total number of users on condition that the Extraverts are scoring high and the anxious group members are scoring low (high Emotional Stability).

2. The only negative influence in behaviour can be practiced by users who are suffering of Extraversion interaction with Anxiety. The behaviour of the interactive users is opposite to all good behaving characters. From the results of analysis in Chapter 5, the value of the interaction regression **index (B)** is not as high as the value of **B** from either Extraversion or Anxiety in the good behaviour of users. This can be seen in specific Facebook activity such as: Religion accessibility, Movies you like accessibility and Street Address accessibility as in **Chapter 5**.

8.2.3 Tough-Mindedness (Openness): The third contributor to the risk behaviour in low scale is the Tough-Mindedness (Openness) trait. From Chapter 5 specific Facebook activities are listed under the influence of Tough-Mindedness on users such as:

1. When accessing a third-party Computer, do you remember to Logout?
2. Having common friends on Facebook that influences the decision in accepting them
3. Have you ever made friends and met them in person?
4. Employer Accessibility
5. Political Views Accessibility
6. Activity Level Accessibility

The high scoring of the Tough-Mindedness was crucial in influencing others to behave by not worrying to logout, adding friends with less caution, showing the employer details, publishing the political views recklessly, exposing all activities, uploading a high number of photos and uploading many apps. However, the low in scoring Tough-Mindedness (Openness) Facebook users are acting differently in a positive way with high care of the personal data.

The following is a list of the effects of Tough-Mindedness (Openness):

Tough-Mindedness (Openness): reflects the richness of the individual imagination, aesthetic feelings, degree of dedication, inventive and curious about new things versus dull, unimaginative, literal-minded and cautious.

1. The quantitative Facebook activities that are influenced by the **Tough-Mindedness** trait are as follows:

- I. “Number of uploaded photos do you have on Facebook” with extremely high and directly proportional effect. The more the Tough-Mindedness, the more photos are uploaded on Facebook (Negative effect).
 - II. “The number of uploaded Apps you currently have” with extremely high and directly proportional effect. The more the Tough-Mindedness, the more apps are uploaded on Facebook (negative effect).
 - III. “Frequency of you is visiting Facebook” with very low and inversely proportional effect. The more the Tough-Mindedness, the less frequency of visiting Facebook (Good effect).
 - IV. “The Year of Birth of the person” with high and directly proportional effect. The more Tough-Mindedness the more the year of birth of the person on Facebook, i.e. **the more Tough-Minded the person, younger the person is (Bad effect)**.
2. The categorical Logical Regression Facebook activities questions in the survey that are influenced by the **Tough-Mindedness** trait are as follows:
- I. “Has anybody accessed your Account without your consent?” with directly proportional medium effect for the answer “No”. The more tough-Mindedness the more nobody accessed Facebook account without the person’s consent (Good effect).
 - II. “Are you aware that Facebook uses apps to send messages on behalf of users” with 1.92 number of times of effect. Low effect. Inversely proportional (Good effect).
 - III. “Do you use Facebook login on third party websites” with 1.92 times of effect. Low effect. Directly proportional (Good effect).
 - IV. “The way they look makes you add friends” with 7.899 times of effect. Medium effect. Inversely proportional (Good effect).
 - V. “The way they share your interest makes you add friends on Facebook” with 8.35 number of times of effect. Medium effect. Inversely proportion (Good effect).
 - VI. “When access Facebook on third party computers, do you remember to logout” with extremely high and directly proportional effect in favour of “Always”. The more Tough-Minded the person, the more not remembering to log out (Bad effect).

- VII. “Do you use Facebook app on the phone” with 4.85 number of times of effect. Medium effect. Inversely proportional (Good effect).
3. The Multinomial Facebook questions in the survey that the **Tough-Mindedness** trait influences, are:
- I. Gender Accessibility Level with extremely high and directly proportional effect in favour of “Only Me” which is against “Public” accessibility. The more the Tough-Mindedness the more restriction on **gender** accessibility (Good effect).
 - II. Family Members Accessibility Level with extremely high and directly proportional effect for in favour to “Only Me” and against the “Public” accessibility. The more the Tough-Mindedness the more restriction on **Family Members** accessibility (Good effect).
 - III. University/College Accessibility Level with extremely high and directly proportional effect for in favour to “Only Me” and inversely proportional to “Public” accessibility. The more the Tough-Mindedness the more restriction is imposed on **University/College** accessibility (Good effect).
 - IV. Secondary School Accessibility Level with extremely high and directly proportional effect for in favour to “Only Me” and inversely proportional to “Public” accessibility. The more the Tough-Mindedness the more restriction is imposed on **Secondary School** accessibility (Good effect).

Therefore, it is found in this research that the Tough-Mindedness (Openness) personality trait is not a main contributor to the “Public” accessibility or carelessness towards the personal information. The relationship between Tough-Mindedness (Openness) and Extraversion is not conflicting and in fact there is no tendency to get interaction between Extraversion and Tough-Mindedness (Openness) which is one important outcome in this research by practical testing. A few clusters are reported to be affected by Tough-Mindedness and in favour of “Public” accessibility:

1. Employer Accessibility
2. Political Views Accessibility
3. Activity Level Accessibility

Looking for the Tough-Mindedness facets, it can be understood why this trait contributed in negatively the accessibility of the three activities mentioned above.

The main Tough-Mindedness (Openness) Facets in NEO PI-R and NEO IPIP are as follows:

Tough-Mindedness (Openness) NEO PI-R Model Facets	Tough-Mindedness (Openness) NEO IPIP Model Facets
Fantasy	Imagination
Aesthetics	Artistic Interest
Feelings	Emotions
Actions	Adventurousness
Ideas	Intellect
Values	Liberalism

Table 8.3 List of facets for the Extraversion trait in NEO PI-R model and NEO IPIP model

From **Table 8.3** it can be noticed that at high scoring of Tough-Mindedness (Openness), there is no negative influence on Facebook users to behave through a careless cluster. However, this cluster of high scoring was not found in the cluster testing except for three cases where the scoring was high due to the following Facets as follows:

1. Employer Accessibility: Due to the Intellect facet in Tough-Mindedness (Openness)
2. Political Views Accessibility: Due to the Liberalism facet in Tough-Mindedness (Openness)
3. Activity Level accessibility: Due to the Adventurous facet in Tough-Mindedness (Openness)

8.2.4 The Extraversion, Anxiety (Neuroticism) and Tough-Mindedness (Openness) in NEO PI Model

It is obvious through this research, testing of all the Big Five traits that Extraversion, Anxiety, (Neuroticism) and Tough-Mindedness (Openness) are in general similar traits in imposing

their influence on Facebook users to behave sensibly and take care of their personal information. However, there is a major question in this research in regard of the specific relationship between Extraversion, Anxiety, (Neuroticism) and Tough-Mindedness (Openness). Looking for literature on theories and psychobiology research for finding an explanation has led to the issue of NEO IP explanation as follows: P. Costa and R, McCrae researched the personality assessment development in the early 1970s by using factor models such as cluster analyses of Cattell’s 16 Personality Factors. They settled on three factors model. The three factors were: Neuroticism (Vs Emotional Stability), Extraversion (vs Introversion) and Openness (vs Closeness) to experience and reaching to a new acronym which is “NEO”. The reason for creating this new three factors is the similarities between them. Therefore, the new name was created as NEO PI (Costa & McCrae, 1976). **This finding supports our experimental finding that the three traits are nearly similar in not contributing in the risky behaviour of Facebook users. This finding can be considered as a way of validating the research in this thesis as claimed by (Costa & McCrae, 1976).**

8.2.5 The fourth Big Five trait: Independence (Agreeableness)

Independence (Agreeableness) effects of each Facebook Activity are listed in **Chapter 5**, but are included separately in **Table 8.4** as follows:

Independence (Agreeableness) Cluster Trait as Risk Contributor	Related Facebook Activity Behaviour
Independence	Current City Accessibility
Independence	Hometown Accessibility
Independence	Birthday Accessibility
Independence	Interested in Men/Women Accessibility
Independence	Language Accessibility
Independence	Relationship Status Accessibility
Independence	Favourite Quotation Accessibility
Independence	Website Accessibility
Independence	1. Has anybody accessed your Account without your consent?

	<p>2. Do you use the Facebook Apps on your phone?</p> <p>3. Friends and family, I know them in person, what influences me to choose my friends</p> <p>4. How often do you visit Facebook?</p>
Independence and Extraversion*Anxiety	Favourite Sport Accessibility
Independence and Extraversion*Anxiety	Favourite Sport Team Accessibility
Independence and Extraversion*Anxiety	Favourite Athletes Accessibility
Independence and Extraversion*Anxiety	Email Address Accessibility

Table 8.4 The Facebook activities that are influenced negatively by the high scoring of the Independence (Agreeableness) Trait

A serious question has attracted attention of the researcher as follows: What is the main reason of the negative correlation and negative influence of the Independence (Agreeableness) on many Facebook activities? Before this legitimate question is going to be answered, another surfing on the literature review was carried out through different psychological theories of personality by looking at their inventory of the Agreeableness facets as follows: After the NEO PI was published in early 70's, 10 years later Costa and McCrae managed to publish their 5 Factor Model (**Costa & McCrae, 1985**) by adding Agreeableness and Conscientiousness to the original model (NEO PI) and then published the revised NEO PI (**Costa & McCrae, 1992**). From the experiments in Chapter 4, the analysis in Chapter 5 and the clustering in Chapter 6, it has clearly been found that Independence (Agreeableness) poses risky influence as an independent trait on a group of Facebook survey participants to behave against the personal data privacy and render this information exposed on the "Public" domain. Therefore, the trivial question arises is: Why does Agreeableness have this influence on Some Facebook users to behave in support of the "Open" accessibility? Going again to investigate literature, it has been found that when the NEO PI model was developed to include 5 factors, each factor was assigned six lower level traits called "Facets". The six lower level factors of the Agreeableness in the 5 Factor NEO PI are as follows:

1. Trust: Those who scores high on this facet believe others to be benevolent and who score low tend to be cynical and dishonest.
2. Straight Forwardness: Those scoring high tend to interact in direct and frank way and those who score low are less direct, deceitful and manipulative.
3. Altruism: Those who score high tend to be self-sacrifice, generosity, courtesy for others.
4. Compliance: Those who score high tend to be meek and mild and prefer cooperation, but those who score low tend to be aggressive and quarrelsome.
5. Modesty: Those who score high tend to be humble and others-focused, but those who score low tend to be arrogant and self-aggrandizing (**Costa & McCrae, 1991**).
6. Tender-Mindedness: Those who score high can have high sympathy and are controlled by emotions. However, those who score low do not care about emotions and can be tough-minded (**Matsumoto & Juang, 2012**).
7. From the above in the NEO PI model, it can be noticed how the Agreeableness scoring high puts the trait at the following groups of descriptions: Kind-hearted, generous, sympathising, mild, others-focused, self-sacrifice, frank and benevolent. Therefore, this is a genuine and accurate reasoning to what has been found in this research experiments in Chapters 4, 5 and 6. In Chapter 6, it was found that the risky clusters were the clusters that scored high in Independence (Agreeableness) for different Facebook activities as seen in Table 8.1. The high scoring of Agreeableness lead to good characters of any human in general, but in online social networks these characters can influence the Facebook user to give away lots of personal information under the facet of frankness, kind-heartedness, self-sacrifice and trust. Additionally, the soft-side of the personality can be exploited by ill-behaving users.
8. While the literature investigation continued to find an additional model supporting the description of Agreeableness, a second model was found and called **HEXACO**. **HEXACO** has five facets for Agreeableness (**Lee & Ashton, 2004**) as follows:
 9. Forgiveness: People who score high tend to regain trust and repair relations by forgiveness but those who score low tend to hold grudges.
 10. Gentleness: People who score high tend to avoid being overly judgmental and people who score low are highly critical and judgmental.

11. Flexibility: Those who score high prefer cooperation and compromise to solve disagreements and those who score low tend to be stubborn, argumentative and unwilling to accommodate others.
12. Patience: People who score high can tolerate high levels of anger and those who score low on this facet have a quick temper and can be provoked easily.
13. Altruism versus Antagonism: This facet is correlated with Agreeableness. This facet at high scoring tests the extent to which a person is sympathetic, kind-hearted and helpful. At low scoring, persons tend to toward an antagonistic interpersonal style.
14. Again, from **HEXACO**, people who score high in the Agreeableness can be described to be: forgiving, trusting, gentleness oriented, avoid judging, cooperative, compromiser, flexible, tolerating high level of anger and sympathy. If those people who carry these facets are Facebook users, it will be very easy to accept others requests for friendship and answer any question about their personal information.
15. As Independence (Agreeableness) has shown its influence in locating the high scoring of Agreeableness as a risky cluster for specific Facebook activities in identifying an at-risk group, the following table shows the Facebook activities vs the high scoring Agreeableness for NEO PI model and HEXACO model facets as in **Table 8.5** as follows:

Facebook Activity	High Agreeableness Scoring in NEO PI Model Facets	High Agreeableness Scoring in HEXACO Model Facets
Current City Accessibility	Straightforwardness	Forgiveness
Hometown Accessibility	Straightforwardness	Forgiveness
Birthday Accessibility	Trust	Gentleness
Interested in Men/Women Accessibility	Tender-Mindedness	Flexibility
Language Accessibility	Compliance	Gentleness
Relationship Status Accessibility	Tender-Mindedness	Flexibility
Favourite Quotation Accessibility	Straightforwardness	Gentleness
Website Accessibility	Trust	Forgiveness

Has anybody accessed your Account without your consent?	Modesty	Patience
Do you use the Facebook Apps on your phone?	Compliance	Gentleness
Friends and family, I know them in person, what influences me to choose my friends	Trust	Flexibility
How often do you visit Facebook?	Tender-Mindedness	Altruism
Favourite Sport Accessibility	Altruism	Altruism
Favourite Sport Team Accessibility	Altruism	Altruism
Favourite Athletes Accessibility	Altruism	Altruism
Email Address Accessibility	Compliance	Gentleness

Table 8.5 the Facebook activities vs the high scoring Agreeableness for NEO PI model and HEXACO model facets.

From the Chapter 5 of the effect of Agreeableness, it is clear that few Facebook activities are influenced by both Agreeableness and the interaction of Extraversion and the Anxiety as can be noticed in this mini **Table 8.6**:

Independence (Agreeableness) Cluster Trait as Risk Contributor	Related Facebook Activity Behaviour
Independence and Extraversion*Anxiety	Favourite Sport Accessibility
Independence and Extraversion*Anxiety	Favourite Sport Team Accessibility
Independence and Extraversion*Anxiety	Favourite Athletes Accessibility
Independence and Extraversion*Anxiety	Email Address Accessibility

*Table 8.6 Effect of Independence (Agreeableness) Cluster and the Interaction (Extraversion*Anxiety) on four Facebook activities.*

While Extraversion alone is positive trait and lowest scoring of Anxiety is also positive in not influencing the “Public” accessibility, the interaction of Extraversion*Anxiety is in favour of “Public” accessibility. When this interaction is added to the effect of Independence (Agreeableness) a high value of the correlation index B is created which can make a huge effect in a number of times in an exponential way (EB). The reason for confining the effect on these four Facebook activities is due to the Agreeableness facets in both NEO PI and HEXACO models which both agree on Altruism facts. The four Facebook activities belong to activities that the Facebook users tend to self-sacrifice themselves for their sporty ambitions. The Email address accessibility is also a real self-sacrifice because most of the Facebook attacks use the email to hijack and change the password for the wrong reasons.

8.2.6 The Fifth Big Five trait: Self-Control (Conscientiousness)

Self-Control (Conscientiousness) influences on each Facebook Activity are listed in **Chapter 5**, but are included separately in **Table 8.7** as follows:

Big Five Trait Risk Cluster Contributor	Facebook Activity Behaviour
Self-control	Awareness that Facebook apps can send messages on behalf of your friends
Self-control	Using the Facebook app on the phone
Self-control	Using Facebook login on 3 rd party websites
Self-control	The way they look, influences your decision to accept friends
Self-control	The way they share the same interest, influences you to accept friends

Self-control	Have you experienced bullying or harassment due to sharing photos or posts on Facebook?
Self-control	Do you use multiple user accounts on Facebook?
Self-control	University/College accessibility
Self-control	Secondary School accessibility
Self-control	Gender accessibility
Self-Control and Extraversion*Anxiety	Religion Accessibility
Self-Control and Extraversion*Self-Control	Music you Like Accessibility
Self-Control and Extraversion*Self-Control	People Who Inspire You Accessibility
Self-Control and Extraversion*Self-Control	Books you Like Accessibility
Self-Control and Extraversion*Anxiety	Movies you Like Accessibility
Self-Control and Extraversion*Self-Control	Television you Like Accessibility
Self-Control and Extraversion*Self-Control	Phone Number Accessibility
Self-Control and Extraversion*Anxiety	Street Address Accessibility
Self-Control and Extraversion*Self-Control	IM Screen Names Accessibility

Table 8.7 The Facebook activities that are influenced negatively by the high scoring of the Self-Control (Conscientiousness) Trait

A serious question has attracted attention of the researcher is as follows: What is the main reason of the negative correlation and negative influence of the Self-Control (Conscientiousness) on many Facebook activities? Before this question is going to be answered, another surfing on the literature review was carried out through different psychological theories of personality by looking at their inventory of the Conscientiousness facets as follows: A study by **(Joshua J. Jackson et al 2010)** aimed to specify the behavioural component of Self-Control (Conscientiousness) by identifying a pool of behaviours in the domain of Self-Control (Conscientiousness) where individuals are clean, hard-working, follow society rules, think before they act, punctuate and organised, clean floors, comb their hair. Individuals who are low in Self-Control (Conscientiousness) are breaking rules, harm

their credit limit, oversleep, break plans and promises. Researchers in (Roberts & Jackson 2008) concluded that behaviour is only one part of the personality trait. If two persons have the same trait as Self-Control they differ in frequency and type of their behaviour (**Roberts & Jackson 2008**). It is a hierarchical structure where the truth is at the highest level and the thoughts and behaviour constitute the lowest level of the **personality (Roberts & Pomerantz, 2004)**. This person is dependable, caring, responsibly organised and has high will to succeed, correlated with grade point average and educational performance. They have frequent contact with family members. There is no Social Network (SN) promise to obvious return to the social network. A high score on Conscientious will lead to lower numbers of contacts as Conscientious individuals will refrain from high investment in SN profile and instead stick to their main goals. Highly scored Conscientious people tend to hesitate from involvement on social network sites such as Facebook, due to their feeling that the involvement in a social network is a source of distraction (Goldberg, 1999). Longitudinal and cross-sectional studies proved that Self-Control (Conscientiousness) is lower among adolescents, but increase from 18 and 30 years old. The same study has shown that Conscientiousness increases with age from 21 to 60 years old despite the fact that the rate does slow.

8.3 Conscientiousness and forgiveness, relationship

Some researchers said that there is no relationship between Conscientious and Agreeableness. Some said there is a positive correlation. In this research, the relationship can be confirmed because Conscientious and Agreeableness has high level clusters that are correlated to many Facebook activities and both Conscientious and Agreeableness are supported to contribute to the “Open” accessibility and both are prone to be affected by the Extraversion interaction with any of the other 4 traits. Self-Control (Conscientious) people tend to control their emotions and suppress their anger and do not tend to revenge. They regulate their emotions and more forgiving. But, people who score low in the Conscientious, tend to be aggressors (**Fleeson & Nofie, 2008**).

Why is Conscientiousness Important? (Brent W. Roberts, 2005)

Conscientiousness is important in many aspects of human life. The following is a list of points of the important social outcomes that conscientiousness predicts:

1. **Mortality**
2. **Physical Health**
3. **Alzheimer's disease**
4. **Glycemic control in Type 1 diabetes**
5. All the leading **health-related behaviours** that lead to premature mortality
6. **Occupational attainment**
7. **Job performance**
8. **Marital stability**
9. **Diminished drug use**
10. Children who suffer more **injuries**:

Two of the many personality tests that assess the Big Five traits are Costa and McCrae's NEO PI-R (Costa & McCrae, 1992) and Goldberg's NEO-IPIP (<http://ipip.ori.org>) where in both models Conscientiousness is considered a continuous dimension of personality and not categorical. Additionally, the researchers in **Roberts et al (2005)** found that Self-Control (Conscientious) is best described by the **Six Factor model**, including the lower order facts as follows: Industriousness, Orderliness, Traditionalism, Responsibility, Virtue and Self-Control where Virtue and Self-Control are responsible for the relationship between global Conscientious and Forgiveness.

8.3.1 NEO PI-R Facets of Conscientiousness

There are 6 facets for Conscientiousness in the NEO PI-R model as follows:

1. **Competence**
2. **Order**
3. **Dutifulness**
4. **Achievement-Striving**
5. **Self-discipline**
6. **Deliberation**

8.3.2 Six Factor Model for Conscientiousness Facets

The research on the lower-order structure of conscientiousness has revealed at least 6 replicable facets of conscientiousness ((**Brent W. Roberts, 2005**) as follows:

1. Orderliness: The propensity to be organized and neat versus messy and disorganized.
2. Self-control: The propensity to inhibit pre-potent responses.
3. Industriousness: The propensity to work hard
4. Responsibility: The propensity to be reliable, especially in social situations
5. Traditionalism: The propensity to follow socially proscribed norms and traditions
6. Virtue: The propensity to be honest and to tell the truth

Several studies investigated the underlying structure of conscientiousness and each of these studies has revealed specific facets that have not been replicated.

1. Decisiveness: The willingness to make decisions and to be firm in one's commitments
2. Punctuality: The propensity to show up on time for appointments

Formality: The propensity to follow the rules of social decorum.

Conscientiousness was also examined by the NEO IPIP model which has the following 6 Facets:

1. Self-efficacy
2. Orderliness
3. Dutifulness
4. Achievement-striving
5. Self-discipline
6. Cautiousness

Therefore, the Self-Control (conscientiousness) can be tested for its influence on the related Facebook activities and behaviour in three personality models: **NEO PI-R, NEO IPIP and the 6 Factor model** as follows in **Table 8.8:**

Facebook Activity	High Scoring in Conscientiousness NEO PI Model Facets	High Scoring in Conscientiousness NEO IPIP Model Facets	High Scoring in Conscientiousness 6 Factor Model Facets
Awareness that Facebook apps can send messages on behalf of your friends	Competence	Self-efficacy	Responsibility
Using the Facebook app on the phone	Dutifulness	Dutifulness	Traditionalism
Using Facebook login on 3 rd party websites	Deliberation	Cautiousness	Virtue
The way they look, influences your decision to accept friends	Self-discipline	Self-discipline	Self-discipline
The way they share the same interest, influences you to accept friends	Self-discipline	Self-discipline	Self-discipline
Have you experienced bullying or harassment due to sharing photos or posts on Facebook?	Deliberation	Cautiousness	Virtue
Do you use multiple user accounts on Facebook?	Dutifulness	Dutifulness	Traditionalism
University/College accessibility	Competence	Cautiousness	Virtue
Secondary School accessibility	Deliberation	Cautiousness	Virtue
Gender accessibility	Order	Orderliness	Orderliness
Religion Accessibility	Order	Orderliness	Orderliness
Music you Like Accessibility	Competence	Self-efficacy	Responsibility

People Who Inspire You	Dutifulness	Dutifulness	Traditionality
Books you Like Accessibility	Dutifulness	Dutifulness	Traditionality
Movies you Like Accessibility	Order	Orderliness	Orderliness
Television you Like Accessibility	Order	Orderliness	Orderliness
Game you like Accessibility	Order	Orderliness	Orderliness
Phone Number Accessibility	Deliberation	Cautiousness	Virtue
Street Address Accessibility	Deliberation	Cautiousness	Virtue
IM Screen Names Accessibility	Dutifulness	Dutifulness	Traditionalism

Table 8.8 The Facebook activities that are influenced negatively by the high scoring of the Self-Control (Conscientiousness) Cluster Trait in three model facets: NEO PI-R, NEO-IPIP and the 6 Factor Facets Model.

8.3.3 Self-Control (Conscientiousness) Influence on Facebook Related Activities

The Self-Control (Conscientiousness) according to **Table 8.7** has the influence on 19 different Facebook activities which is equivalent to $19/45 = 42\%$. From the clustering testing in Chapter 6, it was found that the effect of the Self-Control (Conscientiousness) was dominant through the high scoring. The high scoring in Self-Control (Conscientiousness) is normally related to positive effect due to the good characters of the Self-Control (Conscientiousness) person where individuals are clean, hard-working, follow society rules, think before they act, punctuate and organised, clean floors, comb their hair...etc. Therefore, someone can wonder why the Self-Control (Conscientious) person affects the Facebook users to adopt "Public" accessibility. The reason for the testing results of this research can be summarised as follows:

1. The Self-Control (Conscientious) person at high scoring completes tasks successfully, likes cleanliness and order, follows the tradition and the rules, works hard, gets jobs and tasks completed right away, avoids mistakes and frank. In each Facebook activity, you will find a description of his/her behaviour in positive terms as can be seen in **Table 8.7**. Exploiting the Self-Control (Conscientiousness) good reasons can happen by intruders or people who may use the personal information for bad reasons, but this will face a tough attitude by the Self-Control (Conscientious) person. There is really no vulnerability but there is frankness and an ability of Self-Control through which he/she will not hold grudges and can absorb any anger. These Self-Control good characters will attract many friends who will exchange respect and cooperation.
2. Several studies investigated the underlying structure of conscientiousness and each of these studies has revealed specific facets that have not been adopted:
 - I. Decisiveness: The willingness to make decisions and to be firm in one's commitments
 - II. Punctuality: The propensity to show up on time for appointments
 - III. Formality: The propensity to follow the rules of social decorum.
 - IV. From the mentioned three facets, it can be realised that the Self-Control (Conscientious) person is also decisive and firm. This personality facet can lead to the shaping of the friendship circle without any extra dangers through knowing whom to friend or defriend. The punctuality can mean keeping promises and using Facebook at specific times. The formality can support the behaviour and decrease the amount of socialism of the person through keeping a distance with every friend.
3. Longitudinal and cross-sectional studies proved that Self-Control (Conscientiousness) is lower among adolescents but increase from 18 and 30 years old. The same study has shown that Conscientiousness increases with age from 21 to 60 years old despite the fact that the rate does slow. The average age of the persons who completed the online and interviewing questionnaires is 21.4 years old. This can be a reason why the Self-Control (Conscientious) has acted in a risky way at some activities.

4. Some researchers concluded that there is no Social Network (SN) promise to obvious return to social network. High score on Conscientious will lead to lower numbers of contacts as Conscientious individuals will refrain from high investment in SN profile and instead stick to their goals. Highly scored Conscientious people tend to hesitate from involvement in social networks sites such as Facebook, due to their feeling that the involvement in social networks is a source of distraction (**Goldberg, 1999**).
5. From the experiments in Chapter 4 and 5, it has become obvious, as shown in **Table 8.6**, that there are interaction traits between Extraversion*Self-Control and Extraversion*Anxiety where each of these interactions is in favour of the “Public” accessibility and this function for each interaction supports the function of the Self-Control trait alone as shown in **Table 8.7**. The interaction has been seen mainly with Agreeableness and Conscientiousness. The interaction by a self-Control (Conscientious) person either by Extraversion*Self-Control or Extraversion*Anxiety are confined to the accessibility Facebook activities.

In all these Facebook activities, it is important to count for the interactions that contribute seriously to the influence on Facebook users. The Self-Control effect in the population, in general, is against the “Public” accessibility if the total number of participants is considered. But, small part of the population, which is tabled in Table 8.6 or Table 8.8 represents the cluster that the high scoring of Self-Control is in favour of the “Public” exposure of the personal information. However, any interaction is in favour of the “Public” domain of the personal information. The highest number of interactions occurs mainly with the Self-Control and the Extraversion. The Interaction of Extraversion and Anxiety (Extraversion*Anxiety) is confined to specific activities such as: Religion accessibility, Movies you like accessibility and Street Address accessibility.

Big Five Trait Risk Cluster Contributor	Facebook Activity Behaviour
Self-Control and Extraversion*Anxiety	Religion Accessibility
Self-Control and Extraversion*Self-Control	Music you Like Accessibility

Self-Control and Extraversion*Self-Control	People Who Inspire You Accessibility
Self-Control and Extraversion*Self-Control	Books you Like Accessibility
Self-Control and Extraversion*Anxiety	Movies you Like Accessibility
Self-Control and Extraversion*Self-Control	Television you Like Accessibility
Self-Control and Extraversion*Self-Control	Phone Number Accessibility
Self-Control and Extraversion*Anxiety	Street Address Accessibility
Self-Control and Extraversion*Self-Control	IM Screen Names Accessibility

Table 8.9 The Facebook Activities that are influenced negatively by the high scoring of the Self-Control (Conscientiousness) and by the Interaction Traits

8.4 Recommendations for Advantageous Privacy Settings and Protection

8.4.1 Introduction

In the rest of this chapter, a set of recommendations is based on the analysis of the testing results that specified the Big Five traits that can influence Facebook users in handling their personal information through defined clusters where the scoring has been high for most of the Big Five traits (or low emotional stability of Anxiety (Neuroticism) of high scoring). This influence could be positive as in the Extraversion, Tough-Mindedness or Anxiety or could be negative as in the effects of Independence (Agreeableness) or Self-Control (Conscientiousness). The effect has been identified by specific facets in each Big Five trait. This guidance is including stage 1 guidance for the effect of The Big Five traits on the accessibility level sheets which is completed by the survey participants, stage 2 guidance for the Facebook privacy protection settings safe handling and stage 3 guidance on the best behaviour to secure the profile from the possibility of hijacking or the compromising or from the wrong use of the personal data.

8.4.2 Stage 1: Questions Sheet on the Accessibility Level Choices for each of Facebook Profile Personal Data Items

- City Accessibility: can be affected mainly by Independence (Agreeableness) by facets: Strait-forwardness or Forgiveness. This item should only be accessed by: close friends or “Custom” of Friends.

- Hometown: can be affected mainly by Independence (Agreeableness) by facet: Strait-forwardness or Forgiveness. This item should only be accessed by: close friends or “Custom” of Friends.
- Birthday (month and day only): can be affected mainly by Independence (Agreeableness) by facet: Trust or Gentleness. This item should only be accessed by: close friends or “Custom” of Friends. Best is to adopt “Only me”.
- Interested in (men/women): can be affected mainly by Independence (Agreeableness) by facet: Tender-Mindedness or Flexibility. This item should only be accessed by: close friends or “Custom” of Friends. Best is to adopt “Not Supplied”.
- Languages: can be affected mainly by Independence (Agreeableness) by facet: Compliance or Gentleness. This item should only be accessed by: close friends or “Custom” of Friends.
- Relationship status: can be affected mainly by Independence (Agreeableness) by facet: Tender-Mindedness or Flexibility. This item should only be accessed by: “Not Supplied” or “Only Me”.
- Family members: can be affected mainly by Anxiety (Neuroticism) by facet: Anxiety. This item best be accessed by “Only Me”.
- Friends List Accessibility: can be affected mainly by Anxiety (Neuroticism) by facet: Anxiety. This item should only be accessed by: Friends.
- Employer Accessibility: can be affected mainly by Tough-Mindedness (Openness) by facet: Adventurousness or Actions. This item should only be accessed by: close friends or “Custom” of Friends.
- College/University Accessibility: can be affected mainly by Self-Control (Conscientiousness) by facets Competence, Cautiousness or Virtue: This item should only be accessed by: close friends or “Custom” of Friends.
- Secondary School Accessibility: can be affected mainly by Self-Control (Conscientiousness) by facets Deliberation, Cautiousness or Virtue: This item should only be accessed by: close friends or “Custom” of Friends.
- Religion Accessibility: can be affected mainly by Self-Control (Conscientiousness) by facet: Order or Orderliness. This item should only be accessed by “Only Me” or “Not Supplied”.

- Political views: can be affected mainly by Tough-Minded (Openness) by facet: Values or Liberalism. This item should only be accessed by “Only Me” or “Not Supplied”.
- Email: can be affected mainly by Independence (Agreeableness) by facet: Compliance or Gentleness. This item should only be accessed by “Only Me” or “Not Supplied”.
- Favourite quotation: can be affected mainly by Independence (Agreeableness) by facet: Straightforwardness or Gentleness. This item should only be accessed by “Friends” or “Friends of Friends”.
- Music you like: can be affected mainly by Self-Control (Conscientiousness) by facets: Competence, Self-efficacy or Responsibility: This item should only be accessed by: “Friends” or “Friends of Friends”
- Books you like: can be affected mainly by Self-Control (Conscientiousness) by facets: Dutifulness or Traditionalism: This item should only be accessed by: close friends or “Friends of Friends”.
- Movies you like: can be affected mainly by Self-Control (Conscientiousness) by facets: Order or Orderliness. This item should only be accessed by: close friends or “Custom” of Friends.
- Television you like: can be affected mainly by Self-Control (Conscientiousness) by facets: Order or Orderliness. This item should only be accessed by: close friends, “Custom” of Friends or “Friends of Friends”.
- Games you like: can be affected mainly by Self-Control (Conscientiousness) by facets: Order or Orderliness. This item should only be accessed by: close friends or “Custom” of Friends.
- Favourite sports Accessibility: can be affected mainly by Independence (Agreeableness) by facet: Altruism. This item should only be accessed by: “Friends” or “Friends of Friends”
- Favourite Athletes Accessibility: can be affected mainly by Independence (Agreeableness) by facet: Altruism. This item should only be accessed by: “Friends” or “Friends of Friends”
- Favourite Sport Team accessibility: can be affected mainly by Independence (Agreeableness) by facet: Altruism. This item should only be accessed by: “Friends” or “Friends of Friends”

- Phone accessibility: can be affected mainly by Self-Control (Conscientiousness) by facets: Deliberation, Cautiousness or Virtue. This item should only be accessed by: “Only Me” or “Not supplied”.
- Street address Accessibility: can be affected mainly by Self-Control (Conscientiousness) by facets: Deliberation, Cautiousness or Virtue. This item should only be accessed by: “Only Me” or “Not supplied”.
- Website Accessibility: can be affected mainly by Independence (Agreeableness) by facet: Trust or Forgiveness. This item should only be accessed by: “Friends”.
- IM Screens Accessibility: can be affected mainly by Self-Control (Conscientiousness) by facets: Dutifulness or Traditionalism. This item should only be accessed a “Custom” of “Friends”.

8.4.3 Stage 2: Guidance on the Facebook Settings for Best Privacy Protection

The provided settings by the Facebook provider are designed through many years of experience on cyber-attacks, compromised privacy, steal of personal data and hijacking profiles. Exploiting the settings to the limit will help decreasing substantially the attacks or the use maliciously of the personal data. However, it will not solve every problem the Facebook user may face, but it will make the recovery of the problem easier and quicker. On any account, best use of setting is a good step, although everything depends on the behaviour of the user and the handling of the activity items accessibility. Therefore, the following are the best ways to control the settings in Facebook:

- Make your profile always private
- Make sure to avoid any posts to go “Public” with or without your consent
- Control the demographic settings to avoid share settings
- Make sure that posts go to the right “Friends” within your “Friends” by the “Custom” facility
- Give high attention to the account settings in the following fields:
 - Security by supplying or creating:
 - Login Alerts: If anyone attempts to login to the account, you will be notified.
 - Login Approvals: If you approve someone who is trusted to login to your account

- Code Generator: Currently is not applicable
- App Passwords: Password to access to specific application
- Trusted Contacts: names and details of trusted persons to refer to if the account is compromised.
- Trusted browsers: Assign safe browsers to log in from

- Privacy
 - Specify who can see your future posts
 - Review all your posts and things you're tagged in: approve in advance to allow things you are tagged in to appear on your profile
 - Limit and control the audience for posts you've shared with friends or friends of friends: subdivide friends and family into groups and decide who see what
 - Limit Who can send you friend requests (may be to friends of friends only)
 - Filter any message into your inbox: Stop someone to send messages to you
 - Do not supply your email to anybody so no one can look you up
 - Do not allow any search engine such as Google to link to your timeline

- Timeline and Tagging
 - Specify who can post on your timeline
 - Review posts friends tag you in before they appear on your timeline and approve or reject.
 - Limit who can see posts you've been tagged in on your timeline
 - Limit who can see what other posts on your timeline
 - Strictly review tags people add to your own posts before the tags appear on Facebook
 - When you're tagged in a post, decide who you want to add to the audience if they aren't already in it
 - Decide who can see tag suggestions when photos are uploaded by you.

- Blocking

- Create a restricted List of persons whom you do not want them to see your activity
- Followers
 - Identify who can follow you
- Apps
 - Usable Apps that can be Logged in with Facebook
 - Logged in Anonymously
 - Apps, Websites and Plugins
 - Instant Personalization
 - Apps, Others Use.

8.4.4 Stage 3: Suggested Additional Novel Settings for Using by Facebook

1. Use encryption Public key and private key per person
2. Assign a secret Code for retrieval per person when they open their account. If anyone hijacks this account, the owner can go back to Facebook with his original credentials to retrieve the account.
3. Use phone number to access instead of the password through a generated code sent to the phone.
4. Facebook should inform of Date of opening the account with any friend request. Many accounts are created instantly with a few friends to deceive someone with different owner name.
5. Overview of behaviour of user: This can to be monitored by Facebook automatically and then every 3 months a comprehensive activity report should be there briefly with the friend request showing the number of times this person has already requested friendship from others.
6. Assign a reviewed number or colour of every Facebook profile showing the degree of conformability to the decent behaviour with others.
7. Stop anybody copying photos from other user profiles without consent from the owner through a request to the owner.

8.4.5 Stage 4: Recommendations to Facebook Users to Protect their Privacy

1. Secure your uploaded photos against copying by others unless you give permission
2. Change the password every fortnight and make it very strong
3. Ensure that the profile of any new Friendship request is not created days or weeks earlier, except if you know the person whose profile might be stolen or lost
4. Make any login issue related to your mobile phone number instead of the email
5. Do not access a third-party computer without waiting confirmation access code through your phone.
6. Do not be affected by the way the profile photo looks like
7. Do not add anybody unless you ask someone from your current friendship circle who confirms that he knows this person well
8. Do not accept friendship from someone who has an excessive number of friends who may score high (Low in emotional stability) in the Anxiety
9. Do not befriend someone whose account is “Open”
10. Never make access to any of the following Facebook items: Phone number, Email, Street address and your full Date of Birth
11. Avoid befriending some who have the following items: Phone number, Email, Street address and your full Date of Birth
12. Do not surf in Facebook continually. Be realistic and balance the time use with other duties
13. Be aware that Facebook apps can send messages on behalf of your friends
14. Do not be influenced by the way others share the same interest with you
15. Do not be influenced by the way others profile photos look like
16. Using multiple user account on Facebook is not advised
17. If you need to use a third - party computer, make sure that you log out when you finish
18. Do not use the idea of common friends to request or respond to a request for adding friends
19. Do not show the personal details of the family members
20. Do not show your political views
21. Do not trust anybody by giving them your password to open your Facebook account

22. Block anybody who may bother you in any way
23. Do not request friendship from anyone unless you know very well and you would have spoken with them in advance
24. Never click on any video or never open any online link posted by your friends
25. Review posts you are tagged before they appear on the timeline
26. Limit audience for any post or personal information accessibility
27. Do not open your profile from untrusted website or browser
28. Do not show relationship status accessibility
29. Do not allow any search engine to look you up
30. Click spam for any unwelcome friendship request
31. Disable your Facebook activity level accessibility
32. Do not show details of your employer
33. Do not give importance to names on Facebook as many use fake names
34. Report to Facebook management any harassment from any person
35. You do not need to always trust your friends. This is the reason why you need to specify your close friends or use “Custom” when you need to specify a group of friends.

8.5 Summary of Chapter 8

Chapter 8 covers the following important issues:

1. Allocation of the Dominant Big Five traits for each Facebook activity and accessibility in the fields of categorical regression and the Personal information accessibility. The identified Big Five traits belong to the majority number of the participants in the online survey (the safely behaving Facebook users).
2. Allocation of the clustered risky Big Five trait which was identified in Chapter 6 in regard of the risky cluster that carries the high scores of the Big Five traits that correspond to a small number of participants who favoured the “Public” accessibility (The risky behaving Facebook users).
3. The focus was given to the clustered risky Big Five traits that influences each Facebook activity because the objective is to educate, warn and guide the Facebook users for the potential Big Five traits scoring that poses risky influence on the already

identified at-risk groups of Facebook users. This leads to knowing the risky Big Five traits from the nature of the Facebook activity.

4. This has led to creating a table that included each Big Five trait in correspondence to the related Facebook activity. Separating similar Big Five traits versus their corresponding Facebook activities as in Table 8.8 could identify the range of Facebook activities that are controlled by specific Big Five traits. This can be fed to Facebook users through an application for them to identify the risky personality characteristic of the Facebook user who performs any one of the known Facebook activities.
5. From Table 8.8, it was found that there were few risky Facebook activities that were belonging to Extraversion, Anxiety (Neuroticism) and Tough-Mindedness (Openness). Most of their influences on Facebook activities were positive by affecting the Facebook users to act sensibly and protect their personal information by choosing “Only me”, “Not supplied”, “Custom” or “Friends”.
6. Therefore, this triggered the researcher to look for an explanation for the sort of similarity between the three Big Five traits: Extraversion, Anxiety (Neuroticism) and Tough-Mindedness (Openness) as shown in section 8.6.
7. In this research, it was found that the two Big Five traits that pose risk on most of Facebook activities are: Independence (Agreeableness) and Self-Control (Conscientiousness). Separate table was created for Each Big Five trait such as Table 8.12 and Table 8.15 where each table shows the Big Five traits versus the related Facebook activities.
8. The Independence (Agreeableness) was investigated further to identify the psychobiology facets in the two representative models: The NEO PI and the HEXACO. Each model has 6 different facets. Every Facebook activity was analysed to see how it was influenced by each model. It was found that the Independence (Agreeableness) effect on most of the activities is due to trust, modesty, straightforwardness, gentleness, flexibility and Altruism. All these facets characters are not negative at high scoring of the Independence (Agreeableness) but lead to the person in favour of “Public” accessibilities of the personal information which are considered as a risk that can be exploited by people who are targeting identity theft.

9. The Self-Control (Conscientiousness) was investigated further to identify the psychobiology facets in the related three representative models: The NEO PI-R, The NEO IPIP and the 6 Factor model as shown in Table 8.16. Each model has 6 different facets. Every Facebook activity was analysed to see how it was influenced by each model and the related facet. It was found that the Self-Control (Conscientiousness) effect on most of the activities is due to the following main facets: competence, order, dutifulness, deliberation, responsibility, traditionalism, virtue and self-efficacy. All these facets characters are not negative at high scoring of the Self-Control (Conscientiousness) but lead to the person to be in favour of “Public” accessibilities of the personal information which are considered as a risk that can be exploited by people who are targeting identity theft and malicious behaviour.
10. It is noticed that the two Big Five traits: The Independence (Agreeableness) and the Self-Control (Conscientiousness) are accompanied in their negative effect at high scoring by specific interactions. The Independence (Agreeableness) influence is accompanied by Extraversion*Anxiety for four Facebook activities. The Self-Control (Conscientiousness) influence is accompanied by Extraversion*Self-Control for five Facebook activities and by Extraversion*Anxiety for two Facebook activities. These interactions degree of support to the “Public” accessibility have a lower B than that B of the Big Five traits.
11. A guidance for Facebook users is created to advise them for the best accessibility strategy for each Facebook activity as in Stage 1. In Stage 2, full guidance is presented for the best Facebook profile settings. In stage 3, a group of novel settings is suggested to be considered by Facebook provider. In stage 4, a group of recommendations is presented to any Facebook user to protect the profile and the personal information from identity theft or any malicious use.

8.6 The Validation of the Results in the Thesis

The validation process has taken the following steps:

1. The 16 Personality Factors Test Results Chart Shows a match between the Open Psychology Research Data and the findings of this survey
2. The radar Chart shows also a match between the Open Psychology Research Data and the results of the Big Five traits in this research.
3. The participants' data of this survey shown in the Global Factors Descriptive Statistics represent idealized bell-shaped randomisation in a normal distribution with a mean and a standard deviation.
4. The adopted accuracy in this thesis results is for non-significance values of < 5%.
5. The overall significance of the online survey for 90 participants is calculated as 96%
6. The quantitative survey analysis of results has shown approximate similarity with the analysis of the qualitative results as shown in the comparison tables in Chapter 7.
7. Comparing this research results with 3 other papers has shown that there is a positive trend with the published results in general terms because they used less number of activities and were targeting different objectives. The three references are:
 - I. Chance William Garrett Johnson (2015)
 - II. Zhang et al. (2011)
 - III. Amichai-Hamburger and Vinitzky (2010)

Chapter 9: The Conclusions

9.1 General Conclusions

1. The 16 Personality Factors Test Results Chart Shows a match between the Open Psychology Research Data and the findings of this survey
2. The radar Chart shows also a match between the Open Psychology Research Data and the results of the Big Five traits in this research.
3. The participants' data of this survey shown in the Global Factors Descriptive Statistics represent idealized bell-shaped randomisation in a normal distribution with a mean and a standard deviation.
4. The adopted accuracy in this thesis results is for non-significance values of $< 5\%$.
5. The overall significance of the online survey on 90 participants is calculated as 96%
6. Testing R and R^2 in the **quantitative questions** by using **the Liner Regression** on the SPSS showed the dominating Big Five traits in each question which might be positively or negatively correlated the quantity in the question answer by using the correlation index (B) value which could be negative or positive. The exact effect normally appears in the EXP (B) value.
7. The testing of R and R^2 in the **Binary logistic categorical regression** test for Yes or No questions has to go through different individual test for each Big Five traits to define the significant model.
8. The questions with many options more than two have been investigated by the **multinomial logistic regression** on the SPSS where the exact outcome results are shown clearly in the "Parameter Estimates" table for the significant values that have the non-significance values equal or less than 0.05 only. Any non-significance more than 0.05 was ignored.
9. Major interaction traits which are created by two interacting Big Five traits are discovered in this thesis and tested for their influence through the value of Regression Index (B). It is discovered that their combined influence opposes the influence of each single Big Five trait. However, the related B to the interaction of the Big Five traits is smaller than each individual Big Five traits but still has significant effect.

10. The effective interaction Big Five traits that have significant effect when tested are: Extraversion*Independence, Extraversion*Tough-Mindedness, Extraversion*Self-Control and Extraversion*Anxiety.
11. All Big Five traits are positive when increase and are negative when decrease except the Anxiety which is best when decrease and negative when increase.
12. The 16 Personality Factors Test Results Chart Shows a match between the Open Psychology Research Data and the findings of this survey
13. The radar Chart shows also a match between the Open Psychology Research Data and the results of the Big Five traits in this research.
14. The participants' data of this survey shown in the Global Factors Descriptive Statistics represent idealized bell-shaped randomisation in a normal distribution with a mean and a standard deviation. **The adopted accuracy in this thesis results is for non-significance values of < 5%.**
15. The overall significance of the online survey on 90 participants is calculated as 96%
16. Testing R and R² in the **quantitative questions** by using **the Liner Regression** on the SPSS showed the dominating Big Five traits in each question which might be positively or negatively correlated the quantity in the question answer by using the correlation index (B) value which could be negative or positive. The exact effect normally appears in the EXP (B) value.
17. The testing of R and R² in the **Binary logistic categorical regression** tests for, Yes or No questions, have to go through different individual test for each Big Five traits, to define the significant model.
18. The questions with many options more than two have been investigated by the **multinomial logistic regression** on the SPSS where the exact outcome results are shown clearly in the "Parameter Estimates" table for the significant values that have the non-significance values equal or less than 0.05 only. Any non-significance more than 0.05 was ignored.
19. Major interaction traits which are created by two interacting Big Five traits are discovered in this thesis and tested for their influence through the value of Regression Index (B). It is discovered that their combined influence opposes the influence of each single Big Five trait. However, the related B to the interaction of

the Big Five traits is smaller than each individual Big Five traits but still has significant effect.

20. The effective interaction Big Five traits that have significant effect when tested are: Extraversion*Independence, Extraversion*Tough-Mindedness, Extraversion*Self-Control and Extraversion*Anxiety.
21. All Big Five traits are positive when increase and are negative when decrease except the Anxiety which is best when it decreases and negative when increases.

9.2 Testing the Three Types of the Activity Questions

The Facebook activity and behaviour questions have three Types of questions: quantitative type where numbers are involved, the categorical type where the answer is Yes or No and multinomial questions where the answers have more than 2 choices.

Testing R and R² in the quantitative questions by using the Linear Regression on the SPSS showed the dominating Big Five traits in each question which might be positively or negatively correlated the quantity in the question answer by using the correlation index (B) value by taking the Exp (B) which could be negative or positive.

The testing of R and R² in the **Binary logistic categorical regression** test for Yes or No question has to go through different individual test for each Big Five traits to define the successful model.

The questions with many options more than two have been investigated by the **multinomial logistic regression** on the SPSS where the exact outcome results are shown clearly in the "Parameter Estimates" table for the significant values that have the non-significance values equal or less than 0.05 only.

9.3 The Correlational Results between the Big Five Traits and the Related Facebook Activities

The results of the correlational interpretation of each Big Five trait as an independent variable is defined for each dependent outcome of the related survey question.

This trait is characterised with emotional stability when the Anxiety is low. With the high Anxiety the person tends to use Facebook less and has low number of friends and has low frequency of accessing Facebook. If the person is low in the emotional stability when the Anxiety is low, the person tends to use Facebook more frequently, has more friends and tends to less self-disclose the personal information.

9.4 The Identified At-Risk Groups by Clustering of the Big Five Traits

Clustering results in showing the at-risk group in the total number of survey population is due to the measured level of the Big Five traits in different clusters. Some clusters are not taken into account, and some other clusters the half of the population is considered and in some clusters all populations are taken into account. For each accessibility parameter, the results of the percentages of risk and the related dominating Big Five traits are tabled in **Table 6.1 in Chapter 6**.

9.5 Qualitative Methodology Interviewing to identify the Privacy Risk of Males, Females and the All Participants

Looking into the main **table 7.7 in Chapter 7**, it is clear, that those participants who chose to give “Public” accessibility, are representing the at-risk group. Those participants who chose to give accessibility to their “Friends” are more cautious and get themselves less risk to their personal data. However, the participants who chose to “Not to Supply”, to “Only Me” or to “Friends except the acquaintances” are not risking their personal information and are safe in general. If each accessibility parameter is considered separately, more specific definitions can be identified about the levels of accessibility (Considering that the “Public” accessibility is given 100% risk, the “Friends” accessibility is given 50% risk and the safe zone is given 0%).

It is found from the results of the accessibility levels of males, female and all participants that University/College, Secondary School, Movies you like, TV you like and Favourite Sports level of accessibility are bearing very high risk where females contributed in this risk more than males. In Current City, Hometown, Gender, Birthday, Relationship status, religion and Favourite Quotations accessibility the risk is high, but females bear higher risk than males. However, in Languages, Relationship Status, Family members, Friends, Employer, Email,

music you like and Street Address the males are bearing more risk than the female participants. In Political views, Games you like, Phone number, Books you like and Movies you like both males and females bear the same level of risk.

9.6 A Comparison between the Quantitative and the Qualitative Surveys for the Selection of the “Public” Accessibility by Participants

It is important to compare at this point between the Quantitative results of the online survey and the Qualitative results from the face-to-face interviewing survey in regard of the at-risk groups who had decided to take the “Public” accessibility in their Facebook activities. This may be considered as a validation method of the online survey. The comparison of the “Public” choice in both surveys is shown in the following **Table 7.5 in Chapter 7**. It can be noticed in Table 7.5 that the Qualitative research by interviewing results of accessibility have validated the Quantitative survey results in nearly 95% of the cases. All Facebook activities levels of accessibility are either exactly same, within limits or nearly the same.

9.7 Facebook Provided Settings Utilisation

From **Table A7.6 in the appendix**, it can be noticed that the Facebook settings are utilised for a small part of them only, by most of the Facebook users. If each setting item is considered separately, it was found that there is a risky under-utilisation of the settings.

9.8 The Analysis of the Recorded Responses during the Face-to-Face interviews

In this stage, the same 14 participants were interviewed individually at specific dates and times. Each participant has to go through answering all questions and the interviewer used to clearly record the whole dialogue on a tape. The interviewing questions are presented in a sheet. **The list of interview questions is presented in Stage 3 in Chapter 7.**

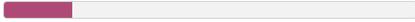
APPENDICES

Appendix Chapter 3: A3

A3.0 The SNSS (Social Networking Security Survey)

SNSS (Social Networking Security Survey)

1. SNSS (Social Networking Security Survey)

1 / 6  17%

Image

Contact for further information:

Mr. Yaacoub Yousef

Who is organising the research:

The research is organised by Anglia Ruskin University, Faculty of Science & Technology, Telecommunication Engineering Research Group (TERG) to supply resources and the research directorate in Chelmsford, Essex, UK. The Website is <http://www.anglia.ac.uk/research/TERG>.

*** 1. To qualify for this experiment, you must answer YES to the following questions:**

	Yes
Are you over 18 years old?	<input type="radio"/>
Are you living in the United Kingdom	<input type="radio"/>
Do you have a Facebook profile?	<input type="radio"/>

Next

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[Privacy & Cookie Policy](#)

2. Social Awareness and security Questions

2 / 6  33%

* 1. How secure do you feel your profile information is on Facebook?

1 (Not secure) 2 3 4 5 (Highly secure)

* 2. Has anybody accessed your Facebook account without your consent?

Yes
 No
 Don't know

Other (please specify)

* 3. When accessing Facebook from a friend's computer, university or library do you remember to logout?

Always
 Sometimes
 Never
 Not sure

Other (please specify)

* 4. Are you aware that Facebook apps can post wall messages on behalf of your friends?

Yes
 No

* 5. Do you ever use the Facebook Login Button on 3rd party websites?

Yes
 No

* 6. Do you use the Facebook app on your phone?

Yes
 No

* 7. Have you ever experienced bullying or harassment due to your shared Facebook photos or posts?

Yes
 No

* 8. Do you use multiple user accounts on Facebook?

Yes
 No

Prev Next

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SMSS (Social Networking Security Survey)

3. Facebook Questions

3 / 6 5%

1. How often do you visit Facebook?

Hourly
 Daily
 Weekly
 Monthly
 Yearly

2. Have you ever made new friends on Facebook and met in person?

Yes
 No

3. What influences your decision making when accepting friend requests on Facebook?

Friends or Family, know them in person.
 By the way they look (Profile Photo)
 They share my interests
 We have friends in common
 Other (please specify):

4. To the best of your knowledge, please select the accessibility level for each of your Facebook profile fields.

	Public	Friends	Friends except Acquaintances	Only Me	Custom	Not Supplied
Current city	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hometown	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Gender	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Birthday (month and day only)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Interested in (interests)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Languages	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Relationship status	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Family members	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Friends	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Employer	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
College/University	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Secondary school	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Religion	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Political views	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
People who inspire you	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Favourite quotations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Music you like	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Books you like	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Movies you like	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Television you like	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Games you like	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Favourite sports	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Favourite sports teams	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Favourite athletes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Activities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Interests	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Email addresses	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Phone numbers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Street address	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
AI screen names	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Website	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

5. How many Facebook friends approximately do you currently have?

6. How many uploaded photos approximately do you currently have on your Facebook profile?

7. How many apps approximately do you currently have on your Facebook account?

8. Are most of your Facebook friends from:

Same Family/Town
 Same School/College/University
 Same Workplace
 Worldwide
 Not sure

9. In a typical day, about how often do you comment on other Facebook users' activities (photos, posts, etc.)?

Extremely often
 Very often
 Moderately often
 Slightly often
 Not at all often

10. In a typical day, about how often do you like other Facebook users' activities (photos, posts, etc.)?

Extremely often
 Very often
 Moderately often
 Slightly often
 Not at all often

11. Have you ever used the "Report Story or Spam" on Facebook wall posts?

Yes
 No
 I am unaware this is available

12. Do you use the Facebook Activity Log to control what is published on your wall?

Yes
 No
 I am unaware of this feature

13. Have you ever used any of the following applications or groups on Facebook?

See Who Viewed Your Profile App (various messages posted on Facebook claim that, by following a link and installing a Facebook application, you can see who has been viewing your Facebook Profile or find out who has been stalking you.)
 Like and Share To Win - Prize Offers on Facebook (various messages distributed on Facebook claim that users can win expensive prizes such as Apple products of designer headphones just by liking and sharing a Facebook Page.)
 Who Will Be Your Valentine (various messages distributed on Facebook relating to "seeing who your Valentine will be")
 Free Disneyland Tickets Survey (various Facebook messages claim that users can receive free tickets to Disneyland by liking and sharing a picture and participating in online surveys.)
 I have not used any of the above.

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 See how easy it is to UNDETECT

SMSS (Social Networking Security Survey)

3. Facebook Questions

3 / 6 5%

1. How often do you visit Facebook?

Hourly
 Daily
 Weekly
 Monthly
 Yearly

2. Have you ever made new friends on Facebook and met in person?

Yes
 No

3. What influences your decision making when accepting friend requests on Facebook?

Friends or Family, know them in person.
 By the way they look (Profile Photo)
 They share my interests
 We have friends in common
 Other (please specify):

4. To the best of your knowledge, please select the accessibility level for each of your Facebook profile fields.

	Public	Friends	Friends except Acquaintances	Only Me	Custom	Not Supplied
Current city	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hometown	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Gender	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Birthday (month and day only)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Interested in (interests)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Languages	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Relationship status	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Family members	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Friends	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Employer	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
College/University	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Secondary school	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Religion	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Political views	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
People who inspire you	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Favourite quotations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Music you like	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Books you like	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Movies you like	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Television you like	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Games you like	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Favourite sports	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Favourite sports teams	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Favourite athletes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Activities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Interests	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Email addresses	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Phone numbers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Street address	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
AI screen names	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Website	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

5. How many Facebook friends approximately do you currently have?

6. How many uploaded photos approximately do you currently have on your Facebook profile?

7. How many apps approximately do you currently have on your Facebook account?

8. Are most of your Facebook friends from:

Same Family/Town
 Same School/College/University
 Same Workplace
 Worldwide
 Not sure

9. In a typical day, about how often do you comment on other Facebook users' activities (photos, posts, etc.)?

Extremely often
 Very often
 Moderately often
 Slightly often
 Not at all often

10. In a typical day, about how often do you like other Facebook users' activities (photos, posts, etc.)?

Extremely often
 Very often
 Moderately often
 Slightly often
 Not at all often

11. Have you ever used the "Report Story or Spam" on Facebook wall posts?

Yes
 No
 I am unaware this is available

12. Do you use the Facebook Activity Log to control what is published on your wall?

Yes
 No
 I am unaware of this feature

13. Have you ever used any of the following applications or groups on Facebook?

See Who Viewed Your Profile App (various messages posted on Facebook claim that, by following a link and installing a Facebook application, you can see who has been viewing your Facebook Profile or find out who has been stalking you.)
 Like and Share To Win - Prize Offers on Facebook (various messages distributed on Facebook claim that users can win expensive prizes such as Apple products of designer headphones just by liking and sharing a Facebook Page.)
 Who Will Be Your Valentine (various messages distributed on Facebook relating to "seeing who your Valentine will be")
 Free Disneyland Tickets Survey (various Facebook messages claim that users can receive free tickets to Disneyland by liking and sharing a picture and participating in online surveys.)
 I have not used any of the above.

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SNSS (Social Networking Security Survey)

5. Demographic Questions

5 / 6  83%

The following demographic questions will provide us with more insight on the users of Facebook, this experiment is 100% anonymous and you will not be identifiable from the answers you provide.

* 1. In what year were you born? (enter 4-digit birth year; for example, 1976)

* 2. What is your gender?

- Female
 Male

* 3. What is your marital status?

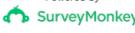
- Single
 In a Relationship
 Engaged
 Married
- It's Complicated
 In an Open Relationship
 Widowed
 Separated
- Divorced
 In a Civil Union

* 4. What is your employment status

- In full time work, permanent
 In full time work, temp/contract
 In part time work, permanent
 In part time work, temp/contract
- Part time work, part time student
 Part time work, full time student
 Student only
 Unemployed due to incapacity
- Retired
 Self-employed

Prev

Next

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SNSS (Social Networking Security Survey)

6.

6 / 6  100%

Thank you for participating in our research questionnaire. If you are interested in finding out the results of this research, please provide your email address.

1. Email Address:

Prev

Done

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A3.1 The Personality Psychological Behaviour Question Options

Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
1	2	3	4	5

Table A3.1: Sample of the Personality Psychological Behaviour Questions in harmony with Raymond Cattell's 16 PF framework.

A3.2: The Questionnaire Participation Documents

1. Participant Consent Form is as follows:



Cambridge & Chelmsford
Bishop Hall Lane
Chelmsford
CM1 1SQ

T: 0845 271 3333
Int: +44(0)1245 493131
www.anglia.ac.uk

Participant Consent Form

NAME OF PARTICIPANT:

Title of the project:

A Study to Identify the Causes and Effects of Poor Privacy Practices by Online Social Network Users: The Potential of Training and Advisory Monitoring Software in Changing User Behaviour

Main investigator and contact details: Mr. Yaacoub Yousef

Email:

Members of the research team:

Mr. Yaacoub Yousef (PhD Research student), Dr. Ian Van Der Linde (1st Supervisor), Dr. Debbie Holley and Dr. Ayoub Shirvani.

Participant to confirm:

1. I agree to take part in the above research. I have read the Participant Information Sheet which is attached to this form. I understand what my role will be in this research, and all my questions have been answered to my satisfaction.
2. I understand that I am free to withdraw from the research at any time, for any reason and without prejudice.
3. I have been informed that the confidentiality of the information I provide will be safeguarded.
4. I am free to ask any questions at any time before and during the study.
5. I have been provided with a copy of this form and the Participant Information Sheet.

Data Protection: I agree to the University¹ processing personal data which I have supplied. I agree to the processing of such data for any purposes connected with the Research Project as outlined to me.

I understand that all data will be treated in confidence according to the Data Protection Act 1998.

Name of participant (print).....Signed.....Date.....

A3.3 The Ethical issues of the project

The ethical issues relating to this research project are:

- xi. The sample will be balanced in gender, profession, geographic location and race in both the online and hard-copy questionnaires.
- xii. The emphasis to involve the over 18 year’s old participants will be guaranteed by using the consent form signature for the online and hard-copy questionnaires.
- xiii. In accordance with the Data Protection Act (DPA) 1998, the researcher will be actively involved in the selection of Facebook users, that is, no information will be passed on to third parties in such a way that it violates the DPA 1998.
- xiv. The procedure to be carried out on participants is as follows:
 - Identify demographic group.
 - Providing the information pack to explain the objectives of the study.

- Providing the consent form for the user to read and sign.
 - Supplying the user with the questionnaire, the researcher name, address and contact numbers, objectives of the research.
 - Answer any question to participants and store the respondent questionnaire in a safely locked place and on a protected drive.
- xv. All consents forms will be signed, and scanned copies will be stored on a protected drive which is to be stored in a locked safe.
- xvi. The proposed methodological tools do not bear any risk to the physical or psychological well being of the participants.
- xvii. All questionnaire, participants need to have a full understanding of the research purpose.
- xviii. Participation must be entirely voluntary.
- xix. Participants will be made aware of the right to withdraw at any stage of the research.
- xx. The anonymity of hard-copy questionnaires and online questionnaires participants and confidentiality of all data types will be assured.

There will never be any coercion on participants to behave in a certain way.

The Ethics application form was approved.

A3.4 Collected Data Samples from the Social Networking Site (Facebook) Users Using the Anonymised Online Questionnaire

A3.4.1 The Demographic part of Users' details

1. Year of birth
2. Gender
3. Marital status
4. Employment status

A3.4.2 The Facebook Activity related to privacy

Facebook Activities and Privacy experiences by Facebook users to cover the following issues:

1. The degree to which they are familiar with the security settings on the product they are using,
2. The degree in which they think that security is a concern, and
3. Did they know the availability of information on their account?
4. Demographic details of users that include: gender, employment status, and marital status.
5. How secure do the users feel?
6. Has anybody accessed his or her account without his/her consent?
7. Does the user remember to log out when he uses a friend's or library's computer?
8. Does the user know that Facebook apps to send messages on behalf of his friends?
9. Does the user use a login button from third party websites?
10. Does the user use apps on his mobile phone?
11. Has the user experienced bullying or harassment due to shared posts or photos?
12. If they use multiple user accounts
13. How frequently the user visits his profile daily
14. If they added a person and met him/her in person
15. What influenced the user when adding a new friend?
16. For the best of the user knowledge, he or she is asked to select the access level for each of Facebook profile fields. This item included questions about accessibility level on: current city, hometown, gender, birthday, interested in, languages, relationship status, family members, employer, current college, secondary school, religion, political views, people who inspire, quotations, music he likes, books he likes, movies he likes, television he likes, games he likes, favourite sports, favourite athletics, activities, interests, emails, phone numbers, street address, websites and IM screen names.
17. How many friends does the user have on Facebook?
18. How many photos does the user upload on his profile?
19. How many apps does the user have on his Facebook profile?
20. Nature of the friends: relatives, same town, same university, etc.

21. Frequency of comments/posts on a daily basis
22. How often the user likes the posts, photos or shares
23. If the user ever reported posts or comments as spam
24. If the user uses the activity log to control what is published on his or her profile
25. If the user ever used applications or groups on his Facebook profile.

A3.5 Investigation of the Personality Factors of Facebook users by using Cattell's 16 Personality Factors (16 PF) and their relation to the Big Five Traits

A3.5.1 Raymond Cattell's 16 Personality Factor (PF) Technique

The 16PF Questionnaire is a comprehensive and widely used measure of normal, adult personality which was developed from factor-analytic research into the basic structural elements of personality. First published in 1949, and now in its fifth edition, the questionnaire is based on Cattell's multi-level personality theory and measures 16 primary factors, five global or second-stratum factors (the original Big Five), and two third-stratum factors. Although the summary of reliability studies indicates that the questionnaire provides reliable information, and a selection of validity studies illustrates how the instrument is used effectively in a variety of contexts.

For over half a century, the 16PF Questionnaire has proven useful in understanding and predicting a wide range of important behaviours, thus providing a rich source of information about testing users.

A3.5.1.1 The 16 Personality Factors (16 PF) Meaning between two extremes is as follows:

1. **Warmth (A):** Lies between Reserved to Warm
2. **Reasoning (B):** Lies between Concrete to Abstract
3. **Emotional Stability (C):** Lies between Reactive to Emotionally Stable
4. **Dominance (E):** Lies between Deferential to Dominant
5. **Liveliness (F):** Lies between Serious to Lively
6. **Rule-Consciousness (G):** Lies between Expedient to Rule-Conscious
7. **Social Boldness (H):** Lies between Shy to Socially Bold
8. **Sensitivity (I):** Lies between Utilitarian to Sensitive
9. **Vigilance (L):** lies between Trusting to Vigilant
10. **Abstractedness (M):** Lies between Grounded to Abstracted
11. **Privateness (N):** Lies between Forthright to Private
12. **Apprehension (O):** Lies between Self-assured to Apprehend
13. **Openness to Change (Q1):** Lies Between Traditional to Open to Change
14. **Self-reliance (Q2):** Lies between Group-Oriented to Self-Reliant
15. **Perfectionism (Q3):** Lies between Tolerates Disorder to Perfectionistic

16. **Tension (Q4):** Lies between Relaxed to Tense

A3.5.1.2 Scaling and Transferring of Personality Factors Questions into Cattell’s 16 Personality Factors

Option 1: Strongly Disagree	Option 2: Disagree	Option 3: Neither Agree nor Disagree	Option 4: Agree	Option 5: Strongly Agree
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Table A3.2 The Five Options for Participants

Option 1: Weight 1 or 9 (Depending on the way the question is formed)

Option 2: Weight 3 or 7 (Depending on the way the question is formed)

Option 3: Weight 5 (Depending on the way the question is formed)

Option 4: Weight 3 or 7 (Depending on the way the question is formed)

Option 5: Weight 1 or 9 (Depending on the way the question is formed)

Personality Factor 5 Different Weights are shown in Table A3.3:

1	3	5	7	9
Strongly Agree				

1	3	5	7	9
	<i>Disagree</i>			

1	3	5	7	9
		<i>Neither Agree Nor Disagree</i>		

1	3	5	7	9
			<i>Agree</i>	

1	3	5	7	9
----------	----------	----------	----------	----------

				<i>Strongly Agree</i>
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Table A3.3 Personality Factors Different Weights

A3.5.1.3 The 163 Psychology Questionnaire Questions Allocation into the Related Cattell's 16 Personality Factors

This is shown in the following table by allocating related questions to each personality factor and read the respondent chosen an option and give a psychological weight to his option. Two random respondents were chosen for example. For each respondent, Column 1 is the chosen option (1 to 5), and Column 2 is for the related weight (1 to 9). For the Warmth PF (for example), all questions that relate to it are extracted from the 163 psychology questions list. This is why the numbers are random in each table in the far left-hand side column. The following Table 3 shows how each PF is drawn as follows and data responses of two participants are used as an example only.

A3.6 Extraction of The Big Five Traits from the 16 Personality Factors (16 PF) for each Participant

A3.6.1 Introduction

The detailed descriptions of the Big Five traits are as follows (**Hellriegel and Slocum, 2009, 2011**):

6. **Extraversion (E):** is directly related to social skills, talkative ability and personal charm and energetic versus shy, unassertive, withdrawn, solitary and reserved.
7. **Independence/Agreeableness (A):** reflects the individual behavioural characteristics, such as conducting help, cooperation and sympathy for others versus unkind, difficult, cold, rude and independent.
8. **Tough Mindedness/Openness (O):** reflects the richness of the individual imagination, aesthetic feelings, degree of dedication, inventive and curious about new things versus dull, unimaginative, literal-minded and cautious.
9. **Self-Control/Conscientiousness (C):** includes elements of self-discipline, organisation and thoroughness of planning, as well as the need for achievement versus impulsive, careless and irresponsible.

10. **Anxiety/Neuroticism (N):** reflects the degree of emotional stability, effective, secure and confined versus moody, self-doubting, nervous, sensitive, depressed and anxious.

A3.6.2 Methods of Conversion of the 16 Personality Factors into the Big Five Factors

1. Extroversion

Extraversion is directly related to social skills, talkative ability and personal charm

For computation of Extraversion, the following Cattell's Personal Factors are considered:

- I. Warmth: Any Warmth Sten at five plus is Positive
- II. Liveliness: Any Liveliness Sten at five plus is Positive
- III. Social Boldness: Any Social Boldness Sten less than 5 is positive
- IV. Privatness: Any Privatness Sten more than 7 is negative
- V. Self-reliance: Any Self-Reliance Sten less than five is negative.

2. Independence

Independence (Agreeableness) reflects the richness of the individual imagination, aesthetic feelings, degree of dedication, and curiosity about new things.

For computation of Independence, the following Cattell's Personal Factors are considered:

- I. Dominance: Any Dominance Sten less than 5 is positive
- II. Social Boldness: Any Liveliness Sten less than 5 is Positive
- III. Vigilance: Any Vigilance Sten less than 5 is positive
- IV. Privatness: Any Privatness Sten more than 7 is negative
- V. Openness to Change: Any Openness to Change Sten more than 5 is positive.

3. Tough-Mindedness

Tough-Mindedness (Openness) reflects the individual behavioural characteristics, such as conducting help, cooperation and sympathy for others

For computation of Tough-Mindedness, the following Cattell's Personal Factors is:

- I. Warmth: Any Warmth Sten at five plus is Negative
- II. Sensitivity: Any Sensitivity Sten at five plus is Negative
- III. Abstractedness: Any Abstractedness Sten less than five is Negative
- IV. Openness to Change: Any Openness to Change Sten more than five is positive.

4. Self-control

Self-Control (Conscientiousness) includes elements of self-discipline, organisation and thoroughness of planning, as well as the need for achievement.

For computation of Self-Control, the following Cattell's Personal Factors are considered:

- I. Liveliness: Any Liveliness Sten at five plus is Negative
- II. Rule-Consciousness: Any Rule-Consciousness Sten at five plus is Positive
- III. Abstractedness: Any Abstractedness Sten less than five is Negative
- IV. Perfection: Any Perfection Sten at five plus is Positive.

5. Anxiety

Anxiety (Neuroticism) reflects the degree of emotional stability and has a close link to mental health (depression and anxiety).

For computation of Anxiety, the following Cattell's Personal Factors are considered:

- I. Emotional Stability: Any Emotional stability Sten at less than five is Negative
- II. Vigilance: Any Vigilance Sten at less than five is Positive
- III. For Apprehension: Any Apprehension Sten at more than five is Positive
- IV. Tension: Any Tension Sten less than five is Positive.

A3.6.3 Scaling and Transferring of the Scores of the 16 Personality Factors into the Big Five Traits

Each Big Five trait has a group of personality factors. For each respondent, there is one weight for each personality factor. The mean of all personality factor weights represents the Sten for the related Big Five traits. This table is an example of how to find the Sten of the Extroversion personality factor. Let us take Extroversion as an example in the following table:

A3.6.4 Finding the Sten of each Big Five Trait for each Participant using the Personality Factors

A3.6.4.1 Scaling of the Facebook Activity from the Participants Responses Data on the basis of Privacy of Users

Scaling of respondents' opinions in the field of Facebook activities can be subdivided into the following categories:

1. Scaling of two choices only that have a “Yes” or “No”.
 - I. In this case, a number is given to each. For example, number 5 is given for “Yes”, and number 10 is given for “No”, this is required to facilitate the comparison.
2. Scaling of Gender as “Male” is given number 10 and “Female” is given number 5.
3. Scaling of Multiple choices.

For example:

Questionnaire options regarding some privacy items which could be shown on the Facebook profile to friends and that take shape as follows:

1. Not Supplied
2. Only Me
3. Custom
4. Friends, Except acquaintances
5. Friends

The replies by respondents are equated in regard of security as follows:

1. Not Supplied is given a score of 10
2. Only Me is given a score of 8
3. Custom is given a score of 6
4. Friends, except acquaintances is given a score of 4
5. Friends is given a score of 2

A3.6.4.2 Scaling Ideas in Other Research References

In the article of **T. Halevi, J. Lewis and N. Memon (2013)**, their scaling of the number of photos was using the following formula for the Facebook number of photos and the Facebook number of posts:

FB posts = log₁₀ (Total Entries + 0.001)

The users were asked about six different privacy settings options. Each entry was assigned a value between '0' (for nobody) and '3' (for making the item visible to everybody) to each privacy setting element. These values were then added to create a combined value for the Facebook privacy settings out of $6 \times 3 = 18$. This means any activity of making the item visible somehow is given a number. Any number "0" for nobody will not be counted as a disclosure factor against privacy. It is possible, for example, that we can equate Yes, as "3" and No as "0".

A3.7 SPSS Testing Techniques

A3.7.1 One Way ANOVA

- We use ANOVA to compare between two means
- We use regression to look at the relationship between variables
- We test the fit regression model with an ANOVA (The F-test)
- ANOVA is a special case of regression (linear model)
- ANOVA is a variance ratio method
- ANOVA in SPSS is under General Linear Model (GLM)
- ANOVA is a way to compare the ratio of variance in what is known as (F-ratio)
- So, regression is tested by (F-ratio)
- We can use grand mean, if the difference between individual means are small
- SS (Sum of Squares) = S squared (N-1)
- But SST = S squared grand (N-1).
- SSM = No (mean-global mean) squared + No (mean-global) squared+.....
- SSR = S squared grand (n₁-1) + S squared grand (n₂-1) +.....
- MSm = SSm/dfm
- MSr = SSr/dfr
- F-ratio = MSm/MSr

A3.7.2 Understanding Regression (Andy Field, 2009)

Basic regression = $b_0 + b_1X + e$

Two way regression = $(b_0 + b_1X_1 + b_2X_2) + e$

Many dependent variables regressions = $b_0 + b_1X_1 + b_2X_2 + \dots + b_iX_i + e$

The right hand side of any regression is the Y which is the outcome variable.

X_1, X_2, \dots, X_i are predictors, and b_0 is the interception with the Y axis. The symbol e is the error. In fact, b_1, b_2, \dots, b_i is the coefficient of the related X's. This coefficient is the slope of the regression line. For each predictor, we have a regression coefficient (b).

For one predictor we get simple regression, and for many predictors, we call it a multiple regression.

Total error = $\sum (\text{Observed} - \text{Model})^2 = SS_R = \text{Residual Sum of Squares}$. W.r.t regression model.

The line is good fit if $SS_R = \text{Small}$

The goodness-of-fit measure is to compare all sums of squares for every possible line that could fit.

The lowest SS_R is the best fitting model. This is a way to find best b . This is called OLS (Ordinary Least Squares) regression.

SS_T is a total sum of squares w.r.t mean, which is a first step trial towards SS_R . So we get the model sum of Squares (SS_M).

SS_M uses the differences between the mean value of Y and the regression line.

If SS_M is large, then using the mean is good.

If SS_M is small, using regression model is a little better than using the mean.

So, we can use $R^2 = SS_M/SS_T$ to express a percentage value by $\times 100$. R^2 represents the variance in the outcome explained by SS_M relative to how variation there was to explain in the first place SS_T .

Taking the square root of R^2 gives Pearson's Correlation Coefficient for the relationship between the value of the outcome predicted by the model and the value of the outcome we observed. Hence, Correlation Coefficient gives us a good estimate of the overall fit of the regression model (between predicted values and actual value) and R^2 provides us with a gauge of the substantive size of the model fit.

Sum of squares, SS is important in finding the F-Test:

$F = \text{Systematic variance} / \text{unsystematic variance}$ or compare model to an error in the model.

Average sum of squares = Mean squares (MS).

$F_{\text{ratio}} = MS_M/MS_R$ which is a measure of how much the model has improved the prediction of the outcome compared to the level of inaccuracy of the model. If the mode is good, then (MS_M will be large) and the difference between the model and the observed data to be small (MS_R will be small). Hence, the best mode should have a large F (More than 1).

$F = (N - k - 1) / k (1 - R^2)$ as N = is the number of cases and k is the number of predictors. For null hypothesis ($R^2 = 0$) where $R^2 = SS_M/SS_T$.

In applying the Social network privacy cases, we can take one or more of the Big Five Traits as independent factors to yield Y which can be any privacy factors. We can take the whole Five Traits in one test vs. one privacy factor.

A3.7.3 Assessing Individual Predictors

Any predictor has a coefficient b_i (slope).

Always b has not to be 0. If it is 0, then the line is flat, and it shows a null hypothesis. So we test the null hypothesis of the t – statistic test.

The t -statistic is based on the ratio of explained variance to unexplained variance or error. The t -test tells us whether the b -value is different from 0 relative to the variation in b -value across samples. $T = (b \text{ Observed} - b \text{ Expected})/SE_b$ as SE_b is the standard error of the mean.

A3.7.4 Is the model biased?

This can be done by:

- a. Outliers
- b. Influential Cases

Outlier is data substantially different than other data trend.

In (a) of the unstandardized residuals are measured in the same units as the outcome variable and so is difficult to interpret across different models. Look for large residuals. We use standardised residuals which are converted to Z-scores. The residuals can tell if the model is a poor representation of the actual data. If the residuals are more than 2.5, the level of error is unacceptable. If more than 2, then also the model is poor.

For (b), Influential Cases: it is when a case is removed from the analysis. The computer calculates the model without this case. This leads to a deleted residual that gives: Studentized Deleted Residual. The overall influence of a case as the model is called Cook's distance. Any value >1 is a cause for concern.

A3.7.5 Cross-Validation of a Model

This means we assess how well our model can predict the outcome in a different sample. This should lead to a generalisation of the model.

Cross validation of a regression model is: (Andy Field, 2000)

1. Adjusted R^2 (computed by SPSS) while R^2 tells us how much of the variance in Y is accounted for by the regression model from the sample.
2. Data Splitting: This approach involves splitting sample data, computing a regression equation on both halves of the data and then comparing the resulting models. Use stepwise method and cross-validation and run a regression on 80% of cases. Then

force the model on the remaining 20% of the data by comparing R^2 and b-value of the two sample, you can tell how well the original generalisation is significant.

A3.7.6 Sample Size in Regression

It is better to have bigger sample sizes. This should lead to $R = 0$. However, for a sample of 21 cases at 6 predictors we get $R = k/(N-1) = 6/(21 - 1) = 0.3$ (medium effect). But if the sample 100 then $R = 6/(100 - 1) = 0.06$ (better). The sample over 55, therefore, is sufficient.

A3.7.7 Using SPSS for Basic Regression

The Main Steps:

1. Analyse Regression then chooses Linear
2. Choose Dependent then choose Privacy Case
3. In Independent place predictors (Big Five traits)
4. Choose one and add it to predict or side.
5. We get regression and a confidence interval
6. Check on Bootstrap
7. Select Bootstrapping and get 95% confidence interval by clicking on Bia or Bca Corrected accelerated.
8. Click OK. To get basic analysis, go to interpreting a simple regression.

A3.7.8 Interpretation of Simple Regression

We get two tables: a Model Summary table that gives R and R² for the model. If R = 0.578 this gives the value of the Correlation between the predictor and the privacy factor. If R² = 0.335, it shows a Big Five factor can account for 33.5% of the variation in the privacy factor. Hence 66% of privacy factor cannot be due to the BIG FIVE Factor. Hence there must be another predictor to influence this. The second table is an ANOVA where we need to find F-ratio as F = 99.59 significant at p < 0.001. This means that there is less than 0.1% chance that the F value would happen if the null hypothesis were true.

A3.7.9 Multiple Regression

This means we can use the Big Five traits as five predictors versus each dependent privacy factor of Facebook. Entering predictors can be stepwise (in one go) or hierarchically can be “Forced Entry”. We can use the Stepwise method when we need to check the best order of involve predictors. However, it is not always preferred unless you have a good reason. Use backwards method rather than a forward method to minimise suppressor effects which occur when a predictor has a significant effect when another variable is held constant. The forward method runs a higher risk of making a type II error.

A3.7.10 Comparing Models

Check if R² in the new model is better (more) than the value in your previously (old) model. Normally, it will get bigger when we add predictors. The matter if this increase in R² is significantly bigger. This is called (R²new). There is also change in a number of predictors as (k_{change}) as well as in the new model (k_{new}).

The F_{change} equation is:

$$F_{\text{change}} = \frac{[(N - k_{\text{change}} - 1)R^2_{\text{change}}]}{[k_{\text{change}}(1 - R^2_{\text{change}})]}$$

So, we can compare models using the F-Ratio. However, we can use (AIC) Akaike Information Criterion is a measure of fit which penalises the model for having more variables. If AIC is bigger, the fit is worse and vice versa. So many uses AIC rather than R² in selecting models. Just compare AIC with other models. If it gets smaller than the fit is improving.

A3.7.11 Multicollinearity

The main concern in adding more than one predictor is Multicollinearity due to the strong correlation between two or more predictors. Perfect Collinearity exists if one predictor is a perfect linear correlation with the other predictors with a correlation coefficient of 1. However, perfect Collinearity is rare in real-life data. Low level of Collinearity poses little threat to the model estimates. When Collinearity increases, there are three problems that arise:

1. Untrustworthiness b_s : Big standard error for b coefficients means that these b_s are more variable across samples which means b coefficient in a single is less likely to represent the population.
2. The size of R : R is a measure of the correlation between the predicted values of the outcome and the observed values, and R^2 indicates the variance in the outcome for which the model accounts. Therefore, having uncorrelated predictors is beneficial.
3. The importance of Predictors: Multicollinearity between predictors makes it difficult to assess the individual importance of predictors. This makes it difficult to know which of the two variables are important.

To check the Multicollinearity is to scan the correlation matrix and see if any correlates very highly (more than 0.9). SPSS produces Collinearity diagnostics such as (VIF) variance inflation factor. VIF indicates if the predictor has a strong linear relationship with other predictors. Tolerance statistics are related to VIF which is $1/VIF$.

1. If $VIF > 1$, then regression may be biased.
2. If $VIF > 10$, then there is a cause for concern.
3. Tolerance below 0.1 is a serious problem.
4. Tolerance below 0.2 is a potential problem.

Other measures to show if the predictors are dependent:

1. Eigenvalues of the scaled
2. Cross-Products matrix
3. The condition indexes

4. The varying proportions

A3.7.12 Regression Testing Examples

Tough-Mindedness Vs has (anybody accessed your account?)

Here in this example there is more correlation for the Tough-Mindedness = 0.326 and the effect is equal to 10.6 times.

Extraversion VS hometown accessibility

There is a regression (R) of .331 between Extraversion and the Hometown Accessibility. It means an 11% effect (R^2) by the hometown accessibility.

- a. Dependent Variable: Have you ever made new friends on Facebook and met in person?
- b. Predictors: Extraversion

A3.8 Clustering (D. Sculley, 2000)

Cluster analysis or **clustering** is the task of grouping a set of objects in such a way that objects in the same group (called a **cluster**) are more similar to each other than to those in other groups (clusters). Clustering can be formulated as a multi-objective optimisation problem. The appropriate clustering algorithm and parameter settings depend on the individual data set and intended use of the results.

A3.8.1 k-means Clustering Method

It is a method of vector quantization originally from signal processing, that is popular for cluster analysis in data mining. *K*-means clustering aims to partition *and* observations into *k* clusters in which each observation belongs to the cluster with the nearest mean, serving as a prototype of the cluster.

A3.8.2 Squared Euclidean Distance

The most straightforward and accepted way of computing distances between objects in a multi-dimensional space is to compute Euclidean distances, an extension of Pythagoras' theorem.

A3.8.3 Cluster Analysis

Geometric distance between objects in the space. In a univariate example, the Euclidean distance between two values is the arithmetic difference, i.e. $\text{value}_1 - \text{value}_2$. In the bivariate case, the minimum distance is the hypotenuse of a triangle formed from the points, as in Pythagoras' theory.

A3.8.4 Qualitative Research Methodology

A3.8.4.1 Difference between Qualitative Research and Quantitative Research

Qualitative research is used to get opinions, reasons, thoughts and specific personal experience about any issue. It is described as an explanatory research to get insight into problems and gain ideas and hypothesis. It is intended to dive into the roots of a problem. There are different methods of qualitative research, such as semi-structured or unstructured methods. In some cases, it uses individual interviews, group discussions or observations. Normally, small sample sizes are used with specific care is taken to choose the participants. The aim of qualitative research is to quantify the problem by generating data that can be analysed by suitable statistics. This means that the generated data will be about opinions, behaviours and motivations. The analysed results can be compared to the larger sample that was gained from the quantitative research. Qualitative Research gets the measurable data to find facts and patterns in the researched process. Normally, quantitative research is more structured than Qualitative research data collection techniques. Quantitative research methods vary in the data collection forms such as online surveys, telephone surveys, paper surveys, online polls and longitudinal surveys.

Qualitative research collects information that is not in numerical data form. Qualitative information is descriptive and therefore is more difficult to analyse than quantitative data. Qualitative research mainly is used at the individual level, and to find out thoroughly how the participant thinks or feels. Consequently, the analysis of qualitative data is hard and needs an accurate understanding of participant response.

A good example of a qualitative research method would be unstructured, which generate qualitative data through the use of open questions. This allows the respondent to talk in some depth, choosing their own words. This helps the researcher develop a real sense of a person’s understanding of a situation. However, it can be time-consuming to conduct the unstructured interview and analyse the qualitative data, according to **McLeod (2008)**.

Research methods **and research data in psychology can be placed into two basic categories; McLeod (2008) is as follows:**

The nature of Qualitative and Quantitative research can be summarised in the following comparison table A3.2 (Surbhi S., 2016)

Comparison Factors	Qualitative Research	Quantitative Research
Nature	Holistic	Particularistic
Approach	Subjective	Objective
Research type	Exploratory	Conclusive
Reasoning	Inductive	Deductive
Sampling	Purposive	Random
Data	Verbal	Measurable
Inquiry	Process-oriented	Result-oriented
Hypothesis	Generated	Tested
Elements of analysis	Words, pictures and objects	Numerical data
Objective	To explore and discover ideas used in the ongoing processes.	To examine cause and effect relationship between variables.
Methods	Non-structured techniques like In-depth interviews, group discussions, etc.	Structured techniques such as surveys, questionnaires and observations.
Result	Develops initial understanding	Recommends final course of action

Table A3.2 The nature of Qualitative and Quantitative research

The important issues in the Qualitative Research analysis are: the types of qualitative analysis, the process of Qualitative data analysis and the principles of Qualitative data analysis as described by presentation of **Tilahun Nigatu (2009)** as follows: The main types of Qualitative Analysis are: Content, Narrative, Disclosure, Framework and Grounded Theory

The main steps of the Process of Qualitative Data Analysis are:

Step 1: Organise the data,

Step 2: Identify framework,

Step 3: Sort data into a framework,

Step 4: Use the framework for descriptive analysis,

Step 5: Second order analysis

The Principles of Qualitative Data Analysis are as follows:

People differ in their experience and understanding of reality.

A social phenomenon cannot be understood outside its context.

Qualitative research can be used to describe a phenomenon or generate theory grounded in data.

Understanding human behaviour emerges slowly and non-linearly.

Exceptional cases may yield insights into a problem or new idea for further inquiry.

A3.9 Qualitative Research and Interviewing

Following the quantitative research data collected by the online social network questionnaire of Facebook users in two main fields. The first section of the questionnaire was on the Facebook activities and demographic information. The second section was about the behaviour and its relationship to the personality factors and the psychological Big Five traits. After the detailed description of the quantitative research in section 1 of the research methodology chapter, section 2 will describe and discuss the research methodology of the interviewing process.

The interviews provide a qualitative method of gathering evidence, data or information. Our goal in conducting interviews for the Facebook activities and behaviour project was to enrich our understanding of the importance of privacy by the users, the level of protection they adopted, comparing the survey answers to the settings they set and the impact and efficiency of the supplied resources.

In this research, it is needed to carry out interviews as part of our research project, the first things to consider are who will be interviewed, what kind of information is targeted to be obtained, and the type of interview that will help to do that.

A3.9.1 The Approach to Research in this Project

Research is centred on defining a problem and investigates changes and interventions that can solve the problem and underpin the main causes of the problem towards a better quality solution. **(David Silverman, 2005)**. The effective feedback of researchers has to be of good quality at different stages of the research process. The aim is to collect evidence and analyse data collected to find the usefulness of the changes made to the system. In some cases, further research questions can be found. The collected data will be transferred into models to test the hypotheses.

A3.9.1.1 Mixed Method Research

While quantitative and qualitative research have been adopted in this research project, the mixed methods research is useful in combining the collection and analysis of both qualitative and quantitative data, in a way that achieves complementary strengths and non-overlapping weaknesses to guarantee that the data collection and the analysis is error free according to **Ranjit Kumar (2014)**. Who concluded that the methodology history of social science research shows three main waves: the dominance of quantitative methods, the emergence of qualitative methods, and the growth of mixed methods.

Mixed methods research is an approach to knowledge (theory and practice) that attempts to consider multiple viewpoints, perspectives, positions, and standpoints (always including

the standpoints of qualitative and quantitative research) according to **R. Burke Johnson et al, (2007)**.

“Mixed methods research is a systematic integration of quantitative and qualitative methods in a single study for purposes of obtaining a fuller picture and deeper understanding of a phenomenon. Mixed methods can be integrated in a way that allows qualitative and quantitative methods to retain their original structures and procedures (pure form mixed methods). Alternatively, these two methods can be adapted, altered, or synthesised to fit the research and cost situations of the study (modified from mixed methods).”, Huey Chen was quoted in **R. Burke Johnson et al, (2007)**.

“Mixed methods research is empirical research that involves the collection and analysis of both quantitative and qualitative data” Punch 2009.

There are three dimensions for mixed methods. The timing dimension, the weighting dimension and the mixing dimension are described in **(Punch, 2009)**.

A3.9.1.2 Use of Interviews

Interviews allow you to gather a wide range of open-ended, qualitative data. They can provide information about people’s motivations, feelings, desires and needs, attitudes, and what they remember. To do this, it has to deal with the private, intuitive, and symbolic world of the individual which is not readily accessible to consciousness **(Joanna Chrzanowska 2002)**.

“Interviewing is a powerful way to gain insight into educational issues through understanding the experience of the individuals whose lives constitute education. Interviewing as a method of inquiry is most consistent with people’s ability to make meaning through language” as quoted from **I. E. Seidman (1991)**.

Interviews are usually a vital part of any project to investigate the usage and impact of digitised resources according to **Joanna Chrzanowska (2002)**. They provide rich qualitative data about specific projects, about key stakeholders, and end users. Interviews can be conducted face-to-face, by telephone or Skype, or even by email. Interviews can be conducted one-to-one, or in small groups. While each of these modes of interviewing has advantages and disadvantages, the strategy, in general, should be to make your interviewee

feel as relaxed as possible, <http://microsites.oii.ox.ac.uk/tidsr/kb/32/why-should-i-conduct-interviews>.

In the process to carry out interviews as part of a research project, the first things to consider are whom we will interview, what kind of information we want to obtain, and the type of interview that will help this research to do that. The different types of interviews are as follows:

- Unstructured interview. The interviewer uses at most, an 'aide memoir' - notes to jog the memory - rather than a list of questions. The interview may be like a conversation, with the interviewer responding to the participants and letting them speak freely. However, unstructured interviews do not reflect any preconceived theories or ideas and are performed with little or no organisation. Such an interview may simply start with an opening question such as 'Can you tell me about your experience of visiting the dentist?' and will then progress based, primarily, upon the initial response. Unstructured interviews are usually very time-consuming (often lasting several hours) and can be difficult to manage, and to participate in, as the lack of predetermined interview questions provides little guidance on what to talk about (which many participants find confusing and unhelpful). Their use is, therefore, generally only considered where significant 'depth' is required (**British Dental Journal 204, 291 - 295 2008**).
- Semi-structured interview. The interviewer has a list of questions or key points to be covered and methodically works through them. Similar questions are asked of each interviewee, although supplementary questions can be asked as appropriate. The interviewee can respond how they like and does not have to 'tick a box' with their answer. The flexibility of this approach, particularly compared to structured interviews, also allows for the discovery or elaboration of information that is important to participants, but may not have previously been thought of as pertinent by the research team (**British Dental Journal 204, 291-295, 2008**).
- Structured interview. The interviewer asks the interviewee a series of specific questions, to which a fixed range of answers is possible ('ticking a box'). This is the typical form of interview used in social survey research and can provide quantitative data, as in a questionnaire, (**The Open University, 2015**).

In this Facebook Activity and privacy project, the structured method is adopted. Structured interviews are, essentially, verbally administered questionnaires, in which a list of predetermined questions is asked, with little or no variation and with no scope for follow-up questions with responses that warrant further elaboration. Consequently, they are relatively quick and easy to administer and may be of particular use if clarification of certain questions is required or if there are likely to be literacy or numeracy problems with the respondents. However, by their very nature, they only allow for limited participant responses.

A3.9.1.3 Sampling Framework

“Sampling is a process of selecting a few elements from a sampling population. Sampling is a trade-off between accuracy and resources. Through sampling, you estimate the information of interest. You do not find the true population mean” as quoted from **(Ranjit Kumar, 2014)**. In the same reference Kumar went on describing qualitative research sampling as three principles guide it, one of which is that the greater the sample size, the more accurate the estimate of the true population mean, given that everything else remains the same. Sampling size does not occupy a significant place in qualitative research, and it is determined by the data saturation point while collecting data.

Different qualitative sampling strategies may be used at different stages of the research, or for different research purposes. Questions which the researcher should ask themselves at the outset, and which will inform the design of the sampling strategy, are similar for both quantitative and qualitative research as detailed by **(Som R.K, 1996)**. These questions and answers are vital for this research project, and each question requires an answer in this social network project which are:

- What are the research objectives?
- What is the target population?
- Who should be excluded from the sample?
- Who should be included in the sample?
- What is the budget?
- What is the reporting period?

- How many qualified researchers are available to work on the project?
- What sampling technique(s) should be employed?
- How are the data to be analysed?
- What data collection methods, should be employed?
- What are the sample criteria?
- How long will the interview be?
- What size should the sample be?
- What should be used as the sampling frame?
- How should potential respondents/participants be recruited?

From this list, there are significant questions that their answers have a major impact on the Facebook users' behaviour in this study which are:

- What are the research objectives?
- What is the target population?
- Who should be excluded from the sample?
- Who should be included in the sample?
- How are the data to be analysed?
- What data collection methods, should be employed?
- What are the sample criteria?

The sampling frame is a major ingredient of the overall sample design. At a minimum, it provides a means of identifying and locating the population elements, and it usually contains a good deal of additional information that can be used for stratification and clustering. The organisation of the frame also often exerts a strong influence on the sample design. Areal clustering is, for instance, greatly assisted by having a frame arranged in suitable geographic units, and stratification is helped by having a frame separated into groups formed by the relevant stratification factors. Frequently listed frames are stored in computer files, with the considerable benefit that they can be readily rearranged to meet sampling requirements **(Graham Kalton, 1983)**.

A3.9.1.4 Advantages and Disadvantages of Snowball sampling

a. The Advantages of Snowball Sampling are:

i. Locate hidden populations: It is possible for the surveyors include people in the survey that they would not have known.

ii. Locating people of a specific population: There are no lists or other obvious sources for locating members of the population.

iii. Low Cost: As the subject is used to locate the hidden population, the researcher does not have to invest money and time in the sampling process. The snowball sampling method does not require a complex planning and the staff used is considerably smaller in comparison to other methods.

b. The Disadvantages of Snowball Sampling are:

i. Community Bias: The first participants will have a strong impact on the sample. Snowball sampling is inexact and can produce varied and inaccurate results. The method is heavily reliant on the skill of the individual conducting the actual sampling, and that individual's ability to network and find an appropriate sample vertically. To be successful requires previous contacts within the target areas, and the ability to keep the information flow going throughout the target group.

ii. Not Random: Snowball sampling contradicts many of the assumptions supporting conventional notions of random selection and representativeness (**Atkinson, Rowland and Flint, John 2004**). However, Social systems are beyond the researcher's ability to recruit randomly. Snowball sampling is inevitable in social systems.

iii. Vague Overall Sampling Size: There is no way to know the total size of the overall population according to (David L. Morgan 2008).

iv. Wrong Anchoring: Another disadvantage of snowball sampling is the lack of definite knowledge as to whether or not the sample is an accurate reading of the target population. By targeting only a few select people, it is not always indicative of the actual trends within the resulting group. Identifying the appropriate person to conduct the sampling, as well as locating the correct targets is a time-consuming process which renders the benefits only slightly outweighing the costs.

v. Lack of control over the Sampling Method: As the subjects locate the hidden population, the research has very little control over the sampling method, which becomes mainly dependent on the original subject. This is because it is a chain sampling in which the original and subsequent subjects add the sampling pool using a method outside of the researcher's control.

vi. Compensations for the Disadvantages

The best defence against weaknesses is, to begin with, a set of initial informants that are as diverse as possible, **(David L. Morgan, 2008)**. The concentrated efforts of the specialists to improve the main disadvantage of the Snowball Sampling resulted in the Respondent Driven Sampling (RDS). based on the referrals of the respondents by means of the combination between the referral method and a mathematic method which weights the sample in order to compensate its selection by a nonrandom method, and where appropriate use of stimulants may lead to cutback of errors occurring in sampling by the referral method **(Voicu, Mirela-Cristina 2011)**. In this research, the best strategy against the possible weakness that is adopted is to choose respondents randomly without any referral methods.

A3.10 Preparation for the Conducted Interview in this Research

The Conducted Preparation before the Interview

As an interview is an interaction between two human beings, the only guarantee is that every single interview will be different. However, it is essential to treat each one as an individual event, and to prepare accordingly – so for both parties the prep starts well before 5 minutes before the interview and even in advance of the night before,

For the interviewer, the following arrangements were carried out:

Prepared a welcome

Booked a room

Allocated the time: allow specific reasonable time for each interview.

Prepared a clear participant information sheet for the interviewee to read in advance

Supplied the interviewee with a consent form.

Knew your goals: was clear in your objectives for the interview.

Prepared to sell the opportunity by showing the benefits of interviewing

Made it specific to the candidate's requirements.

Allocated time for their questions.

Gave the candidate an opportunity to ask questions.

They were given time to ask Questions too.

The researcher has adopted fully specific techniques as will be seen in the next paragraph. The following skills are recommended by **I. E. Seidman, (1991)** *Interviewing as Qualitative Research*, Teacher's College Press:

- I. Listen more, talk less
- II. Follow up on what the participant says
- III. Ask questions when you do not understand
- IV. Ask to hear more about a subject
- V. Explore, do not probe
- VI. Listen more, talk less and ask real questions
- VII. Avoid leading questions
- VIII. Ask open-ended questions
- IX. Follow up, do not interrupt
- X. Ask participants to talk to you as if you were someone else
- XI. Ask participants to tell a story
- XII. Keep participants focussed
- XIII. Do not flow the interview too personally
- XIV. Share experience on occasion
- XV. Ask participants to reconstruct not to remember
- XVI. Avoid reinforcing responses
- XVII. Explore laughter
- XVIII. Follow your hunches
- XIX. Use an interview guide cautiously

A3.11 The Interview and the Interview Questions

The interview is a two-part stage. First, the participant is asked some questions that will provide an insight into the user experience and knowledge of privacy/security. Then the participant will be asked to log in to the Facebook profile settings page so that we can document what privacy options the user has set.

Interview Questions in This research:

- i. How would it make you feel if somebody other than your Facebook friends was looking at your Facebook photos and posts?

- ii. Has your Facebook account ever been used by somebody other than you without your permission (e.g., posts from a third party appearing on your Newsfeed, our friends posting on your profile as a joke?). If not, do you know people whom this has happened to?
- iii. Have you spent time investigating the settings on your Facebook profile to ensure that your profile is visible only to those that you wish it to be visible? If so, what was the main reason that you wanted to secure your profile? (E.g., not wishing to share personal activities with ex-friends, colleagues, boss, and employees).
- iv. Do you know what you would need to do if your Facebook account was compromised to make it secure?
- v. Are you confident that Facebook takes the security of your personal information sufficiently seriously? Have you ever an experience where your settings appear to have changed without your consent (e.g., due to a Facebook update or change in policy)?
- vi. Have you ever downloaded software or filled out a form presented on Facebook as a link (e.g., a contest, survey or psychological test)?

If No, have you ever seen those types of links shared by friends and what prevented you from clicking them?

If Yes, did you experience any negative outcome (e.g., the results being posted without your consent, unsolicited emails, link not what you thought it was, sales pitch masqueraded as a contest, etc.).

- vii. How confident are you that you understand the implications of the security settings on Facebook? (E.g., do you understand the information presented, and what each setting will produce as an outcome?).
- viii. Have you ever changed your Facebook password, and if so, how frequently and for what reason?
- ix. If you had access to software that could improve your understanding of the Facebook security settings, would you use it and why? If not, then why?
- x. How confident are you that you know and understand your current security settings on Facebook, and that your personal information is only visible to those people that you wish it to be visible?

A3.12 Interviewing Ethical Issues

A3.12.1 Ethical Conduct

Major Principles of Ethical Conduct are as follows [http://www.uk.sagepub.com/upm-data/27011_4.pdf]

- xi. Do No Harm
- xii. Privacy and Anonymity
- xiii. Confidentiality
- xiv. Informed Consent
- xv. Rapport and Friendship

Once participants agree to be part of a study, the researcher develops rapport to get them to disclose information. **Duncombe and Jessop (2005)** bring out issues related to what they call faking friendship.

- xvi. Intrusiveness

Individuals participating in a research study have a reasonable expectation that the conduct of the researcher will not be excessively intrusive. Intrusiveness can mean intruding on their time, intruding on their space, and intruding on their personal lives.

- xvii. Inappropriate Behaviour

- xviii. Data Interpretation

A researcher is expected to analyse data in a manner that avoids misstatements, misinterpretations, or fraudulent analysis. The other principles involve your interaction with individuals in your study.

- xix. Data Ownership and Rewards

In general, the researcher owns the work generated. Some researchers choose to archive data and make them available through data banks. Questions have been raised as to who owns such data. Several ethnographers have shared a portion of their royalties with participants. **Parry and Bauthner (2005)** discuss this issue in their article on the practical, legal, and ethical questions surrounding archived data.

A3.12.2 Planning Ethics and Data Collection

There are several ethical issues which must always be considered when planning any type of data collection. Data collection always costs someone something. It may cost health workers' time and energy to complete surveillance forms. It certainly costs the health coordinating organisation money and time to collect, analyse, interpret, and disseminate surveillance data and results. Therefore, before beginning the planning process, be sure that the results of the data collection will:

- To truly be needed,
- Be disseminated widely,
- Be used to implement or revise a program, and
- Use the least intrusive and costly data collection method possible

Nonetheless, keep in mind that data collection in emergency situations is necessary to guide program decisions. Collection of data necessary for this purpose should not be delayed if the data collection poses only minimal risk to individuals or groups according to (Bradley "Woody" Woodruff et al. 2009)

Barbara Diccico-Bloom et al. (2006) considered four ethical issues related to the interview process:

- I. Reducing the risk of unanticipated harm;
- II. Protecting the interviewee's information;
- III. Effectively informing interviewees about the nature of the study, and reducing the risk of exploitation.

The interviewer's task is to obtain information while listening and encouraging another person to speak. One of the dangers of interviewing from the perspective of the interviewee is the act of listening to itself according to **Warren C. (2002)**.

The researchers in **Diccico Bloom-Berg (2004)** found interesting ethical matter. When the interviewer listens, and reflects personal information back to the interviewee, the process may develop in unforeseen ways. This can result in unintended harm to the respondent. For example, during research involving in-depth interviews with nurses from India who had been

working in the USA for 10–25 years, all the participants were carefully informed about the nature of the study and signed explicit consent forms. Despite this, several unexpectedly expressed grief and intense feelings when talking about their lives. In a few cases, the nurses shared that they had never discussed their grief previously. It became evident that many participants had not fully processed their separation from their homeland and families of origin.

The second issue which was concluded by **Dicicco Bloom-Berg (2004)**, is that the anonymity of the interviewee in relation to the information shared must be maintained. During interviews, the interviewee may share information that could jeopardise his or her position in a system. This information must remain anonymous and protected from those whose interest conflicts with those of the interviewee. For example, in a study of primary care practices, interviewees often have positions at the lower end of the occupational hierarchy. Interviews may result in opportunities for individuals to vent their frustrations and share their experiences. Although the work environment might improve if concerns were made known, interviewee anonymity is to be protected first and foremost unless the failure to share the information creates a dangerous situation.

The third ethical issue presented by **Boston, Jones & Bartlett, Germain, C. (2001)** concerns, ensuring adequate communication of the intent of the investigation. This is complicated by the fact that the investigator may not initially know what data he or she will uncover and therefore the purposes that may emerge from the process. It is therefore recommended that interviewees verbal consent to participate in on-going interviews several times during the research process.

Participants have the right to disengage from a research study at any time by **Creswell, J. (1998)**. By asking for consent to participate several times during a study, this actuality is reinforced and provides the opportunity for interviewees to reconsider their participation.

The fourth ethical issue by **Anderson, J. (1991)** considered interviewees who should not be exploited for personal gain. It is important to build into the research plan a method of

acknowledging the contributions that respondents make to the success of the research process and to reimburse them in various ways for their efforts.

Klockars, C. (1977) suggests that the measure of the ethical quality of any interview study is whether or not the researcher suffers with the participants. **Reiman, J. (1979)** further suggests that the outcome of interview research should enhance the freedom of the participants more than it enhances the author's career. We conclude this section with a thought about the personal and intimate nature of interview data and the potential for unanticipated experiences that can and perhaps should evoke ongoing concern. It is the view of the authors that the standard ethical practices that guide qualitative interview research represent a work in process. **Reiman, J. (1979)** encouraged those who engage in qualitative interview research to view these standards as a stepping off point. Interview researchers need to consider the implications of their research and use their experiences as a guide to enhance their ethical standards as well as those that apply to interview research as a whole.

A3.12.3 The Conducted Interview Questions in this Research

The following questions were used in the qualitative interviewing process after been granted the Ethical committee approval:

- i. How worried are you about having your Facebook account compromised and what do you think you would do in such a situation?
- ii. Do you ever wonder who might be looking at your photos, or what you post on your wall and how does it make you feel if a stranger is looking at your post?
- iii. How did you learn about Facebook security features?
- iv. What steps do you take to secure access your Facebook?
- v. Have you ever had your Facebook account compromised, can you explain to me in details what happened and how you dealt with it?
- vi. Upon receiving a friend request, what do you do first before you respond?
- vii. When and why do you agree to respond positively to a friend request?
- viii. Have ever de-friend a friend from your account?
- ix. Do you think that Facebook should supply more details about any user asking to be-friended?
- x. Have you ever sent a request to befriend by someone but rejected?

- xii. Have you ever been de-friended by a friend?
 - xiii. Do you click on any video posted on your wall by friends and why?
 - xiv. Have ever clicked on the commercial adverts on Facebook?
 - xv. Do you arrange for the Facebook to send in a message to your phone if anyone tries to login to your Facebook?
 - xvi. Does the easy accessibility of any personal detail (such as Birth details, phone number, email,... etc.) of a friend on Facebook ring any bell in your mind?
 - xvii. Do you use Facebook as a way of communication with others instead of phone or email, Skype... etc?
 - xviii. Do you use other Social Network such as Twitter?
 - xix. Do you secure your personal photos to avoid copying by hackers?
Do you know that most of Facebook attacks start from hacking the email which is used for the Facebook account?
 - xx. Have you come across an encrypted online connection such Virtual Private Network VPN where all Facebook communication goes through an encrypted data?
 - xxi. Do you control who can see your stuff?
 - xxii. Do you limit who can contact you
 - xxiii. Do you know how to stop someone bothering you?
 - xxiv. Do you control who can send a friend request?
 - xxv. Do you do setting for who can see your email, phone number.... etc.?
26. Do you allow search engines outside of Facebook to look for your profile?

Appendix Chapter 4: A4

A4.1 Global Factors Test Results

A4.1.1 The 16 Personality Factors Test Results Chart

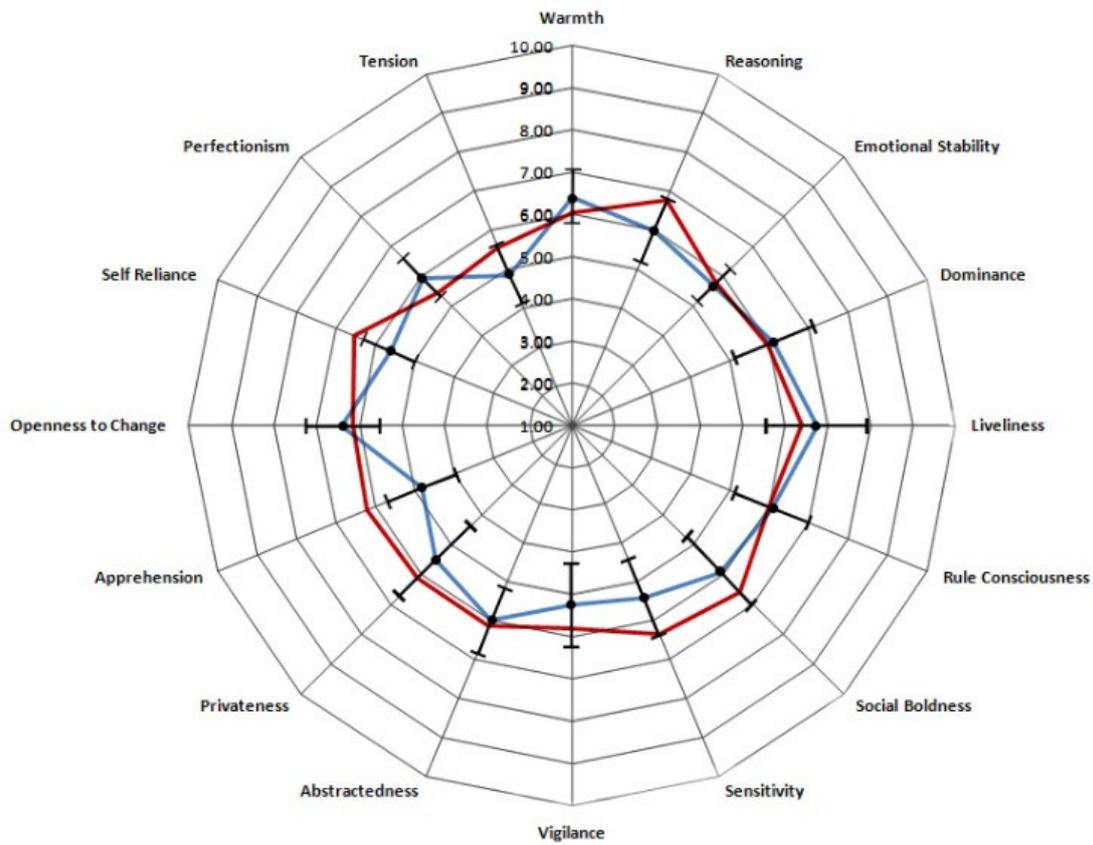


Figure A4.1 the Chart of Cattell's 16 PF in Red and the researcher's 16 PF Survey Results in Blue

This chart in figure A4.1 shows the researcher's results in blue colour which are compared to the average of values achieved by other research centre (Open psychology data: Raw data from online personality tests) who did test the same 16 Personality Factors. This is a way to validate our results and ensure that the results in this research are very near to other researchers' surveys.

A4.1.2 The Big Five Traits Global Radar

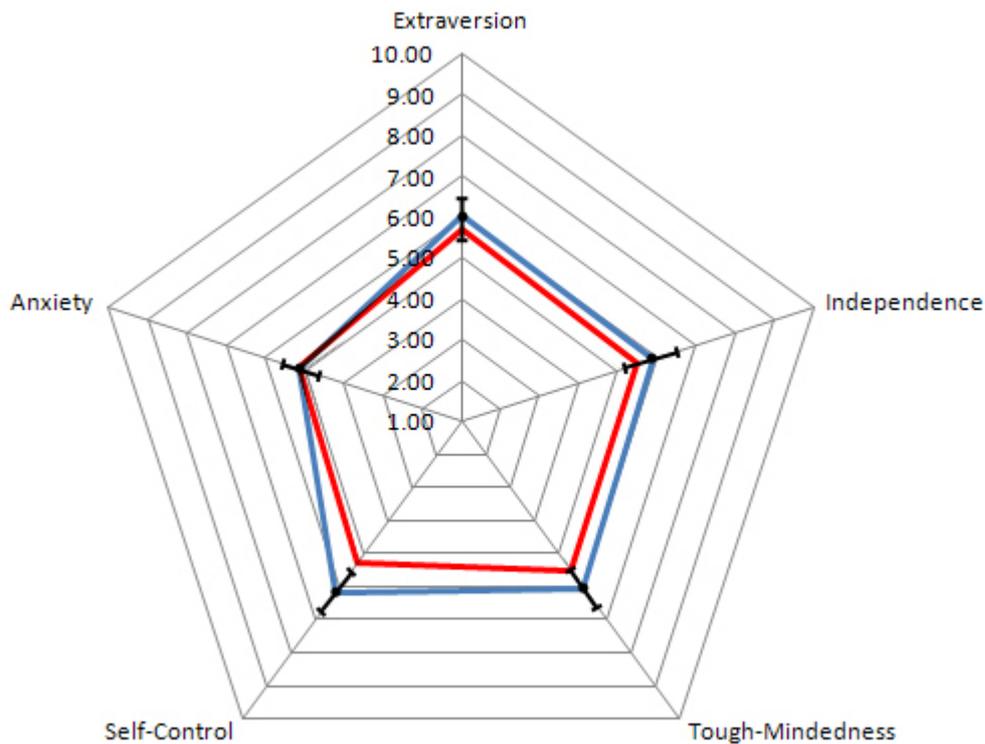


Figure A4.2 The RADAR Graph of the Big Five Traits Created from the Tested Cattell's 16 PF in Blue by the Researcher's Survey

In this radar graph figure A4.2, the Big Five traits are created from the 16 Personality Factors. The blue colour shows this project's survey results. The red colour represents other researcher's results who were investigating the 16 PF model. It seems clear the two results are within the randomisation allowance. This is a practical validation of the 16 PF survey. The link of the other research centre website is: [Open psychology data: Raw data from online personality tests.](#)

A4.1.3 Global Factors (Big Five Traits) Descriptive Statistics

This section includes the randomisation distribution of each Big Five trait of the participants. The five bar charts show a similar meaning in general, except for the Anxiety which is 5.18 but the charts have different standard deviations between the Big Five traits. The more the standard deviation, the more the Big Five trait value number of participants are differing. In the Extraversion trait, the Standard deviation is 0.427 compared to other traits. This shows that more participants share same extraversion value. In the Anxiety trait distribution, the

standard deviation is the least of all traits distributions. This means many participants share the same anxiety.

A4.1.4 The Facebook Questions Descriptive Statistics

In this section, the histograms show the number of participants scoring in each Facebook question where the respondent would choose one option only. All Facebook activity questions are included. This shows the trend of user responses in each option of the questions for all Facebook activity questions.

A4.1.5 Personality Big Five Traits and the Online Privacy Practices

Testing the effect of each of the Big Five traits as independent predictors for each of the 62 columns that represents the Facebook handling behaviour and demographics, cannot be conducted in the same way. The reason for this is that each column of respondents belongs to a specific question in the questionnaire. There are three types of Facebook activity questions in the questionnaire:

1. Survey questions seeking quantity response from the participant such as how many friends do you have, how many photos have you uploaded,.... etc.
2. Survey questions seeking categorical answers such as Yes or No
3. Survey questions that have multiple choices such as Do you give access to your email to: Public, Friends, Friends except Acquaintances, Only Me, Custom, or Not Supplied.

Due to the different types of questions, the SPSS Testing has to be carried out in three different stages as follows:

A4.2 SPSS Testing Results

A4.2.1 Stage 1: SPSS Testing of Survey Questions that Require Quantitative Responses by Linear Regression

This type of testing is accurate on the Linear Regression of SPSS. This depends on finding the independent trait out of the Big Five traits which has the major influence of the quantitative dependent variable. This works by testing each trait in the Big Five scheme (Extraversion,

Independence, Tough-Mindedness, Self-Control and Anxiety) as the only predictor in Model 1. However, the Model 2 includes all of the Big Five traits. The dominating trait is chosen as the main predictor influencing the dependent variable if and only if the test significance is 95% at least (the non-significance is 0.05 or less). The questionnaire responses in numbers were: number of friends on Facebook, the number of photos, number of uploaded apps, number of visits to Facebook, in what year you were born and how secure do you feel in Facebook. The following are the test results for each quantitative question:

The procedure of performing the test for the quantitative questions in each case is as follows:

1. Choose Analyse-Regression-Linear
2. Enter the dependent variable in the dependent variable space
3. Enter the independent variable in the allocated space as Model 1
4. Press "Next" and enter the Big Five traits as Model 2
5. For each model select "Statistics" you need such as Estimates, Confidence Interval, Model Fit, R Squared Change, Descriptive, Partial Correlations, Collinearity, Durbin-Watson factor and Casewise Diagnostics and then press "Continue".
6. For each model select "Plots" and enter ZPRED on x-axis space and ZRESID on y-axis space then choose Histogram and Normal Probability Plot. Then press "Continue".
7. For each model, press "Save" and choose (optionally) the required results such as Predicted Values, Distances, Residuals, Influence Statistics, and Prediction Intervals and press "Continue".
8. Press "OK" to start testing for the Linear Regression results.

A4.2.1.1 A sample test result of the Stage 1 Quantitative Tests is as follows:

SPSS Testing (1) for the following Dependent Variable: How secure do you feel your profile information on Facebook, Versus the Independent Big Five traits.

VIF = 1 (within Limits) and Durbin-Watson = 0.764 (Less than 1), All Big Five traits (inserted in model 2)

R = 0.409

Regression of Anxiety = 0.139, with non-significance = 0.057, B = - 0.377

Regression of Extraversion = 0.239 with non-significance = 0.001, B (the regression Index) =

- 0.614

Regression of Independence = 0.069, with non-significance = 0.349,

B = -0.177

Regression of Tough-Mindedness = 0.008, with non-significance = 0.910, B = - 0.015

Regression of Self-Control = 0.003, with non-significance = 0.427, B = 0.105

The only two significant predictors are Extraversion and Anxiety as their non-significance is 0.000 or 0.057 respectively.

However, from the above, Extraversion is more dominant in its effect. As the regression index B of Extraversion is negative, there is an inversely proportional correlation between the Extraversion predictor and how secure the user feels about his information on Facebook. This means the more introvert the person is, the more secure the person feels and the more extrovert the person feels, the less secure he feels. The anxiety has less impact when compared with the Extraversion. The B value of Anxiety is also negative. This means that the more the Anxiety, the less secure the user feels about his information on Facebook. Other predictors (Independence, Tough-Mindedness and Self-Control) are having very minor effects and their significance is not valid.

A4.2.2 Stage 2: SPSS Testing of Survey Questions that Seek Categorical Response of Yes or No from the participants and will be analysed by Logistic Regression by means of the Binary Logistics

The General Procedure of Categorical Binary Logistic Regression

Run initial hierarchical analysis for each categorical case to find the dominant independent variable which should be one of the Big Five traits (Independence, Extraversion, Tough-Mindedness, Self-Control and Anxiety). It is needed to find which of the Big Five traits that best fit the data. Finally, it is important to choose the most parsimonious.

Open SPSS and choose SPSS Analyse, Regression and Binary Logistics.

Feed the models one by one taking the dominant Big Five trait first, go next and feed the first trait and the second trait, then next feed the first, the second and the third, next feed the first, the second, the third and the fourth, next feed the first, the second, the third, the fourth and the fifth trait. The fed models are numbered: Model 1, Model 2, Model 3, Model 4 and Model 5. For each model entered, the Method: Enter is chosen.

Click on Categorical button. The covariates of predictors are listed in the left hand side. Choose the dominant model and place it in the right hand side list. Use indicator coding, which is a standard dummy coding and choose either “Last” or “First” category as a baseline then click on “Change”.

Make sure that the model is saved. Then a new window for the diagnostic parameters can be noticed. Choose the following diagnostic residuals: Predicted Values that include: Probabilities and Group membership, In Residuals choose Standardized. To test the influence, choose Cook’s, Leverage Values and DfBetas. The Covariance Matrix has to be included. Press “Continue”.

Go to Logistic Regression Options and choose: Statistics and Plots that include: “Classification Plots”, “Hosmer Lemeshow Goodness-of-Fit”, “Casewise listing of residuals”, “Outliers outside” for 2 standard deviation, “Iteration History”, “CI for Exp (B) for 95%”. “Display at each step” and “include constant in model”. Press “Continue”.

Run the Logistic Regression.

Interpreting Categorical Logistic Regression Outputs

The Series of Outputs will include the following tables:

1. Case Processing Summary output to show selected cases and unselected cases, numbers and percentages.
2. Dependent Variable Encoding Output.
3. Iteration History Output in **Block 0** that includes the “-2 Log Likelihood” and “Coefficient Constants”. The “- 2 Log Likelihood” is a very important value in calculating R and R².
4. Model Summary Output that includes: - 2 Log Likelihood (new), Cox & Snell R Square and Nagelkerke R Square.
5. Classification Table that spells out the Predicted versus Observed of the categorical results with the overall percentage.
6. Variables in the Equation Output that includes B value, S.E value, Wald value, df, the significance, EXP(B), and 95% C. I. for EXP(B). The value of “Wald” and df are also very important values in calculating R.
7. Bootstrap for variables in the equation output.

8. Omnibus Tests of Model Coefficients Output which includes (- 2 LL (baseline) – (-2 LL (New)) to get the Ch-Square, df and the significance.

A4.2.2.1 Experiment 1 For Measuring R and R² of Logistic Regression

Suppose that it is needed to use SPSS to test the logistic regression to find R and R² for the following dependent variable: Have you ever made friends on Facebook and met them in person? The independent variables are the Five Big traits. First, it is required to test each trait individually to find the contribution to the regression. The total initial – 2 Logical Likelihood is found to be 251.045. The following values are found after testing each trait individually:

1. Extraversion -2 LL test = 182.354
2. Anxiety/Neuroticism -2 LL test = 188.446
3. Tough-Mindedness/Openness -2 LL test = 200.265
4. Self-Control/Consciousness -2 LL test = 222.812
5. Independence/Agreeableness -2 LL test = 185.584

In this case, Self-Control/Consciousness is the highest independent trait, Tough-Mindedness is the second, Anxiety is the third, Independence is the fourth in the hierarchy, and Extraversion is the fifth in the hierarchy.

To build the Categorical Logistic Regression Model between the independent predictors (The Big Five traits) and the Facebook activity question: Have you made friends on Facebook and met them in person?, the following Models have to be fed to SPSS as explained above:

1. Model 1: Self-Control/Consciousness
2. Model 2: Self-Control and Tough-Mindedness
3. Model 3: Self-Control, Tough-Mindedness, Anxiety
4. Model 4: Self-Control, Tough-Mindedness, Anxiety, Independence
5. Self-Control, Tough-Mindedness, Anxiety, Independence Extraversion

When the Categorical Logistic Regression was built and run, the following outputs were collected in Block 0: A sample of *the actual results are shown in Appendix 4.2 Categorical Logistic Regression for experiment 1.*

Experiment 1 Comments and Conclusions:

For Model 1: Self-Control

1. It has a substantial contribution into the regression as the -2 LL value = 222.812 out of -2 LL = 251.045 (baseline).
2. The sig. Value is 0.00.
3. Model 1 has covered 95.2 as overall percentage.
4. The -2 LL new value is 28. 231.

For Model 2: Self-Control and Tough-Mindedness

1. It has Additional contribution in the regression as the -2 LL value = 28.231.
2. The significant value = 0.00.
3. The -2 LL (Baseline) has been completed in this model.
4. Model 2 has reached 100% as overall percentage.
5. Model 2 is the Final choice in considering the categorical logistic regression between the independents (Self-Control and Tough-Mindedness) and the dependent (Have you made friends on Facebook and met them in person?)
6. Model 2 will be adopted in calculating R and R²L.
7. Model 2 estimations of R² by Cox and Snell R² = 0.739 and by Nagelkerke R² = 1.

For Model 3, Model 4 and Model 5: None will be adopted as there is no contribution to the -2 LL = 251.045 (baseline) and the 100% as overall percentage has been achieved by Model 2. The Following important achieved values of the general test results that are shown in the Variables in the Equation output 5 in Block 0 are as follows:

1. The value of Z² – Wald Value = 8.013

2. The viability factor of Exp (B) = Exp (. 423) = 1.527 showing the validity of the regression as the value is > 1.
3. -2LL (new) = 0.28.231.

Calculations of R and R²_L from the model 2 Parameters:

$$R = \sqrt{\frac{Wald-2xdf}{-2LL(Baseline)}} = \sqrt{\frac{8.013-2x1}{251.045}} = 0.155.$$

$$R^2_L = \frac{-2LL(baseline) - (-2LL(new))}{-2LL(baseline)} = \frac{251.045 - 28.231}{251.045} = 0.89.$$

This shows high regression between the dominating independent trait (Self-Control) and Facebook users' interest in making a new friend on Facebook and meeting him/her in person. The trend of R²_L is between 0.65 and 0.89. The average of the effect is 77%, which represents the substantial effect of Self-Control followed by the Tough-Mindedness in a directly proportional way.

A4.2.3 Stage 3: Testing of the Multinomial Logistic Regression of Survey Questions that Have More than Two Choices

A4.2.3.1 Introduction

The Multinomial Logistic Regression, is a tool in SPSS to test questionnaire questions that have more than choices. The process starts with choosing this tool by going to Analyse and choose Regression which leads to the Multinomial Logistic Regression. Then a window opens on SPSS where there are two locations. One location is called Dependent which is the space where the question under test is located. The other main location is called Factors where the predictors of the Big Five traits are located as one model and the interactive effects are added as additional models. In this space the following Big Five predictors and the related interactive predictors are added in every test:

Extraversion, Independence, Tough-Mindedness, Self-Control, Anxiety, Extraversion*Independence, Extraversion*Tough-Mindedness, Extraversion*Self-Control, Extraversion*Anxiety, Tough-Mindedness*Independence, Tough-Mindedness*Self-

Control, Tough-Mindedness* Anxiety, Independence*Self-Control, Independence*Anxiety.

Then the output controllers are chosen and filled one by one. This includes Model, Statistics, Criteria, Options and Save. Then press OK to get the output results. In each test the following main outputs are produced:

1. Case Processing Summary
2. Step Summary
3. Model Fitting information
4. Goodness-of-fit
5. Pseudo R Square
6. Likelihood Ratio Test
7. Parameter Estimates

The important information that can be found in these outputs are:

1. The -2 Likelihood Value of the main Model (Model 0), the Chi-Square of each of the effect models (model 2, model 3, model 4,... etc.) and the significance of each model. The AIC and BIC values have shown a decrease of their values in each model.
2. The final model -2 Log Likelihood, the Ch-Square and the significance.
3. The Goodness-of Fit that shows the Deviance Final model same value compared with the Pearson value.
4. The Pseudo R-Square, which gives the Regression Square value
5. The Likelihood Ration Test shows the significance of each predictor in any model (this output is very important)
6. The Parameter Estimates are the harvest of the test where we can specify the significant predictors of the Big Five traits for each choice in the question. In this table, we need to know if the significant effect is positively or negatively correlated. This can be known from the correlation index (**B value**) in the table. If **B is >1** then the effect is positive and if **B<1**, the effect is negative. However, to define how many times this effect is, we look for **Exp (B)** value. If B is >1, the Log (B) will be a positive number for the positive effect. If B is <1, the Log (B) will be a fraction less than 1 and in this case the effect is negative and is taken as **(1/Exp(B))**. The Multinomial Test Results are 34 different tests as follows:

A4.2.3.2 The Multinomial Logistic Regression Series of (34) SPSS Sample of Tests Results:

Sample of Results: Multinomial Test 1 as follows:

Multinomial Test (1) for How Secure Do You Feel Your Profile Information is on Facebook Versus the Big Five Traits. There are Five Choices in the Questionnaire: Not Secure (1), Slightly Secure (2), Moderately Secure (3), Reasonably Secure (4) and Highly Secure (5)

Interpretation of Results (The reference category is: 5 (Highly secure)).

The dominant trait is: Extraversion

The Parameter Estimates Table has shown the following results:

1. In the Not Secure choice: The following Big Five traits or the interaction of traits is as follows:
 - 1.1 in support of the Not Secure choice:
 - 1.1.1 Independence (significant)
 - 1.1.2 Extraversion (significant)
 - 1.1.3 Anxiety (significant)
 - 1.2 Against the Not Secure choice: The following Big Five traits or the interaction of traits is as follows:
 - 1.2.1 Extraversion*Independence (significant)
2. In the Slightly Secure choice: The following Big Five traits or the interaction of traits is as follows:
 - 2.1 In support of the Slightly Secure choice:
 - 2.1.1 Independence (significant)
 - 2.1.2 Extraversion (significant)
 - 2.1.3 Anxiety (significant)
 - 2.2 Against the Slightly Secure choice: The following Big Five traits or the interaction of traits is as follows:
 - 2.2.1 Extraversion*Independence (significant)
3. In the Moderately Secure choice: The following Big Five traits or the interaction of traits is as follows:
 - 3.1 In support of the Moderately Secure choice:
 - 3.1.1 Independence (significant)

- 3.1.2 Extraversion (significant)
- 3.1.3 Anxiety (significant)
- 3.2 Against the Moderately secure choice
 - 3.2.1 Extraversion*Independence (significant)
- 4. In the Reasonably Secure choice: The following Big Five traits or the interaction of traits is as follows:
 - 4.1 In support of the Reasonably Secure choice:
 - 4.1.1 Independence (significant)
 - 4.1.2 Extraversion (significant)
 - 4.1.3 Anxiety (significant)
 - 4.2 Against the Reasonably Secure choice
 - 4.2.1 Extraversion*Independence (significant).

Appendix Chapter 5: A5

A5.1 Table of the Categorical Questionnaire Questions for the Big Five Traits and the Regression Index B and the Number of Times of the Effect of B

Facebook Categorical Questions (Yes or No)	Dominant Big Five Trait (s)	Regression Index (B)	Exp (B) as Number of Times of Effect of the Trait
When Accessing a Third Party Computer, Do you Remember to Logout?	Tough-Mindedness	B = 428	Exp (428) as Extremely High Number of Times of Effect is in favour of "Always" Directly Proportional
Has anybody Accessed your Account without your consent?	Tough-Mindedness and Independence	B = 1.549	Exp (1.549) = 4.7 Number of Times Directly proportional for saying "No"
Have you ever made friends on Facebook	Self-Control and Tough-Mindedness	B = + .423 Directly Proportional	Exp (0.423) = 1.28 Number of Times, Directly Proportional

and met them in person?			(Low Effect)
Are you aware that Facebook apps can send messages on behalf of your friends?	Tough-Mindedness and Independence	B = - 0.653 Inversely Proportional	EXP (-0.653) = 0.52. Number of Times = 1/0.52 = 1.92 Inversely Proportional (Low Effect)
Do you use the Facebook Apps on your phone?	Tough-Mindedness and Independence	B = - 1.578 Inversely Proportional	Exp (-1.578) = 0.206. Number of Times = 1/0.206 = 4.85 Inversely Proportional (Medium Effect)
Friends and Family I know them in person what influences me to choose my friends	Anxiety and Self-Control	B = +1.578 Directly Proportional	EXP (1.578) = 4.85 Times, Directly proportional (Medium Effect)
Do you use Facebook login on 3 rd party websites?	Tough-Mindedness	B = +0.653 Directly Proportional	Exp (0.653) = 1.76 Times, Directly Proportional (Low Effect)
Have you experienced bullying or harassment due to sharing photos or posts on Facebook?	Anxiety and Tough-Mindedness	B = + 1.334 Directly Proportional	Exp (1.334) = 3.8 Number of Times, Directly Proportional (Medium Effect)
Do you use multiple user accounts on Facebook?	Independence	B = + 2.015 Directly Proportional	Exp (2.015) = 7.5 Number of Times, Directly Proportional (High Effect)
By the way they look in their profile photo,	Tough-Mindedness and Self-Control	B = - 2.067	Exp (-2.067) = 0.127.

what influences my decision in accepting friends		Inversely Proportional	Number of Times = $1/0.127 = 7.87$, Inversely Proportional (High Effect)
By the way they share the same interest what influences my decision to accept friends	Tough-Mindedness and Self-control	B = - 2.122 Inversely Proportional	Exp (- 2.122) = 0.1197. Number of Times = $1/0.1197 = 3.35$ Inversely Proportional (Medium Effect)
Having common friends on Facebook that influences the decision in accepting them.	Independence and Tough-Mindedness	B = - 0.401 Inversely Proportional	EXP (- 0.401) = 0.67. Number of Times = 1.49, Inversely Proportional (Low Effect)

Table A5.1 Categorical Questionnaire Questions and the Related Big Five Trait (s)

Regression Index (B) and its Number of Times of the Effect of B

A5.2 Table of the Quantitative Questionnaire Questions for the Big Five Traits and the Regression Index B and the Number of Times of the Effect of B

Quantitative Questions	Big Five Trait (s)	Regression Index (B)	Exp (B) and Number of Times of the Effect
How many Facebook friends do you have?	Anxiety	B = +277.795 Directly Proportional	Exp (277.795) = 4.4×10^{120} Extremely High Figure of number of times. Directly Proportional

			(Extremely High Effect)
How many uploaded photos do you have?	Tough-Mindedness	B = + 205.505 Directly Proportional	Exp (205.505) = 1.77x10 ⁸⁹ Extremely High Figure of number of times. Directly Proportional
How many uploaded Apps do you currently have?	Tough-Mindedness	B = + 6.173 Directly Proportional	Exp (6.173) = 479.6 Times, Directly Proportional (High effect)
How often do you visit Facebook?	Tough-Mindedness And Self-control	B = - 0.277 Inversely Proportional	Exp (- 0.277) = 0.76. Number of Times = 1/0.76 = 1.31, Inversely Proportional (Low effect)
In What year you were you born?	Tough-Mindedness And Self-control	B = + 4.288 Directly Proportional	EXP (4.288) = 72.82, Directly proportional (High effect)
How Secure do you feel?	Extraversion	B = - 0.614 Inversely Proportional	EXP (- 0.614) = 0.54. Number of times = 1/0.54 = 1.85, Inversely Proportional (Low Effect)

Table A5.2 Quantitative Questions Analysis by testing for the Big Five Traits Regression Index and the Number of times of the Effect of B.

A5.3 Table of the Multinomial Questionnaire Questions for the Big Five Traits and the Regression Index B and the Number of Times of the Effect of B

Multinomial Disclosure Questions	The Big Five Traits are taken for "In-	The Big Five Traits are taken for	Comments on Disclosures
---	---	--	--------------------------------

	Favour” of the “Public” disclosure of each Personal Data for each Facebook Activity	“Against” of the “Public” disclosure of each Facebook Activity	
City Accessibility Level	<p>Extraversion*</p> <p>Independence</p> <p>B = - 2.5</p> <p>EXP (- 2.5) = 0.082</p> <p>Number of Times = 1/0.082 = 12.18</p> <p>Inversely Proportional (Low Effect)</p>	<p>Extraversion</p> <p>And</p> <p>Self-control</p> <p>B = + 32</p> <p>EXP (32) = Very high</p> <p>Number of Times (High Effect)</p>	<p>The dominant traits are: Extraversion and Self- Control but are in favour of “Friends” and “Custom”.</p> <p>In favour of public: The interaction of Extraversion* Independence with medium effect</p> <p><u>Against Public:</u> The Extravert and Self- Controlled persons with high effect</p>
Hometown Accessibility Level	<p>Independence</p> <p>B = + 21.294</p> <p>EXP (21.294) = Billion plus</p> <p>Number of Times</p> <p>Directly Proportional (Very High Effect)</p>	<p>Extraversion and Self-Control for very high effect are against public and are in favour of “Only Me”.</p> <p>Extraversion B = 325.2 and</p>	<p>The dominant traits are: Extraversion and Self- Control.</p> <p>The Extravert and Self- Control does not support “Public” choice.</p>

	In favour of public accessibility.	Self-Control B = 145.1 Extremely high effects. Directly Proportional	In-Favour of public: Independence trait Against public: Extraversion and Self-Control
Gender Accessibility Level	All traits except Tough-Mindedness and Extraversion are in support of showing Gender on "Public"	Tough-Mindedness and Extraversion are against the "Public" accessibility For Exp (12.4) value of high effect on "Only Me".	The dominant traits are: Tough-Mindedness and Extraversion with direct proportion in support of "Only Me"
Birthday Accessibility	Independence with high effect of Exp (B) = Exp (6.5) = 665 number of times of the effect.	Nobody is significantly against (Nil Effect) All other traits are in-favour of "Only Me"	Dominant Trait: Independence trait who supports the birthday accessibility. In favour: Independence trait Against: No significant trait
Interested in Men/Women Accessibility Level	Independence B = + 1.692 Exp (1.692) = 5.43 Number of Times Directly Proportional	Anxiety (B = --27.8) for Exp (-27.8)	The dominant traits are Anxiety and the Extraversion In favour of public: Independence trait

	(Low Effect) In favour of public accessibility	number of times for very high number of times and Extraversion B = -17.089 Exp (- 17.089) = 3.78x10 ⁻⁸ Number of Times is 1/(3.78x10 ⁻⁸) = (Extremely high effect) Inversely Proportional Figure) (Extremely High Effect)	Against public: Anxiety, Extraversion, Tough-mindedness and Self-control
Language Accessibility Level	Independence B = + 1.367 EXP (1.367) = 3.92 Number of Times Directly Proportional (Low Effect) Self-control B = 1.3	Extraversion B = - 1.6 and Tough-Mindedness B = - 1.384 EXP (- 1.384) = 0.25 Number of Times = 1/0.25= 4 Inversely Proportional	The dominant traits are: Extraversion and Independence In favour of public: The Independent person with low effect. Against public: the Extravert and Tough-Minded person with low effect

		(Low Effect)	
Relationship Status Accessibility Level	Independence B = + 1.665 EXP (1.665) = 5.29 Number of Times Directly Proportional (Low Effect)	Anxiety for B = 62 and Extraversion for B = 52 and Self-Control for 44 in support of "Only Me".	The dominant traits are the Anxiety and the Extraversion. In favour of Public: The independent person with low effect. Against: The Anxious, the Extravert and the Self-controlled person with high effect
Family Members Accessibility Level	Anxiety B = + 46.690 EXP (46.69) = Many Billions Directly Proportional (Extremely High Effect)	Tough-Mindedness trait for B = - 36 For high effect Self-control B = - 32.183 EXP (- 32.183) = 1×10^{-14} Number of Times = $1/1 \times 10^{-14} = 10^{14}$ Extremely High Figure Inversely Proportional	The dominant traits are Tough-Mindedness and Self-Control In favour: The anxious person with Extremely high effect. Against: Tough-Mindedness person and Self-controlled person with extremely high effect.

		(Extremely High Effect)	
Friends List Accessibility Level	Anxiety B = + 4.772 EXP (4.772) = 118.16 Number of Times Directly Proportional (Medium Effect)	Extraversion B = - 77.397 EXP (- 77.397) = 2.43x10 ⁻³⁴ Number of Times = 1/2.43x10 ⁻³⁴ = 4x10 ³³ Extremely High Figure Tough-Mindedness B = -72 Both are Inversely Proportional (Extremely High Effect) But directly proportional to "Only Me".	The dominant traits are Extraversion and Tough- Mindedness In favour: The anxious person with a medium effect. Against: The Extravert person and the Tough- Minded person with extremely high effect.
Employer Accessibility Level	Tough-Mindedness B = 15.189 EXP (15.189) = 3.9 Million	Self-control B = - 24.256 EXP (- 24.256) =2.92x10 ⁻¹¹	The dominant trait is Self- Control for inversely proportional with employer accessibility

	<p>Number of Times</p> <p>And the interaction trait:</p> <p>Extraversion*</p> <p>Self-control for B = 4.</p>	<p>Number of Times</p> <p>= $1/(2.92 \times 10^{-11}) =$</p> <p>Extremely Big Figure</p> <p>Inversely Proportional</p> <p>(Extremely High Effect) but directly proportional to the "Only Me".</p>	<p>In favour: Tough-Mindedness and the Extraversion*Self-Control trait with low effect.</p> <p>Against: The Self-Control trait with extremely high effect.</p>
<p>University/College Accessibility Level</p>	<p>Self-control</p> <p>B = + 1.416</p> <p>EXP (1.416) = 4.12</p> <p>Number of Times</p> <p>Directly Proportional</p> <p>(Low Effect)</p>	<p>Tough-Mindedness for B = 118</p> <p>Very high effect</p> <p>Extraversion for B = 117</p>	<p>The dominant trait is Tough-Mindedness for inversely proportional with University/College accessibility</p> <p>In favour: The Self-Controlled person with low effect.</p> <p>Against: Tough-Mindedness and Extraversion with high effect in favour of "Only Me".</p>
<p>Secondary School Accessibility Level</p>	<p>Independence, which is in favour of public accessibility</p>	<p>Tough-Mindedness for B = 118</p> <p>Very high effect</p> <p>Extraversion for B = 117</p>	<p>Dominant trait: Tough-Mindedness and Extraversion</p> <p>In favour: Independence trait</p>

			Against: Tough-mindedness and Extraversion
Religion Accessibility Level	Extraversion* Anxiety interaction B = + 6.433 EXP (6.433) = 622 Number of Times Directly Proportional (Medium Effect)	Self-Control for B = - 55 Extraversion B = - 46 Anxiety B = - 37. For example: EXP (- 46) = 1×10^{-20} Number of Times = $1/1 \times 10^{-20} = 10^{20}$ huge number Inversely Proportional (Extremely High Effect) against the public accessibility and in favour of "Only Me".	The dominant trait is the Self-Control In favour: Interaction of Extraversion and Anxiety with medium effect. Against: Self-Control, Extraversion and Anxiety trait with Extremely high effect.
Political Views Accessibility Level	Tough-Mindedness B = + 16.250 EXP (16.25) =	Self-Control B = - 22.478	The dominant traits are Self-Control and Extraversion

	11.4 Million Number of Times Directly Proportional (High Effect)	EXP (- 22.478) = 1.73×10^{-10} Number of Times = $1 / (1.73 \times 10^{-10}) = 57 \times 10^8$ And Extraversion for B = - 9 Inversely Proportional (High Effect)	In favour: The Tough-Minded person with high effect. Against: The Self-Controlled person and the Extraversion person with high effect.
People Who Inspire You Accessibility Level	Extraversion* Self-control B = 3.42 For medium effect $1/e^{-3.42} = 30$ times	Self-control B = - 19.2 Against the public accessibility for very high effect $e^{19.2} = 217$ million times	Dominant trait is Self-Control In-favour Extraversion* Self-control Against: Self-Control
Favourite Quotation Accessibility	Independent For B = 0.718 For low effect For $e^{0.718} = 2$ times	Self-control for B = - 2.3 For Number of times = $1/e^{-2.3} = 10$ times	Dominant trait is Self-Control In favour: Extraversion*Self-Control with low effect. Against: Self-Control with medium effect.
Music You Like Accessibility Level	Extraversion* Self-control	Extraversion B = - 43.797	The dominant trait: Extraversion and Self-

	<p>B = + 5.478</p> <p>$e^{5.478} = 239.37$</p> <p>Number of Times</p> <p>Directly Proportional</p> <p>Extraversion*</p> <p>Anxiety</p> <p>B = 5.25</p> <p>$e^{5.25} = 190$</p> <p>Directly proportional</p> <p>(Medium Effect)</p>	<p>$e^{-43.797} = 9.5 \times 10^{-20}$</p> <p>Number of Times</p> <p>$= 1/(9.5 \times 10^{-20}) = 10^{19}$</p> <p>Inversely Proportional</p> <p>(Extremely High Effect)</p> <p>Self-control for B = -33 which is against the open accessibility.</p>	<p>Control for inversely proportional with music accessibility</p> <p>In favour: The Extraversion* Self-Control interaction and Extraversion* Anxiety</p> <p>Against: The Extravert person with Extremely high effect and the Self-Controlled person with extremely high effect.</p>
Books you Like Accessibility Level	<p>Extraversion*</p> <p>Self-control</p> <p>B = + 1.609</p> <p>EXP (1.609) = 5</p> <p>Number of Times</p> <p>Directly</p>	<p>Self-control</p> <p>B = - 9.915</p> <p>EXP (- 9.915) = 49×10^{-6}</p> <p>Number of Times</p> <p>$= 1/(49 \times 10^{-6}) = 20231.57$</p> <p>Inversely Proportional</p> <p>(High Effect) against the public accessibility.</p>	<p>The Dominant trait is Self-Control for inversely proportional to Books accessibility</p> <p>In favour: The Extraversion interaction with Self-Control person with low effect.</p> <p>Against: The Self-Control trait with high effect.</p>

<p>Movies You Like Accessibility Level</p>	<p>Extraversion* Anxiety B = + 6.1 e^{6.1} = 445.8 Number of Times Directly Proportional (Medium Effect)</p>	<p>Extraversion B = - 52.341 Exp (- 52.341) = 1.86x10⁻²³ Number of Times = 1/(1.86x10⁻²³) = 53x10²¹ Inversely Proportional (Extremely High Effect) & Self-control with extremely high effect</p>	<p>The dominant traits are Extraversion and Self- Control for inversely proportional with Movies accessibility In favour: The Extraversion* Anxiety trait with a medium effect. Against: The Extraversion trait with Extremely high effect and the Self- Control trait with extremely high effect.</p>
<p>Television You Like Accessibility Level</p>	<p>Extraversion* Self-control B = + 6.691 EXP (6.691) = 805.13 Number of Times Directly Proportional (Medium Effect)</p>	<p>Self-Control for B = + 88.26 leading to extremely high effect for the "Only Me" Extraversion against public for B = - 50.776 EXP (- 50.776) = 8.88x10⁻²³</p>	<p>The dominant trait is Self- Control for inversely proportional with Television you like accessibility In favour: The extraversion interaction with Self-Control person with a medium effect.</p>

		<p>Number of Times = $1/(8.88 \times 10^{-23}) = 11.26 \times 10^{21}$</p> <p>Inversely Proportional (Extremely High Effect)</p>	<p>Against: The Self-Control and extravert person with Extremely high effect.</p>
<p>Games You Like Accessibility Level</p>	<p>Extraversion* Anxiety</p> <p>B = + 7.704</p> <p>Exp (7.704) = 2217</p> <p>Number of Times Directly Proportional (Medium Effect)</p>	<p>Self-control</p> <p>For B = 88.6 in favour of "Only Me" with extremely high effect ($e^{88.6}$).</p> <p>Extraversion</p> <p>B = -59.148</p> <p>Exp (-59.148) = 2×10^{-26}</p> <p>Number of Times = $1/(2 \times 10^{-26}) = 5 \times 10^{25}$</p> <p>Inversely Proportional (Extremely High Effect) for against public accessibility.</p>	<p>The dominant trait is Self-Control for inversely proportional with Game Accessibility</p> <p>In favour: The Extraversion* Anxiety person with a medium effect.</p> <p>Against: The Extraversion person with extremely high effect.</p>

<p>Favourite Sport Accessibility Level</p>	<p>Extraversion* Anxiety B = + 8.535 EXP (8.525) = 5039.18 Number of Times Directly Proportional (High Effect)</p>	<p>Extraversion B = -52.414 EXP (-52.414) = 1.72x10⁻²³ Number of Times = 1/(1.72x10⁻²³) = 5.8x10²² Inversely Proportional (Extremely High Effect) Anxiety for B = - 52 against the public accessibility.</p>	<p>The dominant traits are Extraversion and Anxiety with inversely proportional with the favourite sport accessibility In favour: The Extraversion interaction with Anxiety person with high effect. Against: The extraversion person with extremely high effect and the Anxious person.</p>
<p>Favourite Sport Team Accessibility Level</p>	<p>Extraversion* Anxiety B = + 8.931 EXP (8.931) = 7562.82 Number of Times Directly Proportional (High Effect)</p>	<p>Extraversion B = -54.122 EXP (-54.122) = 3.13x10⁻²⁴ Number of Times = 1/(3.13x10⁻²⁴) = 3.2x10²³ Inversely Proportional (Extremely High Effect)</p>	<p>The dominant traits are Extraversion and Anxiety with inversely proportional with the favourite team accessibility In favour: The Extraversion* Anxiety interaction with high effect.</p>

		Anxiety with B = - 52.6 which gives extremely high effect	Against: The extraversion person with extremely high effect and the Anxious person with extremely high effect.
Favourite Athletes Accessibility Level	Extraversion* Anxiety B = + 9.130 EXP (9.130) = 9228.01 Number of Times Directly Proportional (High Effect)	Extraversion B = -55.486 EXP (-55.486) = 7.99x10 ⁻²⁵ Number of Times = 1/(7.99x10 ⁻²⁵) = 1.25x10 ²⁴ Inversely Proportional (Extremely High Effect) and Anxiety with B = - 52 for extremely high number of times against the public accessibility.	The dominant traits are Extraversion and Anxiety with inversely proportional with the favourite athletes accessibility In favour: The Extraversion interaction with Anxiety person with high effect. Against: The extraversion person with extremely high effect.

<p>Activity Level Accessibility Level</p>	<p>Extraversion* Anxiety B = + 5.377 EXP (5.377) = 216.37 Number of Times Directly Proportional (Medium Effect)</p>	<p>Self-Control for B = 116.1 for supporting "Only Me" and Tough-Mindedness for B = 13.39 for supporting "Only Me"</p>	<p>The dominant traits are: Self-Control and Tough-Mindedness with direct proportion with the activity level accessibility for "Only Me" In favour: The Extraversion* Anxiety interaction with medium effect. Against: The Self-Control and Tough-Mindedness persons with extremely high effect.</p>
<p>Email Address Accessibility Level</p>	<p>Extraversion* Anxiety B = + 7.683 Exp (7.683) = 2171 Number of Times Directly Proportional (Medium Effect)</p>	<p>Extraversion B = - 40 $e^{-40} = 4 \times 10^{-18}$ The number of times = $1/4 \times 10^{-18}$ = 0.25×10^{-18} (Very High Effect) And Anxiety for B = 48.05 with extremely high effect.</p>	<p>The dominant traits are Extraversion and Anxiety for Direct proportion with Email accessibility for supporting "Only Me". In favour: The Extraversion* Anxiety interaction with low effect. Against: The Extraversion and Anxiety traits with extremely high effect.</p>

<p>Phone Number Accessibility Level</p>	<p>Extraversion* Anxiety B = + 4.669 EXP (4.669) = 106.59 Number of Times Directly Proportional (Low Effect)</p>	<p>Self-Control for B = 20.1 in support of "Custom" and Extraversion B = -43.510 EXP (-43.510) = 1.27×10^{-19} Number of Times = $1 / (1.27 \times 10^{-19}) = 7.9 \times 10^{+18}$ Inversely Proportional (Extremely High Effect) for against public accessibility</p>	<p>The dominant trait is Self-Control for direct proportion with phone number accessibility in support of "Custom". In favour: The Extraversion interaction with Anxiety with low effect. Against: The Self-Control trait with extremely high effect.</p>
<p>Street Address Accessibility Level</p>	<p>Extraversion* Anxiety B = + 6.608 EXP (6.608) = 740.99 Number of Times Directly Proportional (Medium Effect)</p>	<p>Extraversion B = -64.641 EXP (-64.641) = 8.5×10^{-29} Number of Times = $1 / (8.5 \times 10^{-29}) = 1.18 \times 10^{28}$</p>	<p>The dominant traits are Extraversion and Self-Control for inversely proportional with street address accessibility for against public accessibility. In favour: The Extraversion interaction</p>

		<p>Inversely Proportional</p> <p>(Extremely High Effect) against public accessibility.</p> <p>And Self-Control for B = -25.2 against public accessibility.</p>	<p>with Anxiety person with medium effect.</p> <p>Against: The extraversion and Self-Control persons with extremely high effect.</p>
<p>IM Screen Names Accessibility Level</p>	<p>Extraversion*</p> <p>Self-control</p> <p>B = + 2.116</p> <p>EXP (2.116) = 8.3</p> <p>Number of Times</p> <p>Directly Proportional (Low Effect)</p>	<p>Extraversion</p> <p>B = + 71.094</p> <p>For extremely high effect</p> <p>and</p> <p>Self-control for B = - 12.53 to be against public accessibility and for B = 41.028 in support on "Only Me"</p>	<p>The dominant traits are Extraversion and Self-Control for inversely proportional with IM Screen Names accessibility against "public" and in support of "Only Me".</p> <p>In favour: The Extraversion interaction with Self-Control with low effect.</p> <p>Against: The extraversion and Self-Control persons with very high effect.</p>
<p>Web Site Accessibility Level</p>	<p>Not Significant trait in favour of "Public" (Nil Effect)</p>	<p>Anxiety for B = 1.096</p> <p>in support of "Only Me"</p> <p>And</p>	<p>The dominant traits are: Anxiety and Independence</p>

		Independence for B = 0.641 in support of "Friends".	In favour of "Public": No significant trait Against of "Public": Anxiety and Independence significant traits
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Table A5.3 Multinomial Questionnaire Questions and the Related Big Five Trait (s)

Regression Index (B) and its Number of Times of the Effect of B.

Table A5.4 the Clustered Risky Personality Big Five Traits that can Influence Users to Behave in a "Public" Accessibility Fields of Activity

Influencing Clustered Risky Big Five Trait	Facebook User Risky Behaviour Accessibility
Independence	Current City Accessibility
Independence	Hometown Accessibility
Independence	Birthday Accessibility
Independence	Interested in Men/Women Accessibility
Independence	Language Accessibility
Independence	Relationship Status Accessibility
Independence	Favourite Quotation Accessibility
Independence	Website Accessibility
Independence and Extraversion*Anxiety	Favourite Sport Accessibility
Independence and Extraversion*Anxiety	Favourite Sport Team Accessibility
Independence and Extraversion*Anxiety	Favourite Athletes Accessibility
Independence and Extraversion*Anxiety	Email Address Accessibility
Anxiety	Family Members Accessibility
Anxiety	Friends List Accessibility
Tough-Mindedness	Employer Accessibility
Tough-Mindedness	Political Views Accessibility

Tough-Mindedness and Extraversion*Anxiety	Activity Level Accessibility
Self-control	University/College Accessibility
Self-control	Secondary School Accessibility
Self-control	Gender Accessibility
Self-Control and Extraversion*Anxiety	Religion Accessibility
Self-Control and Extraversion*Self-Control	People Who Inspire You
Self-Control and Extraversion*Self-Control	Music you Like Accessibility
Self-Control and Extraversion*Self-Control	Books you Like Accessibility
Self-Control and Extraversion*Anxiety	Movies you Like Accessibility
Self-Control and Extraversion*Self-Control	Television you Like Accessibility
Self-Control and Extraversion*Self-Control	Phone Number Accessibility
Self-Control and Extraversion*Anxiety	Street Address Accessibility
Self-Control and Extraversion*Self-Control	IM Screen Names Accessibility

Table A5.4 the Clustered Risky Personality Big Five Traits that can Influence Users to Behave in a “Public” Accessibility Fields of Activity.

Table A5.5 the Big Five Traits Contribution to the Risk in all Types of Facebook Activity Questions.

Grouping the Big Five Trait Clustered Risk Contributor	Facebook Users Activity Behaviour in the accessibility Fields
Independence	Current City Accessibility
Independence	Hometown Accessibility
Independence	Birthday Accessibility
Independence	Interested in Men/Women Accessibility
Independence	Language Accessibility
Independence	Relationship Status Accessibility
Independence	Favourite Quotation Accessibility
Independence	Website Accessibility
Independence	1. Has anybody accessed your Account without your consent?

	<ol style="list-style-type: none"> 2. Do you use the Facebook Apps on your phone? 3. Friends and Family, I know them in person, what influences me to choose my friends 4. How often do you visit Facebook?
Independence and Extraversion*Anxiety	Favourite Sport Accessibility
Independence and Extraversion*Anxiety	Favourite Sport Team Accessibility
Independence and Extraversion*Anxiety	Favourite Athletes Accessibility
Independence and Extraversion*Anxiety	Email Address Accessibility
Self-control	<ol style="list-style-type: none"> 1. Awareness that Facebook apps can send messages on behalf of your friends 2. Using the Facebook app on the phone 3. Using Facebook login on 3rd party websites 4. The way they look, influences your decision to accept friends 5. The way they share the same interest, influences you to accept friends 6. Have you experienced bullying or harassment due to sharing photos or posts on Facebook? 7. Do you use multiple user accounts on Facebook? 8. University/College accessibility 9. Secondary School accessibility 10. Gender accessibility

Self-Control and Extraversion*Anxiety	Religion Accessibility
Self-Control and Extraversion*Self-Control	Music you Like Accessibility
Self-Control and Extraversion*Self-Control	People Who Inspire You
Self-Control and Extraversion*Self-Control	Books you Like Accessibility
Self-Control and Extraversion*Anxiety	Movies you Like Accessibility
Self-Control and Extraversion*Self-Control	Television you Like Accessibility
Self-Control and Extraversion*Self-Control	Phone Number Accessibility
Self-Control and Extraversion*Anxiety	Street Address Accessibility
Self-Control and Extraversion*Self-Control	IM Screen Names Accessibility
Tough-Mindedness	<ol style="list-style-type: none"> 1. When accessing a third-party Computer, do you remember to Logout? 2. Having common friends on Facebook that influences the decision in accepting them 3. Have you ever made friends and met them in person? 4. Employer Accessibility 5. Political Views Accessibility 6. Activity Level Accessibility
Anxiety	<ol style="list-style-type: none"> 1. Family Members Accessibility 2. Friends List accessibility

Table A5.5 the Big Five Traits Contribution to the Risk in all Types of Facebook Activity Questions.

A5.6 Sample of the Test Results of the (34) Facebook Multinomial Activity Levels by the Resulting Parameter Estimates

A5.6.1 Sample of Tests: Test Number: 2

Questionnaire, Question 2: Has anybody accessed your account without your consent?

The response regression $R^2 = 0.13$.

<p style="text-align: center;">Dominating: Tough-Mindedness</p> <p style="text-align: center;">Against: Self-Control and Independence</p>
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Table A5.1 Scoring values of dominating traits for test number 2

All other empty fields of testing in the tables are non-significant and therefore were not considered. All inserted results in the tables are significant for a non-significance < 0.05 .

Reading of the Table:

This can be interpreted as Tough-Minded person is more caring. The self-Controlled persons and Independent persons are against the “No”. This means they are not sure. However, this correlation between the independent Big Five traits (s) and the Facebook dependent activity is very low (0.13) comparatively where also the regression index B is very low.

Chapter 6 Appendix: A6

A6.1 SPSS Testing Steps of the Big Five Clustering for each Facebook Activity

In this chapter, clustering of the Big Five traits is related to each Facebook activity for all respondents. The clustering has been performed by SPSS through the following steps as follows:

- i. Choose Analyse
- ii. Choose Classify and from it, choose **K-Means Clustering**
- iii. On the window: select the Facebook activity and move to the **Variables** space by the arrow.
- iv. Choose the Big Five traits (one by one) and send to the **Variables** space
- v. Choose the number of clusters
- vi. Choose the **Method**: Iterate and Classify
- vii. Click on **Iterate** and choose 10 iterations.

- viii. Click on **Save** and choose both: Cluster membership and Distance between cluster centres
- ix. Click on **Options** and choose: Initial Cluster Centres, ANOVA Table and Cluster Information for each case.
- x. Under the **Options**, choose either: Exclude cases **listwise** or Exclude cases **pairwise**.
- xi. Click **OK**. The required tables will appear automatically as you have chosen them.

A6.2 The Clustering Tests

A6.2.1 Test Tables for Test 1

Final Cluster Centers

	Cluster	
	1	2
How secure do you feel your profile information is on Facebook	3	2
Extraversion	5.94	6.10
Independence	5.83	6.02
Tough-Mindedness	6.05	6.03
Self-Control	6.24	6.18
Anxiety	5.13	5.27

Distances between Final Cluster Centers

Cluster	1	2
1		1.906
2	1.906	

ANOVA

	Cluster		Error		F	Sig.
	Mean Square	df	Mean Square	df		
How secure do you feel your profile information is on Facebook	163.422	1	.357	185	457.258	.000
Extraversion	1.120	1	.181	185	6.189	.014
Independence	1.525	1	.424	185	3.600	.059
Tough-Mindedness	.017	1	.373	185	.047	.829
Self-Control	.165	1	.380	185	.435	.510
Anxiety	.940	1	.164	185	5.728	.018

The F tests should be used only for descriptive purposes because the clusters have been chosen to maximize the differences among cases in different clusters. The observed significance levels are not corrected for this and thus cannot be interpreted as tests of the hypothesis that the cluster means are equal.

Number of Cases in each Cluster

		Unweighted	Weighted
Cluster	1	53.000	105.000
	2	37.000	82.000
Valid		90.000	187.000
Missing		.000	.000

A6.2.2 Test Tables for Test 2

Final Cluster Centers

	Cluster	
	1	2
Has anybody accessed your Facebook account without your consent	2	2
Extraversion	5.77	6.32
Independence	5.53	6.41
Tough-Mindedness	5.72	6.47
Self-Control	5.89	6.63
Anxiety	5.18	5.21

Distances between Final Cluster Centers

Cluster	1	2
1		1.515
2	1.515	

Number of Cases in each Cluster

		Unweighted	Weighted
Cluster	1	54.000	106.000
	2	36.000	81.000
Valid		90.000	187.000
Missing		.000	.000

ANOVA

	Cluster		Error		F	Sig.
	Mean Square	df	Mean Square	df		
Has anybody accessed your Facebook account without your consent	5.420	1	.318	185	17.071	.000
Extraversion	13.721	1	.113	185	121.527	.000
Independence	35.132	1	.242	185	145.227	.000
Tough-Mindedness	26.117	1	.232	185	112.577	.000
Self-Control	24.916	1	.246	185	101.100	.000

Anxiety	.024	1	.169	185	.142	.707
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The F tests should be used only for descriptive purposes because the clusters have been chosen to maximize the differences among cases in different clusters. The observed significance levels are not corrected for this and thus cannot be interpreted as tests of the hypothesis that the cluster means are equal.

A6.2.3 Test Tables for Test 3

Final Cluster Centers

	Cluster	
	1	2
When accessing Facebook from a friend's computer university or library do you remember to logout	2	1
Extraversion	5.70	6.21
Independence	5.42	6.25
Tough-Mindedness	5.57	6.37
Self-Control	5.79	6.50
Anxiety	5.23	5.17

Distances between Final Cluster Centers

Cluster	1	2
1		1.649
2	1.649	

ANOVA

	Cluster		Error		F	Sig.
	Mean Square	df	Mean Square	df		
When accessing Facebook from a friend's computer university or library do you remember to logout	28.016	1	.388	185	72.205	.000
Extraversion	11.740	1	.124	185	94.974	.000
Independence	31.189	1	.263	185	118.491	.000
Tough-Mindedness	28.438	1	.219	185	129.589	.000
Self-Control	23.086	1	.256	185	90.060	.000
Anxiety	.188	1	.168	185	1.118	.292

The F tests should be used only for descriptive purposes because the clusters have been chosen to maximize the differences among cases in different clusters. The observed significance levels are not corrected for this and thus cannot be interpreted as tests of the hypothesis that the cluster means are equal.

Number of Cases in each Cluster

	Unweighted	Weighted
Cluster 1	38.000	76.000
Cluster 2	52.000	111.000
Valid	90.000	187.000
Missing	.000	.000

A6.2.4 Test Tables for Test 4

Final Cluster Centers

	Cluster	
	1	2
Are you aware that Facebook apps can post wall messages on behalf of your friends	1	1
Extraversion	5.77	6.30
Independence	5.51	6.41
Tough-Mindedness	5.72	6.44
Self-Control	5.88	6.63
Anxiety	5.17	5.22

Distances between Final Cluster Centers

Cluster	1	2
1		1.480
2	1.480	

ANOVA

	Cluster		Error		F	Sig.
	Mean Square	df	Mean Square	df		
Are you aware that Facebook apps can post wall messages on behalf of your friends	.304	1	.226	185	1.344	.248
Extraversion	13.247	1	.115	185	114.727	.000
Independence	37.282	1	.230	185	161.897	.000
Tough-Mindedness	24.422	1	.241	185	101.271	.000
Self-Control	26.046	1	.240	185	108.369	.000
Anxiety	.083	1	.169	185	.493	.483

The F tests should be used only for descriptive purposes because the clusters have been chosen to maximize the differences among cases in different clusters. The observed significance levels are not corrected for this and thus cannot be interpreted as tests of the hypothesis that the cluster means are equal.

Number of Cases in each Cluster

	Unweighted	Weighted
Cluster 1	51.000	103.000
Cluster 2	39.000	84.000
Valid	90.000	187.000
Missing	.000	.000

A6.2.5 Test Tables for Test 5

Final Cluster Centers

	Cluster	
	1	2
Do you ever use the Facebook Login Button on 3rd party websites	2	2
Extraversion	5.73	6.29

Independence	5.49	6.34
Tough-Mindedness	5.68	6.41
Self-Control	5.82	6.61
Anxiety	5.19	5.20

Distances between Final Cluster Centers

Cluster	1	2
1		1.480
2	1.480	

ANOVA

	Cluster		Error		F	Sig.
	Mean Square	df	Mean Square	df		
Do you ever use the Facebook Login Button on 3rd party websites	.499	1	.225	185	2.218	.138
Extraversion	14.470	1	.109	185	132.936	.000
Independence	33.463	1	.251	185	133.355	.000
Tough-Mindedness	25.140	1	.237	185	105.956	.000
Self-Control	28.853	1	.225	185	128.141	.000
Anxiety	.001	1	.169	185	.008	.929

The F tests should be used only for descriptive purposes because the clusters have been chosen to maximize the differences among cases in different clusters. The observed significance levels are not corrected for this and thus cannot be interpreted as tests of the hypothesis that the cluster means are equal.

Number of Cases in each Cluster

	Unweighted	Weighted
Cluster 1	47.000	94.000
Cluster 2	43.000	93.000
Valid	90.000	187.000
Missing	.000	.000

A6.2.6 Test Tables for Test 6

Final Cluster Centers

	Cluster	
	1	2
Do you use the Facebook app on your phone	1	1
Extraversion	5.74	6.29
Independence	5.50	6.35
Tough-Mindedness	5.68	6.43
Self-Control	5.84	6.61
Anxiety	5.18	5.21

Distances between Final Cluster Centers

Cluster	1	2
1		
2		

1		1.477
2	1.477	

ANOVA

	Cluster		Error		F	Sig.
	Mean Square	df	Mean Square	df		
Do you use the Facebook app on your phone	.044	1	.143	185	.305	.582
Extraversion	14.275	1	.110	185	129.883	.000
Independence	33.531	1	.251	185	133.825	.000
Tough-Mindedness	25.881	1	.233	185	110.949	.000
Self-Control	28.195	1	.229	185	123.268	.000
Anxiety	.032	1	.169	185	.187	.666

The F tests should be used only for descriptive purposes because the clusters have been chosen to maximize the differences among cases in different clusters. The observed significance levels are not corrected for this and thus cannot be interpreted as tests of the hypothesis that the cluster means are equal.

Number of Cases in each Cluster

	Unweighted	Weighted
Cluster 1	48.000	96.000
Cluster 2	42.000	91.000
Valid	90.000	187.000
Missing	.000	.000

A6.2.7 Test Tables for Test 7

Final Cluster Centers

	Cluster	
	1	2
Have you ever experienced bullying or harassment due to your shared Facebook photos or posts	2	2
Extraversion	5.74	6.29
Independence	5.50	6.35
Tough-Mindedness	5.68	6.43
Self-Control	5.84	6.61
Anxiety	5.18	5.21

Distances between Final Cluster Centers

Cluster	1	2
1		1.477
2	1.477	

ANOVA

	Cluster		Error		F	Sig.
	Mean Square	df	Mean Square	df		
Have you ever experienced bullying or harassment due to your shared Facebook photos or posts	.000	1	.167	185	.000	.994
Extraversion	14.275	1	.110	185	129.883	.000
Independence	33.531	1	.251	185	133.825	.000
Tough-Mindedness	25.881	1	.233	185	110.949	.000
Self-Control	28.195	1	.229	185	123.268	.000
Anxiety	.032	1	.169	185	.187	.666

The F tests should be used only for descriptive purposes because the clusters have been chosen to maximize the differences among cases in different clusters. The observed significance levels are not corrected for this and thus cannot be interpreted as tests of the hypothesis that the cluster means are equal.

Number of Cases in each Cluster

	Unweighted	Weighted
Cluster 1	48.000	96.000
Cluster 2	42.000	91.000
Valid	90.000	187.000
Missing	.000	.000

A6.2.8 Test Tables for Test 8

Final Cluster Centers

	Cluster	
	1	2
Do you use multiple user accounts on Facebook	2	2
Extraversion	5.73	6.29
Independence	5.49	6.33
Tough-Mindedness	5.67	6.41
Self-Control	5.82	6.60
Anxiety	5.19	5.19

Distances between Final Cluster Centers

Cluster	1	2
1		1.481
2	1.481	

ANOVA

	Cluster		Error		F	Sig.
	Mean Square	df	Mean Square	df		
Do you use multiple user accounts on Facebook	.755	1	.101	185	7.487	.007
Extraversion	14.696	1	.108	185	136.547	.000
Independence	33.119	1	.253	185	131.018	.000

Tough-Mindedness	25.561	1	.235	185	108.768	.000
Self-Control	28.441	1	.227	185	125.075	.000
Anxiety	.001	1	.169	185	.008	.930

The F tests should be used only for descriptive purposes because the clusters have been chosen to maximize the differences among cases in different clusters. The observed significance levels are not corrected for this and thus cannot be interpreted as tests of the hypothesis that the cluster means are equal.

Number of Cases in each Cluster

	Unweighted	Weighted
Cluster 1	46.000	93.000
Cluster 2	44.000	94.000
Valid	90.000	187.000
Missing	.000	.000

A6.2.9 Test Tables for Test 9

Final Cluster Centers

	Cluster	
	1	2
How often do you visit Facebook	2	2
Extraversion	5.88	6.40
Independence	5.71	6.53
Tough-Mindedness	5.83	6.70
Self-Control	6.01	6.81
Anxiety	5.18	5.24

Distances between Final Cluster Centers

Cluster	1	2
1		1.591
2	1.591	

ANOVA

	Cluster		Error		F	Sig.
	Mean Square	df	Mean Square	df		
How often do you visit Facebook	6.597	1	.464	185	14.231	.000
Extraversion	9.586	1	.135	185	70.874	.000
Independence	23.604	1	.304	185	77.587	.000
Tough-Mindedness	26.661	1	.229	185	116.396	.000
Self-Control	22.467	1	.260	185	86.516	.000
Anxiety	.158	1	.168	185	.940	.333

The F tests should be used only for descriptive purposes because the clusters have been chosen to maximize the differences among cases in different clusters. The observed significance levels are not corrected for this and thus cannot be interpreted as tests of the hypothesis that the cluster means are equal.

Number of Cases in each Cluster

	Unweighted	Weighted
Cluster 1	69.000	140.000
Cluster 2	21.000	47.000
Valid	90.000	187.000
Missing	.000	.000

A6.2.10 Test Tables for Test 10

Final Cluster Centers

	Cluster	
	1	2
Have you ever made new friends on Facebook and met in person	2	2
Extraversion	5.86	6.43
Independence	5.72	6.49
Tough-Mindedness	5.82	6.70
Self-Control	6.00	6.84
Anxiety	5.18	5.22

Distances between Final Cluster Centers

Cluster	1	2
1		1.543
2	1.543	

ANOVA

	Cluster		Error		F	Sig.
	Mean Square	df	Mean Square	df		
Have you ever made new friends on Facebook and met in person	.010	1	.242	185	.042	.837
Extraversion	11.408	1	.125	185	90.975	.000
Independence	20.732	1	.320	185	64.839	.000
Tough-Mindedness	27.186	1	.226	185	120.176	.000
Self-Control	24.342	1	.250	185	97.546	.000
Anxiety	.061	1	.169	185	.364	.547

The F tests should be used only for descriptive purposes because the clusters have been chosen to maximize the differences among cases in different clusters. The observed significance levels are not corrected for this and thus cannot be interpreted as tests of the hypothesis that the cluster means are equal.

Number of Cases in each Cluster

	Unweighted	Weighted
Cluster 1	68.000	140.000
Cluster 2	22.000	47.000
Valid	90.000	187.000
Missing	.000	.000

A6.2.11 Test Tables for Test 11

Final Cluster Centers

	Cluster	
	1	2

Friends or Family I know them in person What influences your decision making when accepting friend requests on Facebook	1	1
Extraversion	5.84	6.44
Independence	5.71	6.45
Tough-Mindedness	5.81	6.64
Self-Control	5.97	6.83
Anxiety	5.18	5.22

Distances between Final Cluster Centers

Cluster	1	2
1		1.534
2	1.534	

ANOVA

	Cluster		Error		F	Sig.
	Mean Square	df	Mean Square	df		
Friends or Family I know them in person What influences your decision making when accepting friend requests on Facebook	.405	1	.141	185	2.867	.092
Extraversion	13.340	1	.115	185	116.037	.000
Independence	20.962	1	.319	185	65.815	.000
Tough-Mindedness	25.873	1	.233	185	110.894	.000
Self-Control	27.742	1	.231	185	120.008	.000
Anxiety	.041	1	.169	185	.246	.621

The F tests should be used only for descriptive purposes because the clusters have been chosen to maximize the differences among cases in different clusters. The observed significance levels are not corrected for this and thus cannot be interpreted as tests of the hypothesis that the cluster means are equal.

Number of Cases in each Cluster

	Unweighted	Weighted
Cluster 1	66.000	135.000
Cluster 2	24.000	52.000
Valid	90.000	187.000
Missing	.000	.000

A6.2.12 Test Tables for Test 12

Final Cluster Centers

	Cluster	
	1	2
By the way they look Profile Photo What influences your decision making when accepting friend requests on Facebook	0	0
Extraversion	5.84	6.44

Independence	5.71	6.45
Tough-Mindedness	5.81	6.64
Self-Control	5.97	6.83
Anxiety	5.18	5.22

Distances between Final Cluster

Centers

Cluster	1	2
1		1.533
2	1.533	

ANOVA

	Cluster		Error		F	Sig.
	Mean Square	df	Mean Square	df		
By the way they look Profile Photo What influences your decision making when accepting friend requests on Facebook	.215	1	.100	185	2.156	.144
Extraversion	13.340	1	.115	185	116.037	.000
Independence	20.962	1	.319	185	65.815	.000
Tough-Mindedness	25.873	1	.233	185	110.894	.000
Self-Control	27.742	1	.231	185	120.008	.000
Anxiety	.041	1	.169	185	.246	.621

The F tests should be used only for descriptive purposes because the clusters have been chosen to maximize the differences among cases in different clusters. The observed significance levels are not corrected for this and thus cannot be interpreted as tests of the hypothesis that the cluster means are equal.

Number of Cases in each Cluster

	Unweighted	Weighted
Cluster 1	66.000	135.000
Cluster 2	24.000	52.000
Valid	90.000	187.000
Missing	.000	.000

A6.2.13 Test Tables for Test 13

Final Cluster Centers

	Cluster	
	1	2
They share my interests What influences your decision making when accepting friend requests on Facebook	0	0
Extraversion	5.84	6.44
Independence	5.71	6.45
Tough-Mindedness	5.81	6.64
Self-Control	5.97	6.83
Anxiety	5.18	5.22

Distances between Final Cluster Centers

Cluster	1	2
1		1.532
2	1.532	

ANOVA

	Cluster		Error		F	Sig.
	Mean Square	df	Mean Square	df		
They share my interests What influences your decision making when accepting friend requests on Facebook	.175	1	.096	185	1.828	.178
Extraversion	13.340	1	.115	185	116.037	.000
Independence	20.962	1	.319	185	65.815	.000
Tough-Mindedness	25.873	1	.233	185	110.894	.000
Self-Control	27.742	1	.231	185	120.008	.000
Anxiety	.041	1	.169	185	.246	.621

The F tests should be used only for descriptive purposes because the clusters have been chosen to maximize the differences among cases in different clusters. The observed significance levels are not corrected for this and thus cannot be interpreted as tests of the hypothesis that the cluster means are equal.

Number of Cases in each Cluster

	Unweighted	Weighted
Cluster 1	66.000	135.000
Cluster 2	24.000	52.000
Valid	90.000	187.000
Missing	.000	.000

A6.2.14 Test Tables for Test 14

Final Cluster Centers

	Cluster	
	1	2
We have friends in common What influences your decision making when accepting friend requests on Facebook	0	0
Extraversion	5.86	6.43
Independence	5.72	6.49
Tough-Mindedness	5.82	6.70
Self-Control	6.00	6.84
Anxiety	5.18	5.22

Distances between Final Cluster Centers

Cluster	1	2
1		1.545
2	1.545	

ANOVA

	Cluster	Error	F	Sig.
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	Mean Square	df	Mean Square	df		
We have friends in common What influences your decision making when accepting friend requests on Facebook	.231	1	.242	185	.956	.330
Extraversion	11.408	1	.125	185	90.975	.000
Independence	20.732	1	.320	185	64.839	.000
Tough-Mindedness	27.186	1	.226	185	120.176	.000
Self-Control	24.342	1	.250	185	97.546	.000
Anxiety	.061	1	.169	185	.364	.547

The F tests should be used only for descriptive purposes because the clusters have been chosen to maximize the differences among cases in different clusters. The observed significance levels are not corrected for this and thus cannot be interpreted as tests of the hypothesis that the cluster means are equal.

Number of Cases in each Cluster

	Unweighted	Weighted
Cluster 1	68.000	140.000
Cluster 2	22.000	47.000
Valid	90.000	187.000
Missing	.000	.000

A6.2.15 Test Tables for Test 15

Final Cluster Centers

	Cluster		
	1	2	3
Current city Accessibility level	5	1	2
Extraversion	6.02	6.27	5.73
Independence	5.92	6.31	5.49
Tough-Mindedness	6.15	6.37	5.67
Self-Control	6.25	6.61	5.79
Anxiety	5.33	5.14	5.20

Distances between Final Cluster Centers

Cluster	1	2	3
1		3.958	3.769
2	3.958		1.484
3	3.769	1.484	

ANOVA

	Cluster		Error		F	Sig.
	Mean Square	df	Mean Square	df		
Current city Accessibility level	156.588	2	.307	184	510.120	.000
Extraversion	5.991	2	.123	184	48.716	.000
Independence	13.756	2	.285	184	48.329	.000
Tough-Mindedness	10.036	2	.266	184	37.714	.000
Self-Control	13.768	2	.234	184	58.953	.000
Anxiety	.382	2	.166	184	2.300	.103

The F tests should be used only for descriptive purposes because the clusters have been chosen to maximize the differences among cases in different clusters. The observed significance levels are not corrected for this and thus cannot be interpreted as tests of the hypothesis that the cluster means are equal.

Number of Cases in each Cluster

	Unweighted	Weighted
Cluster 1	12.000	25.000
Cluster 2	39.000	83.000
Cluster 3	39.000	79.000
Valid	90.000	187.000
Missing	.000	.000

**Cluster 1 belongs to Custom Option,
Cluster 2 belongs to Public Option
Cluster 3 Belongs to Friends Option**

A6.2.16 Test Tables for Test 16

Final Cluster Centers

	Cluster		
	1	2	3
Hometown Accessibility level	5	1	2
Extraversion	6.13	6.24	5.69
Independence	5.79	6.33	5.47
Tough-Mindedness	6.26	6.34	5.62
Self-Control	6.26	6.59	5.76
Anxiety	5.21	5.15	5.23

Distances between Final Cluster Centers

Cluster	1	2	3
1		3.922	3.678
2	3.922		1.543
3	3.678	1.543	

ANOVA

	Cluster		Error		F	Sig.
	Mean Square	df	Mean Square	df		
Hometown Accessibility level	156.866	2	.341	184	459.344	.000
Extraversion	6.441	2	.118	184	54.556	.000
Independence	15.234	2	.269	184	56.721	.000
Tough-Mindedness	11.133	2	.254	184	43.799	.000
Self-Control	13.796	2	.233	184	59.147	.000
Anxiety	.132	2	.169	184	.783	.458

The F tests should be used only for descriptive purposes because the clusters have been chosen to maximize the differences among cases in different clusters. The observed significance levels are not corrected for this and thus cannot be interpreted as tests of the hypothesis that the cluster means are equal.

Number of Cases in each Cluster

	Unweighted	Weighted
Cluster 1	12.000	26.000

	2	42.000	87.000
	3	36.000	74.000
Valid		90.000	187.000
Missing		.000	.000

**Cluster 1 belongs to Custom Option,
Cluster 2 belongs to Public Option
Cluster 3 Belongs to Friends Option**

A6.2.17 Test Tables for Test 17

Final Cluster Centers

	Cluster			
	1	2	3	4
Gender Accessibility level	1	1	1	4
Extraversion	5.66	6.35	5.90	5.93
Independence	5.52	6.50	5.59	5.70
Tough-Mindedness	5.51	6.48	5.94	6.18
Self-Control	5.46	6.67	6.33	6.04
Anxiety	5.41	5.23	4.96	5.22

Distances between Final Cluster Centers

Cluster	1	2	3	4
1		1.971	1.117	2.936
2	1.971		1.256	3.082
3	1.117	1.256		2.662
4	2.936	3.082	2.662	

ANOVA

	Cluster		Error		F	Sig.
	Mean Square	df	Mean Square	df		
Gender Accessibility level	29.116	3	.248	183	117.365	.000
Extraversion	4.870	3	.109	183	44.559	.000
Independence	12.511	3	.231	183	54.061	.000
Tough-Mindedness	9.362	3	.224	183	41.835	.000
Self-Control	14.330	3	.150	183	95.298	.000
Anxiety	1.854	3	.141	183	13.186	.000

The F tests should be used only for descriptive purposes because the clusters have been chosen to maximize the differences among cases in different clusters. The observed significance levels are not corrected for this and thus cannot be interpreted as tests of the hypothesis that the cluster means are equal.

Number of Cases in each Cluster

	Unweighted	Weighted
Cluster 1	24.000	48.000
Cluster 2	31.000	69.000
Cluster 3	28.000	58.000
Cluster 4	7.000	12.000
Valid	90.000	187.000
Missing	.000	.000

Cluster 1 belongs to Public and Friends option,
 Cluster 2 belongs to Public and friends Option
 Cluster 3 Belongs to Public and Friends Option
 Cluster 4 Belongs to “Only Me”

A6.2.18 Test Tables for Test 18

Final Cluster Centers

	Cluster			
	1	2	3	4
Birthday month and day only	4	1	2	1
Accessibility level				
Extraversion	5.94	6.32	6.00	5.62
Independence	5.63	6.61	5.60	5.53
Tough-Mindedness	5.82	6.46	6.11	5.52
Self-Control	5.91	6.67	6.38	5.56
Anxiety	5.26	5.30	4.92	5.35

Distances between Final Cluster Centers

Cluster	1	2	3	4
1		3.183	2.693	2.948
2	3.183		1.237	1.950
3	2.693	1.237		1.191
4	2.948	1.950	1.191	

ANOVA

	Cluster		Error		F	Sig.
	Mean Square	df	Mean Square	df		
Birthday month and day only	68.626	3	.323	183	212.586	.000
Accessibility level						
Extraversion	4.011	3	.123	183	32.520	.000
Independence	14.504	3	.199	183	72.969	.000
Tough-Mindedness	7.840	3	.249	183	31.522	.000
Self-Control	11.537	3	.196	183	58.816	.000
Anxiety	1.918	3	.140	183	13.745	.000

The F tests should be used only for descriptive purposes because the clusters have been chosen to maximize the differences among cases in different clusters. The observed significance levels are not corrected for this and thus cannot be interpreted as tests of the hypothesis that the cluster means are equal.

Number of Cases in each Cluster

	Unweighted	Weighted
Cluster 1	16.000	32.000
Cluster 2	26.000	60.000
Cluster 3	27.000	54.000
Cluster 4	21.000	41.000
Valid	90.000	187.000
Missing	.000	.000

Cluster 1 belongs to “Only Me” option,

Cluster 2 belongs to Public option
Cluster 3 Belongs to Friends Option
Cluster 4 Belongs to Public option

A6.2.19 Test Tables for Test 19

Final Cluster Centers

	Cluster			
	1	2	3	4
Interested in men/women	6	1	2	4
Accessibility level				
Extraversion	6.26	6.63	5.99	5.70
Independence	5.85	7.88	5.94	5.52
Tough-Mindedness	6.16	7.48	6.03	5.77
Self-Control	6.19	7.65	6.23	5.94
Anxiety	5.09	4.62	5.21	5.28

Distances between Final Cluster Centers

Cluster	1	2	3	4
1		5.492	4.498	2.028
2	5.492		2.947	4.541
3	4.498	2.947		2.706
4	2.028	4.541	2.706	

ANOVA

	Cluster		Error		F	Sig.
	Mean Square	df	Mean Square	df		
Interested in menwomen	182.013	3	.277	183	656.865	.000
Accessibility level						
Extraversion	1.648	3	.162	183	10.169	.000
Independence	5.023	3	.354	183	14.182	.000
Tough-Mindedness	2.735	3	.332	183	8.229	.000
Self-Control	2.616	3	.342	183	7.639	.000
Anxiety	.498	3	.163	183	3.058	.030

The F tests should be used only for descriptive purposes because the clusters have been chosen to maximize the differences among cases in different clusters. The observed significance levels are not corrected for this and thus cannot be interpreted as tests of the hypothesis that the cluster means are equal.

Number of Cases in each Cluster

	Unweighted	Weighted
1	13.000	29.000
2	2.000	3.000
3	65.000	134.000
4	10.000	21.000
Valid	90.000	187.000
Missing	.000	.000

Cluster 1 belongs to “Not Supplied” option,

Cluster 2 belongs to Public option

Cluster 3 Belongs to Friends Option

Cluster 4 Belongs to “Only Me” option

A6.2.20 Test Tables for Test 20

Final Cluster Centers

	Cluster			
	1	2	3	4
Languages Accessibility level	6	1	1	4
Extraversion	6.23	6.63	5.99	5.74
Independence	5.81	7.88	5.93	5.60
Tough-Mindedness	6.26	7.48	5.99	5.90
Anxiety	5.07	4.62	5.21	5.36
Self-Control	6.20	7.65	6.21	5.99

Distances between Final Cluster Centers

Cluster	1	2	3	4
1		5.481	4.636	2.234
2	5.481		2.976	4.282
3	4.636	2.976		2.557
4	2.234	4.282	2.557	

ANOVA

	Cluster		Error		F	Sig.
	Mean Square	df	Mean Square	df		
Languages Accessibility level	178.390	3	.214	183	832.031	.000
Extraversion	1.264	3	.168	183	7.509	.000
Independence	4.569	3	.362	183	12.633	.000
Tough-Mindedness	2.727	3	.333	183	8.200	.000
Anxiety	.633	3	.161	183	3.945	.009
Self-Control	2.371	3	.346	183	6.845	.000

The F tests should be used only for descriptive purposes because the clusters have been chosen to maximize the differences among cases in different clusters. The observed significance levels are not corrected for this and thus cannot be interpreted as tests of the hypothesis that the cluster means are equal.

Number of Cases in each Cluster

	Unweighted	Weighted
1	13.000	27.000
2	2.000	3.000
3	66.000	139.000
4	9.000	18.000
Valid	90.000	187.000
Missing	.000	.000

Cluster 1 belongs to “Not Supplied” option,

Cluster 2 belongs to Public option

Cluster 3 Belongs to Public option

Cluster 4 Belongs to “Only Me” option

A6.2.21 Test Tables for Test 21

Final Cluster Centers

	Cluster			
	1	2	3	4
Relationship status	6	1	2	4
Accessibility level				
Extraversion	6.14	6.63	5.98	5.82
Independence	5.89	7.88	5.93	5.65
Tough-Mindedness	6.18	7.48	5.98	5.89
Self-Control	6.12	7.65	6.27	5.92
Anxiety	5.07	4.62	5.23	5.30

Distances between Final Cluster Centers

Cluster	1	2	3	4
1		5.406	4.350	1.976
2	5.406		2.970	4.332
3	4.350	2.970		2.497
4	1.976	4.332	2.497	

ANOVA

	Cluster		Error		F	Sig.
	Mean Square	df	Mean Square	df		
Relationship status	216.020	3	.239	183	902.534	.000
Accessibility level						
Extraversion	.952	3	.173	183	5.490	.001
Independence	4.437	3	.364	183	12.196	.000
Tough-Mindedness	2.681	3	.333	183	8.045	.000
Self-Control	2.987	3	.336	183	8.882	.000
Anxiety	.694	3	.160	183	4.348	.005

The F tests should be used only for descriptive purposes because the clusters have been chosen to maximize the differences among cases in different clusters. The observed significance levels are not corrected for this and thus cannot be interpreted as tests of the hypothesis that the cluster means are equal.

Number of Cases in each Cluster

	Unweighted	Weighted
Cluster 1	21.000	45.000
Cluster 2	2.000	3.000
Cluster 3	55.000	116.000
Cluster 4	12.000	23.000
Valid	90.000	187.000
Missing	.000	.000

Cluster 1 belongs to “Not Supplied” option,

Cluster 2 belongs to Public option

Cluster 3 Belongs to Friends option

Cluster 4 Belongs to “Only Me” option

A6.2.22 Test Tables for Test 22

Final Cluster Centers

	Cluster			
	1	2	3	4
Family members Accessibility level	5	2	2	2
Extraversion	6.07	6.44	5.91	5.49
Independence	5.86	6.61	5.70	5.51
Tough-Mindedness	6.07	6.62	5.99	5.31
Self-Control	6.21	6.74	6.27	5.36
Anxiety	5.13	5.18	5.11	5.52

Distances between Final Cluster Centers

Cluster	1	2	3	4
1		3.961	3.487	3.874
2	3.961		1.351	2.421
3	3.487	1.351		1.298
4	3.874	2.421	1.298	

ANOVA

	Cluster		Error		F	Sig.
	Mean Square	df	Mean Square	df		
Family members Accessibility level	170.928	3	.454	183	376.808	.000
Extraversion	5.371	3	.101	183	53.138	.000
Independence	8.942	3	.290	183	30.842	.000
Tough-Mindedness	9.688	3	.218	183	44.354	.000
Self-Control	10.757	3	.209	183	51.477	.000
Anxiety	1.268	3	.150	183	8.446	.000

The F tests should be used only for descriptive purposes because the clusters have been chosen to maximize the differences among cases in different clusters. The observed significance levels are not corrected for this and thus cannot be interpreted as tests of the hypothesis that the cluster means are equal.

Number of Cases in each Cluster

	Unweighted	Weighted
Cluster 1	26.000	56.000
Cluster 2	19.000	40.000
Cluster 3	30.000	62.000
Cluster 4	15.000	29.000
Valid	90.000	187.000
Missing	.000	.000

Cluster 1 belongs to "Custom" option

Cluster 2 belongs to Public option

Cluster 3 belongs to Public option

Cluster 4 belongs to Public option

A6.2.23 Test Tables for Test 23

Final Cluster Centers

	Cluster			
	1	2	3	4
Friends Accessibility level	5	1	2	1
Extraversion	6.09	6.40	5.92	5.48
Independence	5.86	6.55	5.74	5.38
Tough-Mindedness	6.13	6.53	5.96	5.38
Self-Control	6.26	6.75	6.15	5.45
Anxiety	5.19	5.22	5.06	5.47

Distances between Final Cluster Centers

Cluster	1	2	3	4
1		3.406	2.755	3.797
2	3.406		1.371	2.321
3	2.755	1.371		1.403
4	3.797	2.321	1.403	

ANOVA

	Cluster		Error		F	Sig.
	Mean Square	df	Mean Square	df		
Friends Accessibility level	96.827	3	.284	183	340.963	.000
Extraversion	5.695	3	.096	183	59.477	.000
Independence	10.378	3	.266	183	38.957	.000
Tough-Mindedness	8.627	3	.236	183	36.580	.000
Self-Control	10.918	3	.206	183	52.919	.000
Anxiety	1.262	3	.150	183	8.395	.000

The F tests should be used only for descriptive purposes because the clusters have been chosen to maximize the differences among cases in different clusters. The observed significance levels are not corrected for this and thus cannot be interpreted as tests of the hypothesis that the cluster means are equal.

Number of Cases in each Cluster

	Unweighted	Weighted
Cluster 1	16.000	36.000
Cluster 2	23.000	49.000
Cluster 3	36.000	71.000
Cluster 4	15.000	31.000
Valid	90.000	187.000
Missing	.000	.000

Cluster 1 belongs to "Custom" option

Cluster 2 belongs to Public option

Cluster 3 belongs to Friends option

Cluster 4 belongs to Public option

A6.2.24 Test Tables for Test 24

Final Cluster Centers

	Cluster			
	1	2	3	4
Employer Accessibility level	6	1	2	1
Extraversion	6.05	6.27	5.99	5.62
Independence	5.81	6.62	5.69	5.49
Tough-Mindedness	6.01	6.43	6.14	5.49
Self-Control	6.20	6.69	6.31	5.48
Anxiety	5.16	5.24	5.08	5.32

Distances between Final Cluster Centers

Cluster	1	2	3	4
1		4.368	3.628	4.246
2	4.368		1.256	2.017
3	3.628	1.256		1.261
4	4.246	2.017	1.261	

ANOVA

	Cluster		Error		F	Sig.
	Mean Square	df	Mean Square	df		
Employer Accessibility level	223.170	3	.373	183	598.059	.000
Extraversion	2.730	3	.144	183	18.914	.000
Independence	10.431	3	.266	183	39.281	.000
Tough-Mindedness	5.794	3	.282	183	20.526	.000
Self-Control	9.526	3	.229	183	41.576	.000
Anxiety	.437	3	.164	183	2.666	.049

The F tests should be used only for descriptive purposes because the clusters have been chosen to maximize the differences among cases in different clusters. The observed significance levels are not corrected for this and thus cannot be interpreted as tests of the hypothesis that the cluster means are equal.

Number of Cases in each Cluster

	Unweighted	Weighted
1	27.000	63.000
2	22.000	44.000
3	23.000	46.000
4	18.000	34.000
Valid	90.000	187.000
Missing	.000	.000

Cluster 1 belongs to "Not Supplied" option

Cluster 2 belongs to Public option

Cluster 3 belongs to Friends option

Cluster 4 belongs to Public option

A6.2.25 Test Tables for Test 25

Final Cluster Centers

	Cluster			
	1	2	3	4
CollegeUniversity Accessibility level	5	1	2	1

Extraversion	6.13	6.23	5.82	5.58
Independence	5.89	6.31	5.62	5.40
Tough-Mindedness	6.20	6.36	5.83	5.38
Self-Control	6.26	6.65	5.97	5.44
Anxiety	5.26	5.14	5.10	5.35

Distances between Final Cluster Centers

Cluster	1	2	3	4
1		4.201	3.375	4.540
2	4.201		1.449	1.938
3	3.375	1.449		1.297
4	4.540	1.938	1.297	

ANOVA

	Cluster		Error		F	Sig.
	Mean Square	df	Mean Square	df		
CollegeUniversity Accessibility level	168.613	3	.261	183	645.411	.000
Extraversion	3.858	3	.126	183	30.650	.000
Independence	7.690	3	.310	183	24.771	.000
Tough-Mindedness	8.029	3	.246	183	32.688	.000
Self-Control	11.835	3	.191	183	61.874	.000
Anxiety	.517	3	.162	183	3.181	.025

The F tests should be used only for descriptive purposes because the clusters have been chosen to maximize the differences among cases in different clusters. The observed significance levels are not corrected for this and thus cannot be interpreted as tests of the hypothesis that the cluster means are equal.

Number of Cases in each Cluster

	Unweighted	Weighted
1	17.000	39.000
2	36.000	74.000
3	23.000	43.000
4	14.000	31.000
Valid	90.000	187.000
Missing	.000	.000

Cluster 1 belongs to "Custom" option

Cluster 2 belongs to Public option

Cluster 3 Belongs to Friends option

Cluster 4 Belongs to Public option

A6.2.26 Test Tables for Test 26

Final Cluster Centers

	Cluster			
	1	2	3	4
Secondary school Accessibility level	5	1	2	1
Extraversion	6.01	6.30	5.91	5.64
Independence	5.99	6.41	5.53	5.45
Tough-Mindedness	6.16	6.44	5.96	5.41

Self-Control	6.22	6.69	6.18	5.49
Anxiety	5.26	5.17	5.03	5.32

Distances between Final Cluster Centers

Cluster	1	2	3	4
1		4.295	3.485	4.428
2	4.295		1.438	1.977
3	3.485	1.438		1.269
4	4.428	1.977	1.269	

ANOVA

	Cluster		Error		F	Sig.
	Mean Square	df	Mean Square	df		
Secondary school Accessibility level	165.748	3	.292	183	568.136	.000
Extraversion	3.994	3	.124	183	32.303	.000
Independence	10.759	3	.260	183	41.360	.000
Tough-Mindedness	9.365	3	.224	183	41.863	.000
Self-Control	12.307	3	.184	183	67.051	.000
Anxiety	.662	3	.160	183	4.138	.007

The F tests should be used only for descriptive purposes because the clusters have been chosen to maximize the differences among cases in different clusters. The observed significance levels are not corrected for this and thus cannot be interpreted as tests of the hypothesis that the cluster means are equal.

Number of Cases in each Cluster

	Unweighted	Weighted
1	17.000	37.000
2	30.000	66.000
3	23.000	42.000
4	20.000	42.000
Valid	90.000	187.000
Missing	.000	.000

Cluster 1 belongs to "Custom" option

Cluster 2 belongs to Public option

Cluster 3 belongs to Friends option

Cluster 4 belongs to Public option

A6.2.27 Test Tables for Test 27

Final Cluster Centers

	Cluster			
	1	2	3	4
Religion Accessibility level	6	2	1	2
Extraversion	6.06	6.34	5.96	5.72
Independence	5.84	6.51	5.90	5.51
Tough-Mindedness	5.99	6.62	6.04	5.62
Self-Control	6.10	6.82	6.47	5.60
Anxiety	5.10	5.41	4.96	5.30

Distances between Final Cluster Centers

Cluster	1	2	3	4
1		4.170	4.364	4.058
2	4.170		1.146	1.970
3	4.364	1.146		1.181
4	4.058	1.970	1.181	

ANOVA

	Cluster		Error		F	Sig.
	Mean Square	df	Mean Square	df		
Religion Accessibility level	211.186	3	.374	183	564.307	.000
Extraversion	3.070	3	.139	183	22.122	.000
Independence	7.833	3	.308	183	25.424	.000
Tough-Mindedness	7.598	3	.253	183	30.070	.000
Self-Control	12.561	3	.179	183	70.023	.000
Anxiety	1.797	3	.141	183	12.701	.000

The F tests should be used only for descriptive purposes because the clusters have been chosen to maximize the differences among cases in different clusters. The observed significance levels are not corrected for this and thus cannot be interpreted as tests of the hypothesis that the cluster means are equal.

Number of Cases in each Cluster

	Unweighted	Weighted
Cluster 1	25.000	52.000
Cluster 2	19.000	42.000
Cluster 3	21.000	43.000
Cluster 4	25.000	50.000
Valid	90.000	187.000
Missing	.000	.000

Cluster 1 belongs to “Not Supplied” option

Cluster 2 belongs to Friends option

Cluster 3 belongs to Public option

Cluster 4 belongs to Friends option

A6.2.28 Test Tables for Test 28

Final Cluster Centers

	Cluster			
	1	2	3	4
Political views Accessibility level	6	1	2	2
Extraversion	6.04	6.24	6.06	5.69
Independence	5.79	6.69	5.77	5.53
Tough-Mindedness	6.03	6.45	6.15	5.61
Self-Control	6.17	6.75	6.45	5.58
Anxiety	5.15	5.24	5.06	5.33

Distances between Final Cluster Centers

Cluster	1	2	3	4
1		4.618	4.055	4.289

2	4.618		1.125	1.946
3	4.055	1.125		1.157
4	4.289	1.946	1.157	

ANOVA

	Cluster		Error		F	Sig.
	Mean Square	df	Mean Square	df		
Political views Accessibility level	260.433	3	.269	183	968.619	.000
Extraversion	2.199	3	.153	183	14.370	.000
Independence	10.456	3	.265	183	39.436	.000
Tough-Mindedness	5.010	3	.295	183	16.976	.000
Self-Control	10.178	3	.218	183	46.594	.000
Anxiety	.555	3	.162	183	3.430	.018

The F tests should be used only for descriptive purposes because the clusters have been chosen to maximize the differences among cases in different clusters. The observed significance levels are not corrected for this and thus cannot be interpreted as tests of the hypothesis that the cluster means are equal.

Number of Cases in each Cluster

	Unweighted	Weighted
Cluster 1	32.000	68.000
Cluster 2	18.000	39.000
Cluster 3	19.000	37.000
Cluster 4	21.000	43.000
Valid	90.000	187.000
Missing	.000	.000

Cluster 1 belongs to "Not Supplied" option

Cluster 2 belongs to Public option

Cluster 3 Belongs to Friends option

Cluster 4 Belongs to Friends option

A6.2.29 Test Tables for Test 29

Final Cluster Centers

	Cluster			
	1	2	3	4
People who inspire you	6	2	2	2
Accessibility level	6.09	6.30	5.94	5.66
Extraversion	5.77	6.68	5.68	5.57
Independence	6.13	6.51	5.97	5.54
Tough-Mindedness	6.25	6.66	6.41	5.50
Self-Control	5.16	5.20	4.99	5.44
Anxiety				

Distances between Final Cluster Centers

Cluster	1	2	3	4
1		4.368	3.869	3.992
2	4.368		1.292	2.037
3	3.869	1.292		1.141

4	3.992	2.037	1.141	
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ANOVA

	Cluster		Error		F	Sig.
	Mean Square	df	Mean Square	df		
People who inspire you	212.028	3	.426	183	497.988	.000
Accessibility level	3.059	3	.139	183	22.011	.000
Extraversion	11.377	3	.250	183	45.503	.000
Independence	6.937	3	.264	183	26.325	.000
Tough-Mindedness	10.532	3	.213	183	49.527	.000
Self-Control	1.455	3	.147	183	9.894	.000
Anxiety						

The F tests should be used only for descriptive purposes because the clusters have been chosen to maximize the differences among cases in different clusters. The observed significance levels are not corrected for this and thus cannot be interpreted as tests of the hypothesis that the cluster means are equal.

Number of Cases in each Cluster

	Unweighted	Weighted
Cluster 1	26.000	58.000
Cluster 2	20.000	43.000
Cluster 3	23.000	44.000
Cluster 4	21.000	42.000
Valid	90.000	187.000
Missing	.000	.000

Cluster 1 belongs to "Not Supplied" option

Cluster 2 belongs to Friends option

Cluster 3 belongs to Friends option

Cluster 4 belongs to Friends option

A6.2.30 Test Tables for Test 30

Final Cluster Centers

	Cluster			
	1	2	3	4
Favourite quotations	2	1	2	6
Accessibility level	5.72	6.33	5.96	6.01
Extraversion	5.58	6.68	5.70	5.77
Independence	5.62	6.56	6.02	5.97
Tough-Mindedness	5.52	6.77	6.45	6.07
Self-Control	5.39	5.23	5.02	5.18
Anxiety				

Distances between Final Cluster Centers

Cluster	1	2	3	4
1		2.031	1.113	4.182
2	2.031		1.303	4.573
3	1.113	1.303		4.006
4	4.182	4.573	4.006	

ANOVA

	Cluster		Error		F	Sig.
	Mean Square	df	Mean Square	df		
Favourite quotations	226.086	3	.289	183	783.404	.000
Accessibility level	2.639	3	.146	183	18.093	.000
Extraversion	10.873	3	.258	183	42.100	.000
Independence	6.185	3	.276	183	22.420	.000
Tough-Mindedness	11.789	3	.192	183	61.387	.000
Self-Control	.997	3	.155	183	6.450	.000
Anxiety						

The F tests should be used only for descriptive purposes because the clusters have been chosen to maximize the differences among cases in different clusters. The observed significance levels are not corrected for this and thus cannot be interpreted as tests of the hypothesis that the cluster means are equal.

Number of Cases in each Cluster

	Unweighted	Weighted
Cluster 1	20.000	39.000
Cluster 2	19.000	42.000
Cluster 3	25.000	50.000
Cluster 4	26.000	56.000
Valid	90.000	187.000
Missing	.000	.000

Cluster 1 belongs to Friends option

Cluster 2 belongs to Public option

Cluster 3 belongs to Friends option

Cluster 4 belongs to "Not Supplied" option

A6.2.31 Test Tables for Test 31

Final Cluster Centers

	Cluster			
	1	2	3	4
Music you like Accessibility level	6	1	2	2
Extraversion	5.96	6.40	5.86	5.81
Independence	5.73	6.57	5.41	5.95
Tough-Mindedness	5.94	6.62	5.93	5.69
Self-Control	6.03	6.79	6.35	5.67
Anxiety	5.15	5.33	5.00	5.29

Distances between Final Cluster Centers

Cluster	1	2	3	4
1		4.366	3.839	3.997
2	4.366		1.591	1.698
3	3.839	1.591		.961
4	3.997	1.698	.961	

ANOVA

	Cluster		Error		F	Sig.
	Mean Square	df	Mean Square	df		

Music you like Accessibility level	180.008	3	.324	183	555.788	.000
Extraversion	3.356	3	.134	183	25.024	.000
Independence	11.448	3	.249	183	46.003	.000
Tough-Mindedness	7.588	3	.253	183	30.007	.000
Self-Control	10.634	3	.211	183	50.406	.000
Anxiety	1.040	3	.154	183	6.758	.000

The F tests should be used only for descriptive purposes because the clusters have been chosen to maximize the differences among cases in different clusters. The observed significance levels are not corrected for this and thus cannot be interpreted as tests of the hypothesis that the cluster means are equal.

	Unweighted	Weighted
Cluster 1	20.000	45.000
Cluster 2	22.000	47.000
Cluster 3	23.000	48.000
Cluster 4	25.000	47.000
Valid	90.000	187.000
Missing	.000	.000

Cluster 1 belongs to "Not supplied" option

Cluster 2 belongs to Public option

Cluster 3 belongs to Friends option

Cluster 4 belongs to Friends option

A6.2.32 Test Tables for Test 32

	Cluster			
	1	2	3	4
Books you like Accessibility level	6	2	2	2
Extraversion	5.97	6.44	6.01	5.71
Independence	5.81	6.66	5.86	5.51
Tough-Mindedness	6.04	6.65	6.03	5.60
Self-Control	6.09	6.79	6.47	5.63
Anxiety	5.18	5.34	4.98	5.31

Cluster	1	2	3	4
1		4.199	4.038	3.938
2	4.199		1.194	2.070
3	4.038	1.194		1.106
4	3.938	2.070	1.106	

	Cluster		Error		F	Sig.
	Mean Square	df	Mean Square	df		
Books you like Accessibility level	185.790	3	.357	183	520.385	.000
Extraversion	3.772	3	.127	183	29.631	.000

Independence	9.968	3	.273	183	36.497	.000
Tough-Mindedness	7.981	3	.246	183	32.390	.000
Self-Control	11.071	3	.204	183	54.324	.000
Anxiety	1.223	3	.151	183	8.106	.000

The F tests should be used only for descriptive purposes because the clusters have been chosen to maximize the differences among cases in different clusters. The observed significance levels are not corrected for this and thus cannot be interpreted as tests of the hypothesis that the cluster means are equal.

Number of Cases in each Cluster

	Unweighted	Weighted
Cluster 1	21.000	48.000
Cluster 2	17.000	38.000
Cluster 3	27.000	51.000
Cluster 4	25.000	50.000
Valid	90.000	187.000
Missing	.000	.000

Cluster 1 belongs to "Not supplied" option

Cluster 2 belongs to Friends option

Cluster 3 belongs to Friends option

Cluster 4 belongs to Friends option

A6.2.33 Test Tables for Test 33

Final Cluster Centers

	Cluster			
	1	2	3	4
Movies you like Accessibility level	6	1	2	1
Extraversion	5.93	6.40	5.90	5.74
Independence	5.76	6.57	5.57	5.86
Tough-Mindedness	5.93	6.62	5.95	5.51
Self-Control	6.03	6.79	6.23	5.53
Anxiety	5.15	5.33	5.08	5.30

Distances between Final Cluster Centers

Cluster	1	2	3	4
1		4.322	3.703	4.303
2	4.322		1.495	1.950
3	3.703	1.495		1.073
4	4.303	1.950	1.073	

ANOVA

	Cluster		Error		F	Sig.
	Mean Square	df	Mean Square	df		
Movies you like Accessibility level	179.041	3	.321	183	557.286	.000
Extraversion	3.436	3	.133	183	25.881	.000
Independence	9.765	3	.276	183	35.323	.000
Tough-Mindedness	8.406	3	.239	183	35.106	.000
Self-Control	10.252	3	.217	183	47.194	.000

Anxiety	.723	3	.159	183	4.547	.004
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The F tests should be used only for descriptive purposes because the clusters have been chosen to maximize the differences among cases in different clusters. The observed significance levels are not corrected for this and thus cannot be interpreted as tests of the hypothesis that the cluster means are equal.

Number of Cases in each Cluster

	Unweighted	Weighted
Cluster 1	20.000	45.000
Cluster 2	22.000	47.000
Cluster 3	33.000	66.000
Cluster 4	15.000	29.000
Valid	90.000	187.000
Missing	.000	.000

Cluster 1 belongs to “Not supplied” option

Cluster 2 belongs to Public option

Cluster 3 belongs to Friends option

Cluster 4 belongs to Public option

A6.2.34 Test Tables for Test 34

Final Cluster Centers

	Cluster			
	1	2	3	4
Television you like Accessibility level	6	1	2	1
Extraversion	6.04	6.34	5.90	5.75
Independence	5.87	6.55	5.49	5.85
Tough-Mindedness	6.03	6.58	5.95	5.61
Self-Control	6.09	6.79	6.26	5.68
Anxiety	5.20	5.34	5.02	5.26

Distances between Final Cluster Centers

Cluster	1	2	3	4
1		4.468	3.812	4.428
2	4.468		1.538	1.738
3	3.812	1.538		1.017
4	4.428	1.738	1.017	

ANOVA

	Cluster		Error		F	Sig.
	Mean Square	df	Mean Square	df		
Television you like Accessibility level	202.975	3	.247	183	822.305	.000
Extraversion	2.791	3	.143	183	19.470	.000
Independence	9.276	3	.284	183	32.610	.000
Tough-Mindedness	7.014	3	.262	183	26.744	.000
Self-Control	9.045	3	.237	183	38.162	.000
Anxiety	.876	3	.157	183	5.591	.001

The F tests should be used only for descriptive purposes because the clusters have been chosen to maximize the differences among cases in different clusters. The observed significance levels are not corrected for this and thus cannot be interpreted as tests of the hypothesis that the cluster means are equal.

Number of Cases in each Cluster

	Unweighted	Weighted
Cluster 1	20.000	47.000
Cluster 2	21.000	44.000
Cluster 3	28.000	55.000
Cluster 4	21.000	41.000
Valid	90.000	187.000
Missing	.000	.000

Cluster 1 belongs to “Not supplied” option

Cluster 2 belongs to Public option

Cluster 3 belongs to Friends option

Cluster 4 belongs to Public option

A6.2.35 Test Tables for Test 35

Final Cluster Centers

	Cluster			
	1	2	3	4
Games you like Accessibility level	6	1	2	1
Extraversion	6.01	6.34	5.88	5.74
Independence	5.84	6.55	5.57	5.76
Tough-Mindedness	6.03	6.58	5.93	5.53
Self-Control	6.13	6.79	6.22	5.54
Anxiety	5.17	5.34	5.06	5.27

Distances between Final Cluster Centers

Cluster	1	2	3	4
1		4.351	3.683	4.455
2	4.351		1.503	1.923
3	3.683	1.503		1.113
4	4.455	1.923	1.113	

ANOVA

	Cluster		Error		F	Sig.
	Mean Square	df	Mean Square	df		
Games you like Accessibility level	216.713	3	.273	183	792.679	.000
Extraversion	2.693	3	.145	183	18.574	.000
Independence	8.347	3	.300	183	27.854	.000
Tough-Mindedness	7.317	3	.257	183	28.438	.000
Self-Control	9.671	3	.227	183	42.648	.000
Anxiety	.695	3	.160	183	4.357	.005

The F tests should be used only for descriptive purposes because the clusters have been chosen to maximize the differences among cases in different clusters. The observed significance levels are not corrected for this and thus cannot be interpreted as tests of the hypothesis that the cluster means are equal.

Number of Cases in each Cluster

	Unweighted	Weighted
1	25.000	57.000
2	21.000	44.000
3	28.000	55.000
4	16.000	31.000
Valid	90.000	187.000
Missing	.000	.000

Cluster 1 belongs to “Not supplied” option

Cluster 2 belongs to Public option

Cluster 3 belongs to Friends option

Cluster 4 belongs to Public option

A6.2.36 Test Tables for Test 36

Final Cluster Centers

	Cluster			
	1	2	3	4
Favourite sports Accessibility level	6	2	2	1
Extraversion	6.04	6.32	5.91	5.76
Independence	5.83	6.67	5.58	5.76
Tough-Mindedness	6.09	6.58	5.99	5.52
Self-Control	6.25	6.71	6.22	5.66
Anxiety	5.23	5.33	5.02	5.21

Distances between Final Cluster Centers

Cluster	1	2	3	4
1		4.334	3.726	4.528
2	4.334		1.508	1.858
3	3.726	1.508		1.079
4	4.528	1.858	1.079	

ANOVA

	Cluster		Error		F	Sig.
	Mean Square	df	Mean Square	df		
Favourite sports Accessibility level	242.296	3	.269	183	901.088	.000
Extraversion	2.110	3	.155	183	13.657	.000
Independence	9.098	3	.287	183	31.656	.000
Tough-Mindedness	6.974	3	.263	183	26.525	.000
Self-Control	6.695	3	.276	183	24.300	.000
Anxiety	.739	3	.159	183	4.655	.004

The F tests should be used only for descriptive purposes because the clusters have been chosen to maximize the differences among cases in different clusters. The observed significance levels are not corrected for this and thus cannot be interpreted as tests of the hypothesis that the cluster means are equal.

Number of Cases in each Cluster

	Unweighted	Weighted
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	1	29.000	67.000
Cluster	2	18.000	36.000
	3	24.000	47.000
	4	19.000	37.000
Valid		90.000	187.000
Missing		.000	.000

Cluster 1 belongs to “Not supplied” option

Cluster 2 belongs to Friends option

Cluster 3 belongs to Friends option

Cluster 4 belongs to Public option

A6.2.37 Test Tables for Test 37

Final Cluster Centers

	Cluster			
	1	2	3	4
Favourite sports teams	6	2	2	1
Accessibility level				
Extraversion	6.05	6.32	5.88	5.78
Independence	5.82	6.67	5.54	5.76
Tough-Mindedness	6.09	6.58	5.98	5.53
Self-Control	6.27	6.71	6.16	5.70
Anxiety	5.19	5.33	5.07	5.19

Distances between Final Cluster Centers

Cluster	1	2	3	4
1		4.385	3.708	4.587
2	4.385		1.580	1.823
3	3.708	1.580		1.077
4	4.587	1.823	1.077	

ANOVA

	Cluster		Error		F	Sig.
	Mean Square	df	Mean Square	df		
Favourite sports teams	259.190	3	.251	183	1033.926	.000
Accessibility level						
Extraversion	2.136	3	.154	183	13.863	.000
Independence	9.186	3	.286	183	32.126	.000
Tough-Mindedness	6.968	3	.263	183	26.492	.000
Self-Control	6.439	3	.280	183	23.017	.000
Anxiety	.422	3	.164	183	2.572	.056

The F tests should be used only for descriptive purposes because the clusters have been chosen to maximize the differences among cases in different clusters. The observed significance levels are not corrected for this and thus cannot be interpreted as tests of the hypothesis that the cluster means are equal.

Number of Cases in each Cluster

	Unweighted	Weighted
Cluster 1	32.000	73.000
Cluster 2	18.000	36.000
Cluster 3	20.000	39.000

4	20.000	39.000
Valid	90.000	187.000
Missing	.000	.000

Cluster 1 belongs to “Not supplied” option

Cluster 2 belongs to Friends option

Cluster 3 belongs to Friends option

Cluster 4 belongs to Public option

A6.2.38 Test Tables for Test 38

Final Cluster Centers

	Cluster			
	1	2	3	4
Favourite athletes Accessibility level	6	2	2	1
Extraversion	6.05	6.32	5.89	5.77
Independence	5.84	6.67	5.53	5.78
Tough-Mindedness	6.07	6.58	6.00	5.53
Self-Control	6.28	6.71	6.15	5.69
Anxiety	5.21	5.33	5.04	5.21

Distances between Final Cluster Centers

Cluster	1	2	3	4
1		4.479	3.819	4.676
2	4.479		1.586	1.825
3	3.819	1.586		1.091
4	4.676	1.825	1.091	

ANOVA

	Cluster		Error		F	Sig.
	Mean Square	df	Mean Square	df		
Favourite athletes Accessibility level	262.283	3	.202	183	1298.351	.000
Extraversion	2.161	3	.154	183	14.061	.000
Independence	9.447	3	.282	183	33.542	.000
Tough-Mindedness	6.780	3	.266	183	25.479	.000
Self-Control	6.494	3	.279	183	23.289	.000
Anxiety	.582	3	.161	183	3.609	.014

The F tests should be used only for descriptive purposes because the clusters have been chosen to maximize the differences among cases in different clusters. The observed significance levels are not corrected for this and thus cannot be interpreted as tests of the hypothesis that the cluster means are equal.

Number of Cases in each Cluster

	Unweighted	Weighted
1	30.000	69.000
2	18.000	36.000
3	23.000	45.000
4	19.000	37.000
Valid	90.000	187.000
Missing	.000	.000

Cluster 1 belongs to “Not supplied” option

Cluster 2 belongs to Friends option

Cluster 3 belongs to Friends option

Cluster 4 belongs to Public option

A6.2.39 Test Tables for Test 39

Final Cluster Centers

	Cluster			
	1	2	3	4
Activities Accessibility level	6	2	2	6
Extraversion	5.58	6.28	5.79	6.30
Independence	5.37	6.48	5.60	6.07
Tough-Mindedness	5.25	6.45	5.76	6.46
Self-Control	5.51	6.71	5.92	6.49
Anxiety	5.40	5.24	5.14	5.14

Distances between Final Cluster Centers

Cluster	1	2	3	4
1		4.670	3.956	1.863
2	4.670		1.478	4.156
3	3.956	1.478		4.023
4	1.863	4.156	4.023	

ANOVA

	Cluster		Error		F	Sig.
	Mean Square	df	Mean Square	df		
Activities Accessibility level	197.931	3	.379	183	522.854	.000
Extraversion	4.518	3	.115	183	39.266	.000
Independence	10.153	3	.270	183	37.595	.000
Tough-Mindedness	10.458	3	.206	183	50.815	.000
Self-Control	10.121	3	.219	183	46.138	.000
Anxiety	.381	3	.165	183	2.311	.078

The F tests should be used only for descriptive purposes because the clusters have been chosen to maximize the differences among cases in different clusters. The observed significance levels are not corrected for this and thus cannot be interpreted as tests of the hypothesis that the cluster means are equal.

Number of Cases in each Cluster

	Unweighted	Weighted
Cluster 1	7.000	16.000
Cluster 2	25.000	52.000
Cluster 3	43.000	83.000
Cluster 4	15.000	36.000
Valid	90.000	187.000
Missing	.000	.000

Cluster 1 belongs to “Not supplied” option

Cluster 2 belongs to Friends option

Cluster 3 belongs to Friends option

Cluster 4 belongs to “Not Supplied” option

A6.2.40 Test Tables for Test 40

Final Cluster Centers

	Cluster			
	1	2	3	4
Interests Accessibility level	6	1	2	1
Extraversion	6.10	6.29	5.95	5.61
Independence	5.87	6.59	5.68	5.51
Tough-Mindedness	6.10	6.51	5.94	5.56
Self-Control	6.13	6.72	6.30	5.49
Anxiety	5.23	5.24	5.03	5.38

Distances between Final Cluster Centers

Cluster	1	2	3	4
1		4.338	3.813	4.296
2	4.338		1.289	2.014
3	3.813	1.289		1.094
4	4.296	2.014	1.094	

ANOVA

	Cluster		Error		F	Sig.
	Mean Square	df	Mean Square	df		
Interests Accessibility level	182.616	3	.328	183	556.350	.000
Extraversion	3.159	3	.137	183	23.006	.000
Independence	9.964	3	.273	183	36.473	.000
Tough-Mindedness	6.195	3	.276	183	22.469	.000
Self-Control	9.924	3	.223	183	44.580	.000
Anxiety	.984	3	.155	183	6.355	.000

The F tests should be used only for descriptive purposes because the clusters have been chosen to maximize the differences among cases in different clusters. The observed significance levels are not corrected for this and thus cannot be interpreted as tests of the hypothesis that the cluster means are equal.

Number of Cases in each Cluster

	Unweighted	Weighted
1	19.000	44.000
2	21.000	45.000
3	32.000	64.000
4	18.000	34.000
Valid	90.000	187.000
Missing	.000	.000

Cluster 1 belongs to “Not supplied” option

Cluster 2 belongs to Public option

Cluster 3 belongs to Friends option

Cluster 4 belongs to Public option

A6.2.41 Test Tables for Test 41

Final Cluster Centers

	Cluster			
	1	2	3	4
Email addresses Accessibility level	5	1	2	2
Extraversion	6.05	6.41	5.98	5.62
Independence	5.76	6.84	5.77	5.49
Tough-Mindedness	6.04	6.51	6.09	5.55
Self-Control	6.19	6.67	6.39	5.57
Anxiety	5.19	5.32	4.96	5.42

Distances between Final Cluster Centers

Cluster	1	2	3	4
1		3.515	2.763	3.234
2	3.515		1.404	2.144
3	2.763	1.404		1.223
4	3.234	2.144	1.223	

ANOVA

	Cluster		Error		F	Sig.
	Mean Square	df	Mean Square	df		
Email addresses Accessibility level	117.402	3	.491	183	239.147	.000
Extraversion	3.943	3	.124	183	31.680	.000
Independence	13.425	3	.216	183	62.022	.000
Tough-Mindedness	5.795	3	.282	183	20.534	.000
Self-Control	8.503	3	.246	183	34.577	.000
Anxiety	1.856	3	.141	183	13.210	.000

The F tests should be used only for descriptive purposes because the clusters have been chosen to maximize the differences among cases in different clusters. The observed significance levels are not corrected for this and thus cannot be interpreted as tests of the hypothesis that the cluster means are equal.

Number of Cases in each Cluster

	Unweighted	Weighted
1	26.000	55.000
2	17.000	36.000
3	27.000	57.000
4	20.000	39.000
Valid	90.000	187.000
Missing	.000	.000

Cluster 1 belongs to "Custom" option

Cluster 2 belongs to Public option

Cluster 3 belongs to Friends option

Cluster 4 belongs to Friends option

A6.2.42 Test Tables for Test 42

Final Cluster Centers

Cluster

	1	2	3	4
Phone numbers Accessibility level	5	1	2	2
Extraversion	6.13	6.37	5.95	5.59
Independence	5.87	6.89	5.91	5.48
Tough-Mindedness	6.17	6.69	6.00	5.46
Self-Control	6.26	6.82	6.42	5.55
Anxiety	5.17	5.21	4.99	5.46

Distances between Final Cluster Centers

Cluster	1	2	3	4
1		4.016	3.389	3.782
2	4.016		1.412	2.409
3	3.389	1.412		1.271
4	3.782	2.409	1.271	

ANOVA

	Cluster		Error		F	Sig.
	Mean Square	df	Mean Square	df		
Phone numbers Accessibility level	194.633	3	.606	183	321.344	.000
Extraversion	3.547	3	.131	183	27.088	.000
Independence	9.166	3	.286	183	32.017	.000
Tough-Mindedness	7.618	3	.252	183	30.187	.000
Self-Control	8.705	3	.243	183	35.881	.000
Anxiety	1.486	3	.147	183	10.133	.000

The F tests should be used only for descriptive purposes because the clusters have been chosen to maximize the differences among cases in different clusters. The observed significance levels are not corrected for this and thus cannot be interpreted as tests of the hypothesis that the cluster means are equal.

Number of Cases in each Cluster

	Unweighted	Weighted
1	40.000	86.000
2	11.000	21.000
3	20.000	42.000
4	19.000	38.000
Valid	90.000	187.000
Missing	.000	.000

Cluster 1 belongs to “Custom” option

Cluster 2 belongs to Public option

Cluster 3 belongs to Friends option

Cluster 4 belongs to Friends option

A6.2.43 Test Tables for Test 43

Final Cluster Centers

Cluster

	1	2	3	4
Street address Accessibility level	5	2	2	6
Extraversion	5.84	6.32	5.75	6.21
Independence	5.60	6.60	5.62	6.09
Tough-Mindedness	5.79	6.64	5.65	6.31
Self-Control	5.85	6.88	5.91	6.44
Anxiety	5.30	5.16	5.16	5.16

Distances between Final Cluster Centers

Cluster	1	2	3	4
1		3.273	2.870	1.644
2	3.273		1.800	4.143
3	2.870	1.800		4.299
4	1.644	4.143	4.299	

ANOVA

	Cluster		Error		F	Sig.
	Mean Square	df	Mean Square	df		
Street address Accessibility level	213.068	3	.341	183	624.320	.000
Extraversion	3.349	3	.134	183	24.959	.000
Independence	8.036	3	.305	183	26.367	.000
Tough-Mindedness	8.516	3	.238	183	35.836	.000
Self-Control	8.849	3	.240	183	36.835	.000
Anxiety	.218	3	.167	183	1.300	.276

The F tests should be used only for descriptive purposes because the clusters have been chosen to maximize the differences among cases in different clusters. The observed significance levels are not corrected for this and thus cannot be interpreted as tests of the hypothesis that the cluster means are equal.

Number of Cases in each Cluster

	Unweighted	Weighted
Cluster 1	22.000	43.000
Cluster 2	14.000	28.000
Cluster 3	27.000	55.000
Cluster 4	27.000	61.000
Valid	90.000	187.000
Missing	.000	.000

Cluster 1 belongs to "Custom" option

Cluster 2 belongs to Public option

Cluster 3 belongs to Friends option

Cluster 4 belongs to "Not Supplied" option

A6.2.44 Test Tables for Test 44

Final Cluster Centers

Cluster

	1	2	3	4
IM screen names Accessibility level	5	2	2	6
Extraversion	5.81	6.26	5.74	6.22
Independence	5.60	6.61	5.52	6.09
Tough-Mindedness	5.70	6.51	5.72	6.29
Self-Control	5.74	6.73	5.90	6.50
Anxiety	5.36	4.98	5.18	5.21

Distances between Final Cluster Centers

Cluster	1	2	3	4
1		3.385	3.080	1.655
2	3.385		1.689	4.135
3	3.080	1.689		4.388
4	1.655	4.135	4.388	

ANOVA

	Cluster		Error		F	Sig.
	Mean Square	df	Mean Square	df		
IM screen names Accessibility level	230.589	3	.338	183	681.564	.000
Extraversion	3.380	3	.134	183	25.284	.000
Independence	9.796	3	.276	183	35.499	.000
Tough-Mindedness	6.896	3	.264	183	26.102	.000
Self-Control	9.030	3	.237	183	38.056	.000
Anxiety	.794	3	.158	183	5.028	.002

The F tests should be used only for descriptive purposes because the clusters have been chosen to maximize the differences among cases in different clusters. The observed significance levels are not corrected for this and thus cannot be interpreted as tests of the hypothesis that the cluster means are equal.

Number of Cases in each Cluster

	Unweighted	Weighted
1	18.000	36.000
2	16.000	31.000
3	27.000	55.000
4	29.000	65.000
Valid	90.000	187.000
Missing	.000	.000

Cluster 1 belongs to “Custom” option

Cluster 2 belongs to Public option

Cluster 3 belongs to Friends option

Cluster 4 belongs to “Not Supplied” option

A6.2.45 Test Tables for Test 45

Final Cluster Centers

	Cluster			
	1	2	3	4
Website Accessibility level	5	2	2	6

Extraversion	5.79	6.29	5.69	6.30
Independence	5.49	6.42	5.51	6.26
Tough-Mindedness	5.73	6.46	5.65	6.39
Self-Control	5.95	6.62	5.74	6.61
Anxiety	5.09	5.18	5.26	5.24

Distances between Final Cluster Centers

Cluster	1	2	3	4
1		4.173	3.659	1.373
2	4.173		1.639	4.293
3	3.659	1.639		4.291
4	1.373	4.293	4.291	

ANOVA

	Cluster		Error		F	Sig.
	Mean Square	df	Mean Square	df		
Website Accessibility level	243.810	3	.378	183	644.657	.000
Extraversion	4.832	3	.110	183	43.965	.000
Independence	11.354	3	.250	183	45.341	.000
Tough-Mindedness	8.717	3	.234	183	37.195	.000
Self-Control	9.740	3	.226	183	43.171	.000
Anxiety	.262	3	.167	183	1.573	.197

The F tests should be used only for descriptive purposes because the clusters have been chosen to maximize the differences among cases in different clusters. The observed significance levels are not corrected for this and thus cannot be interpreted as tests of the hypothesis that the cluster means are equal.

Number of Cases in each Cluster

	Unweighted	Weighted
1	22.000	44.000
2	24.000	50.000
3	26.000	52.000
4	18.000	41.000
Valid	90.000	187.000
Missing	.000	.000

Cluster 1 belongs to “Custom” option

Cluster 2 belongs to Public option

Cluster 3 belongs to Friends option

Cluster 4 belongs to “Not Supplied” option

Chapter 7 Appendix: A7

A7.1 Distribution of the Interviewed Female Participants Accessibility Choices as shown in the following Table A7.1

Accessibility item for Females	Public	Friends	Friends except Acquaintances	Only me	Custom	Not Supplied
Current City	3	3	0	0	0	1
Hometown	3	2	0	0	0	2
Gender	3	1	0	1	0	2
Birthday (month and day only)	0	4	2	1	0	0
Interested in (Men/Women)	1	0	0	2	0	4
Languages	1	1	1	0	0	4
Relationship status	3	2	0	0	0	2
Family members	1	3	1	0	0	2
Friends	1	3	1	1	1	0
Employer	1	2	0	0	0	4
College/University	3	4	0	0	0	0
Secondary school	4	1	0	0	0	2
Religion	1	1	1	1	0	3
Political views	0	1	0	0	0	6
Email	0	3	0	1	0	3
Favourite quotation	1	2	0	1	0	3
Music you like	3	2	0	0	1	1
Books you like	3	2	0	1	1	0
Movies you like	4	2	0	0	1	0
Television you like	4	2	0	0	1	0
Games you like	3	2	0	0	2	
Favourite sports	3	2	0	0	1	1
Phone number	0	0	0	0	1	6
Street address	0	0	0	2	0	5

Table A7.1 Distribution of the Interviewed Female Participants Accessibility Choices.

A7.2 Distribution of Interviewed Male Participants Accessibility Choices as shown in the following Table A7.2

Accessibility item for Male Participants	Public	Friends	Friends except Acquaintances	Only me	Custom	Not Supplied
Current City	3	1	0	2	0	1
Hometown	3	1	0	2	1	0
Gender	1	3	0	2	1	0
Birthday (month and day only)	0	3	0	3	1	0
Interested in (Men/Women)	2	2	0		1	2
Languages	1	2	0	0	0	4
Relationship status	1	2	0	3	0	1
Family members	2	3	1	0	0	1
Friends	2	2	0	2	1	
Employer	2	2	0	0	0	3
College/University	4	3	0	0	0	0
Secondary school	3	2	0	0	0	2
Religion	0	2	1	0	0	4
Political views	0	1	1	0	0	5
Email	0	5	0	1	0	1
Favourite quotation	1	0	0	0	0	6
Music you like	5	2	0	0	0	0
Books you like	4	0	0	0	0	3
Movies you like	5	1			0	1
Television you like	5	1	0	0	0	1
Games you like	3	2	0	0	2	0
Favourite sports	3	1	0	0	2	1
Phone number		3	0	3	0	1

Street address	2	2	0	0	0	3
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Table A7.2 Distribution of Interviewed Male Participants Accessibility Choices

A7.3 The Distribution of Interviewed All Participants Risk Percentages of Public, Friends and Safe Zone of Accessibility Choices is shown in the following Table A7.3:

Accessibility choices for all participants	“Public” (High Risk)	“Friends” (Medium Risk)	“Friends except Acquaintances”, “Only Me”, “Custom” and “Not Supplied” (Safe Zone)
Current City	6 (43%)	4 (29%)	4 (29%)
Hometown	6 (43%)	3 (21%)	5 (36%)
Gender	4 (29%)	4 (29%)	5 (36%)
Birthday (month and day only)	0%	7 (50%)	7 (50%)
Interested in (Men/Women)	3 (21%)	2 (14%)	9 (64%)
Languages	2 (14%)	3 (21%)	9 (64%)
Relationship status	4 (29%)	4 (29%)	6 (43%)
Family members	3 (21%)	6 (43%)	5 (36%)
Friends	3 (21%)	5 (36%)	6 (43%)
Employer	3 (21%)	4 (29%)	7 (50%)
College/University	7 (50%)	7 (50%)	0

Secondary school	7 (50%)	3 (21%)	4 (29%)
Religion	1 (7%)	3 (21%)	10 (71%)
Political views	0%	2 (14%)	12 (86%)
Email	0%	8 (67%)	6 (43%)
Favourite quotation	2 (14%)	2 (14%)	10 (71%)
Music you like	8 (57%)	4 (29%)	2 (14%)
Books you like	7 (50%)	2 (14%)	5 (36%)
Movies you like	9 (64%)	3 (21%)	2 (14%)
Television you like	9 (64%)	3 (21%)	2 (14%)
Games you like	6 (43%)	3 (21%)	5 (36%)
Favourite sports	8 (57%)	3 (21%)	3 (21%)
Phone number	0%	3 (21%)	11 (79%)
Street address	2 (14%)	2 (14%)	10 (71%)

Table A7.3 Distribution of Interviewed All Participants Risk Percentages of Public, Friends and Safe Zone of Accessibility Choices

A7.4 Distribution of the Interviewed Female Participants risk percentages of Public, Friends and Safe Zone of Accessibility Choices as shown in Table A7.4

Accessibility choices for Female participants	“Public” (High Risk)	“Friends” (Medium Risk)	“Friends except Acquaintances”, “Only Me”, “Custom” and “Not Supplied” (Safe Zone)
Current City	3 (21%)	3 (21%)	1 (7%)
Hometown	3 (21%)	2 (14%)	2 (14%)
Gender	3 (21%)	1 (7%)	3 (21%)
Birthday (month and day only)		4 (29%)	3 (21%)
Interested in (Men/Women)	1 (7%)	0	6 (57%)
Languages	1 (7%)	1 (7%)	5 (36%)
Relationship status	3 (21%)	2 (14%)	2 (14%)
Family members	1 (7%)	3 (21%)	3 (21%)
Friends	1 (7%)	3 (21%)	3 (21%)
Employer	1 (7%)	2 (14%)	4 (29%)
College/University	3 (21%)	4 (29%)	0 (0%)
Secondary school	4 (29%)	1 (7%)	2 (14%)
Religion	1	1	5

	(7%)	(7%)	(36%)
Political views	0	1 (7%)	6 (57%)
Email	0	3 (21%)	4 (29%)
Favourite quotation	1 (7%)	2 (14%)	4 (29%)
Music you like	3 (21%)	2 (14%)	2 (14%)
Books you like	3 (21%)	2 (14%)	2 (14%)
Movies you like	4 (29%)	2 (14%)	1 (7%)
Television you like	4 (29%)	2 (14%)	1 (7%)
Games you like	3 (21%)	2 (14%)	2 (14%)
Favourite sports	3 (21%)	2 (14%)	3 (21%)
Phone number	0	3 (21%)	2 (14%)
Street address	0	0	7 (50%)

Table A7.4 Distribution of the Interviewed Female Participants risk percentages of Public, Friends and Safe Zone of Accessibility Choices

A7.5 The interview data sheet for accessibility that was completed by the male participants interviewing as shown in Table A7.5

Accessibility choices of Male participants	“Public” (High Risk)	“Friends” (Medium Risk)	“Friends except Acquaintances”, “Only Me”, “Custom” and “Not Supplied” (Safe Zone)
Current City	3 (21%)	1 (7%)	3 (21%)
Hometown	3 (21%)	1 (7%)	3 (21%)
Gender	1 (7%)	3 (21%)	3 (21%)
Birthday (month and day only)	0	3 (21%)	4 (29%)
Interested in (Men/Women)	2 (14%)	2 (14%)	3 (21%)
Languages	1 (7%)	2 (14%)	4 (29%)
Relationship status	1 (7%)	2 (14%)	4 (29%)
Family members	2 (14%)	3 (21%)	2 (14%)
Friends	2 (14%)	2 (14%)	3 (21%)
Employer	2 (14%)	2 (14%)	3 (21%)
College/University	4 (29%)	3 (21%)	0
Secondary school	3 (21%)	2 (14%)	2 (14%)
Religion	0	2 (14%)	5 (36%)
Political views	0	1 (7%)	6 (43%)

Email	0	5 (36%)	2 (14%)
Favourite quotation	1 (7%)	0	6 (43%)
Music you like	5 (36%)	2 (14%)	
Books you like	4 (29%)	0	3 (21%)
Movies you like	5 (36%)	1 (7%)	1 (7%)
Television you like	5 (36%)	1 (7%)	1 (7%)
Games you like	3 (21%)	2 (14%)	2 (14%)
Favourite sports	3 (21%)	1 (7%)	3 (21%)
Phone number	0	3 (21%)	4 (29%)
Street address	2 (14%)	2 (14%)	3 (21%)

Table A7.5 Distribution of the Interviewed Male Participants Risk Percentages of Public, Friends and Safe Zone of Accessibility Choices

A7.6 The total number of participants is 14 where there were 7 males and 7 females who were interviewed on Facebook Settings.

The results of the Interviews on Facebook settings are as shown in the Table A7.6 as follows:

Type of Setting	All Replies One by One	Male Replies	Female Replies
Public	Yes, Yes, Yes, Yes.	3	1

If Public what data is shared	Photos, Photos, Photos, Education, photos and events,		
Private	Yes, Yes, Yes, Yes, Yes, Yes, Yes, Yes, Yes, Yes.	4	6
If Private, Any Public posts without your consent	No, No, No, No, No, No, No, No, No, No.	0	0
Any shared demographics?	No, No, No, No, Yes, No, No, No, No, No, No, Yes, No, No.	0	0
a. Do you use any of The following Security Settings?			
i. Login Alerts	Yes, No, Yes, Yes, No, No, No, No, Yes, Yes, No, No, No, No.	3 Yes 4 No	2 Yes 5 No
ii. Login Approvals	No, No, No, No, No, No, No, No, No, No, No, No, No, No.	7 No	7 No
iii. Code Generator	No, Yes, Yes, Yes, Yes, Yes, Yes, No, No, No, Yes, No, No, No.	4 Yes 3 No	3 Yes 4 No
iv. App Passwords	No, No, No, No, No, Yes, No, No, No, No, No, No, No, No.	0 Yes 7 No	1 Yes 6 No
v. Trusted Contacts	No, No, No, No, No, Yes, No, No, No,	0 Yes 7 No	3 Yes 4 No

	Yes, Yes, No, No, No.		
i. Trusted Browsers	No, Yes, No, Yes, No, No, No, No, No, No, Yes, No, No, No.	2 Yes 5 No	1 Yes 6 No
ii. Public Key	No, No.	0 Yes 7 No	0 Yes 7 No
b. How do you use any of following Privacy Settings			
i. Who can see your future posts	Friends Except Acquaintances, Only Me, Friends, Public, Friends, Friends, Friends, Only Me, Friends, Friends, Friends, Friends, Friends, Friends, Friends.	4 Friends 1 Only me 1 "Friends Except Acquaintances" 1 "Public"	6 Friends 1 Only me
ii. Review all your posts and things you're tagged in	No, Use activity log, Use Active, Activity log, Yes, Yes, Yes, Yes, No, No, No, No, No, No, No.	3 Yes 4 No	3 Yes 4 No
iii. Limit the audience for posts you've shared with friends of friends or Public	No, No, Limit, Limit, Limit, Limit, Limit, Limit, No, No, No, No, No, Limit.	4 Limit 3 No Limit	3 Limit 4 No Limit
iv. Who can send you friend requests?	Anyone, Anyone, Anyone, Anyone,	6 Anyone	6 Anyone

	Anyone, Anyone, Anyone, Anyone, Friends of Friends, Anyone, Anyone, Anyone, Anyone, Friends of Friends.	1 Friends of Friends	1 Friends of Friends
v. Whose messages do I want filtered into my inbox?	None, Anyone, None, None, Anyone, Anyone, Friends, Friends, Friends and Friends of Friends, None, Friends, None, None, None.	5 None 2 Anyone	2 None 1 Anyone 3 Friends 1 Friends of Friends
vi. Who can look you up using the email address you provided?	Friends, Friends, Friends of Friends, Everyone, Friends of Friends, Anyone, Friends, Friends, Friends, Friends, Anyone, Anyone, Anyone, Friends.	4 Friends 1 Friends of Friends 2 Anyone	4 Friends 3 Anyone
vii. Do you want other search engines to link to your timeline?	No, No, No, Yes, Yes, No, No, No, No, Yes, No, Yes, Yes, No.	3 Yes 4 No	2 Yes 5 No
c. How do you use Timeline & Tagging in the following options?			
i. Who can post on your timeline?	Friends, Friends, Friends, Friends, Anyone, Friends,	4 Friends 3 anyone	5 Friends 2 Anyone

	Friends, Friends, Friends, Friends, Anyone, Anyone, Anyone, Anyone.		
ii. Do you review posts friends tag you in before they appear on your timeline?	Off, On, On, On, On, On, On, On, Off, Off, On, Off, Off, Off.	4 On 3 Off	4 On 3 Off
iii. Who can see posts you've been tagged in on your timeline?	Custom, Friends, Only me, Only me, Friends, Friends, Friends, Friends, Friends, Friends, Only me, Friends, Friends of Friends, Friends of Friends.	2 Friends 1 Custom 2 Only me 2 Friends of Friends	6 Friends 1 Only me
iv. Who can see what others post on your timeline?	Custom, Only me, Friends, Friends, Only me, Friends, Friends, Only me, Friends, Friends, Only me, Friends, Friends, Friends.	4 Friends 2 Only me 1 Custom	5 Friends 2 Only me
v. Do you Review tags people add to your own posts before the tags appear on Facebook?	Off, On, On, On, On, On, Off, On, On, Off, Off, Off, On, Off	5 On 2 Off	3 On 4 Off
vi. When you're tagged in a post, who do you want to add to	Custom, Only me, Friends, Only me, Only me, Only me,	3 Friends 3 Only me 1 Custom	4 Friends 3 Only me

the audience if they aren't already in it?	Friends, Only me, Friends, Friends, Only me, Friends, Friends, Friends.		
vii. Who sees tag suggestions when photos that look like you are uploaded?	Unavailable, Unavailable, Unavailable, Unavailable, unavailable, Unavailable, Unavailable Unavailable, Unavailable, Unavailable Unavailable, Unavailable, Unavailable, Unavailable, Unavailable, Unavailable.	7 Unavailable	7 Unavailable
d. Blocking			
Restricted List (check this to see if the user has blocked any apps, events or pages ...etc)	None, 21 Apps blocked, 1 App, 1 App, None, Yes, Yes, None, Yes, None, Yes 5 Apps, None, None, Some People Blocked.	3 None 2 Apps 1 people	4 Yes 3 None
e. Followers			
Who can follow you	Friends, Friends, Friends, Friends,	4 Friends 2 Anyone	3 Friends 1 Anyone

	Anyone, None, Friends, Friends, None, None, Friends, Anyone, Anyone, None.	1 None	3 None
f. Apps			
a. Logged in with Facebook	45 Apps, No Apps, 9 Apps, 17 Apps, No Apps, Yes, No Apps, No Apps, 39 Apps, 52 Apps, 43 Apps, 60 Apps, 1 App, 134 Apps.	2 No Apps 5 Apps (45, 9, 17, 1, 134 Apps)	2 No Apps 5 Apps (1, 39, 52, 43, 60 Apps)
ii. Logged in Anonymously			
iii. Apps, Websites and Plugins	No, No, No, No, Enabled, Enabled, Enabled, Enabled, No, No, Enabled, No, No, No.	1 Enabled 6 "Not Enabled"	4 Enabled 3 "Not Enabled"
iv. Apps, Others Use	All Except some posts on religion and politics, all, all, all, All posts by friends, No, No, No, No, No, All, All, No, No.	5 All 2 No	2 All 5 No

Table A7.6 The Interview Data of the Participants on the Facebook Settings

A7.7 Interview Facebook Settings Analysis: 7 the dangerous settings choices and the safe settings choices for females and males are considered and tabled

In the following **Table A7.7**, the dangerous settings choices and the safe settings choices for females and males are considered and tabled as follows:

Type of Setting	Dangerous Settings Choices By Females	Safe Settings Choices By Females	Dangerous Settings Choices Males	Safe Settings Choices Males	Total Dangerous Settings Choices
“Public” Profile	1 (7%)	6 (43%)	3 (21%)	4 (29%)	4 (29%)
Data shared on “Public”	Photos (7%)	6 (43%)	Photos, Photos, Events. (21%)	4 (29%)	4 (29%)
“Private” Profile in the population	1 (7%)	6 (43%)	3 (21%)	4 (29%)	4 (29%)
Posts on “Public” without your consent	0	6 (43%)	0	4 (29%)	(0%)
Shared Demographics	1 (7%)	6 (43%)	1 (7%)	6 (43%)	2 (14%)
Login Alerts	5	2	4	3	9

	(36%)	(14%)	(29%)	(21%)	(65%)
Login Approvals	7 (50%)	0	7 (50%)	0	14 (100%)
Code Generator	4 (29%)	3 (21%)	3 (21%)	4 (29%)	7 (50%)
App Passwords	6 (43%)	1 (7%)	7 (50%)	0	13 (93%)
Trusted Contacts	6 (43%)	1 (7%)	7 (50%)	0	13 (93%)
Trusted Browsers	6 (43%)	1 (7%)	5 (36%)	2 (14%)	11 (79%)
Public Key	7 (50%)	0	7 (50%)	0	14 (100%)
Who can see your future posts?	0	7 (50%)	1 (7%)	6 (43%)	1 (7%)
Do you review Posts and tags	4 (29%)	3 (21%)	4 (29%)	3 (21%)	8 (58%)
Do you Limit the audience for posts?	4 (29%)	3 (21%)	3 (21%)	4 (29%)	7 (50%)
Who can send you friend requests?	6 (43%)	1 (7%)	6 (43%)	1 (7%)	12 (86%)
Whose messages do you want filtered into your inbox?	1 (7%)	6 (43%)	2 (14%)	5 (36%)	3 (21%)

Who can look you up using the email address you provided?	3 (21%)	4 (29%)	2 (14%)	5 (36%)	5 (36%)
Do you want other search engines to link to your timeline?	2 (14%)	5 (36%)	3 (21%)	4 (29%)	5 (36%)
Who can post on your timeline?	2 (14%)	5 (36%)	3 (21%)	4 (29%)	5 (36%)
Do you review posts friends tag you in before they appear on your timeline?	3 (21%)	4 (29%)	3 (21%)	4 (29%)	6 (43%)
Who can see posts you've been tagged in on your timeline?	0	7 (50%)	0	7 (50%)	0 (0%)
Who can see what others post on your timeline?	0	7 (50%)	0	7 (50%)	0 (0%)
Do you review tags people	4 (29%)	3 (21%)	2 (14%)	5 (36%)	6 (43%)

add to your own posts before the tags appear on Facebook?					
When you're tagged in a post, who do you want to add to the audience if they aren't already in it?	0	7 (50%)	0	7 (50%)	0 (0%)
Who sees tag suggestions when photos that look like you are uploaded?	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable
Blocking List (check this to see if the user has blocked any apps, events or pages etc.. and ask them why).	3 (21%)	4 (29%)	3 (21%)	4 (29%)	6 (43%)

Who can follow you?	1 (7%)	6 (43%)	2 (14%)	5 (36%)	3 (21%)
Number of Apps Logged in with Facebook	5 (36%)	2 (14%)	5 (36%)	2 (14%)	10 (72%)
Apps, Websites and Plugins	3 (21%)	4 (29%)	6 (43%)	1 (7%)	9 (64%)
Apps, Others Use	2 (14%)	5 (36%)	5 (43%)	2 (14%)	7 (50%)

Table A7.7 the dangerous settings choices and the safe settings choices for females and males are considered and tabled

A7.8 the Recorded Responses from the 5 Male Participants during the Oral Interview as shown in Table A7.8:

Question Number	User 001 Replies Male	User 002 Replies Male	User 003 Replies Male	User 004 Replies Male	User 0015 Replies Male
1	Annoyed	Annoyed	No, I Do not bother	Feel bad	Not accepted
2	The profile was hacked 3-4 times	Never hacked	Never hacked	Nothing happened	No, but it happened to others
3	Yes	Yes for family photos	Yes, twice for security	Once a year	No, really, I am not bothered
4	I do not know what to do	I use a phone verification code	I do not know what to do	I use my settings and retrieve my email	I do not really,

5	No, Facebook changed some settings	No, my profile was private, but was changed to public	No, Facebook should care	No, Facebook is not trusted	No, Facebook is not trusted
6	Yes, I did, I filled a form	No	No	Yes	No
7	Yes	No	Yes	No, is too complex	Yes, I understand now
8	3 times so far due to a hack	Once in every year	3 times in my Facebook life	Never changed	Once during the Facebook profile life
9	No, it can be a hack software	No, I do not trust any software	No, unless it comes from Facebook	Yes, I will use it	No
10	Yes, I do	Yes, I do	Yes, I do	No, but it depends on the photos	Yes, I understand now

Table A7.8 the Recorded Responses from the 5 Male Participants during the Oral Interview

A7.9 the Recorded Responses from the 5 Female Participants during the Oral Interviews as shown in Table A7.9:

Question Number	User 005	User 006	User 007	User 008	User 009
	Replies Female				

1	Feel bad	I do not mind	I feel angry	I will be surprised	It worries me
2	No, but someone was trying	Yes, my brother did	No	Yes by jokes	No
3	I change settings frequently	Yes in the past only	Yes, I check frequently	Yes, I keep checking	I check my settings regularly
4	I try the email and change my password	Check the email and change the password	Get alerted	I check my email and the password	I have no idea what to do
5	Not enough care from Facebook	No, really,	No, Facebook is not trusted	They try to do their best	No, I do not trust Facebook
6	No	Yes, many times	No	No	Yes, many times
7	Yes	Yes	No	Yes	Yes
8	Twice a year	Once	I do regularly	Five times a year	Once a year
9	No	Yes	No	Yes	No
10	Yes, I do	Yes	Yes	Yes	No

Table A7.9 the Recorded Responses from the 5 Female Participants during the Oral Interviews.

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