The Millennial differences regarding privacy & security perceptions on Facebook

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ABSTRACT

There exist several factors which together determine social media behavior on social networking sites. In this paper we analyze what effects perceived privacy and perceived security may have on social media behavior on Facebook. Furthermore we look at what affects age, gender and nationality seem to have on both perceived privacy, perceived security, trust, attitude and the self-disclosure of personal information. We used a survey in order to gather data to determine whether indeed the perception of privacy and security affect social media behavior. We found that all analyzed explanatory variables had at least some effect on social media behavior, be it directly or indirectly. We established a moderately weak positive relation for percepted privacy and percepted security and a moderate negative impact caused by age. We also found that the Dutch are slightly more positive regarding Facebook its privacy and security and women are at least according to our study slightly more active and positive on Facebook than their male counterparts. Another observation we made was the difference in reliability when using a previously proven theoretical model in order to analyze this subject was significantly different. This suggests that a tailor made data collection model is needed for each specific subject regarding social networking sites such as Facebook if one is to meet the criteria for reliability and validity.

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1. INTRODUCTION

In the modern day society we make ever increasing use of digital interaction. Since their introduction, social network sites (SNS's) such as MySpace, Facebook, Cyworld, and Bebo have attracted millions of users, many of whom have integrated these sites into their daily practices, (Boyd & Ellison, 2007). This refers to the adoption of new technologies and general improvement in living standards, according to the Business dictionary). Sadly like with all inventions, they can be used for both morally sound and malicious purposes. We all know of some positive results from the electronic revolution, like being able to contact your family half a world away or the increasing use of social media for medical promotion, (Korda & Itani, 2010).

However less visible negative consequences like cyber bullying and reduced privacy are also consequences of this new wonder. Sadly often this ignorance towards technology for the greater part shapes the technology it's public perception.

Economic development is also adapting to the societal transformation into the information age, as the economy always has when facing new technologies. This has resulted in the Information economy, an economy where the information sector has become more dominant than the agriculture or industrial sectors of the economy, (Verzola, 2006).

One of the resulting practices is Big data collection. With data collection referring to the systematic approach to gathering information from a variety of sources to get a complete and accurate picture of an area of interest. (Margaret Rouse, 2013). A resulting consequence of this is the collection and analysis of data of our social media behavior. Social media in this case, known as the "participative Internet" encompassing a broad set of internet-based communications, tools, and aids, (Jones & Fox, 2009).

From this summation of ongoing developments we started wondering if different age demographics perceive these technologic developments differently. In extension to this we wondered if different demographics of individuals alter their behavior on online media as a result of different views regarding the medium. This however being a very broad question forced me to concise it to how different demographics feel about and make use of Facebook.

This as questions like 'Who has my online data' and what are they doing with it are very relevant to so many people whom all make use of the Facebook service. To us it seems quite important who knows what about you. Both from a privacy and security angle. Can someone use my data with malicious intent, e.g. commit identity theft with the data collected about me? These effects may become even more apparent serious negative consequences than cyber bullying and to me is definitely worth investigating. How potent is the ignorance of technology? Are users aware, do they realize the potential risks involved and do they even care?

We can look at social media behavior from many different angles. We could, focus on the entertainment potential or take commercial necessity as the main focus of this social media study. Instead of this we will look through a privacy and security perspective. We shall aim to deduce what the difference in younger and older millennial perception is with regard to these subjects if there is a difference to be found.

There has been done research regarding social media usage by personality traits, (Hinsley & Zúñiga, 2010). However what is scarcely researched are the difference between the younger and older millennials, the generations who have grown together with technology.

In this paper we will explore the millennial user's overall sentiment regarding collection of their private data, trust in the platform they provide their information to and whether there are identifiable differences between these groups. Thus seeking to expose and measure the millennial's perception regarding privacy and security on a social media platform. In this instance using a survey regarding Facebook usage, the results of which can be found and explained later in this article.

2. THEORETICAL FRAMEWORK

This section will discuss the theoretical basis we used of we based our study and questionnaire. We will also define the variables and definitions most central to this study.

2.1 Definition Setting & Related Literature

In order to be able to properly discuss this topic it will aid to define what exactly is meant when using certain terms. In the following section we will expand on what the following concepts stand for, who are to be henceforth interpreted as such in the context of this paper. There has, at least to my knowledge, been no coverage of social media behavior based on privacy and security perceptions in relation to age specifically. However there is plenty of material covering the related fields individually.

Firstly we will cover an account of an article regarding the effects of trust, security and privacy on social networking sites, (SNS). In this article, Dong-Hee Shin seeks to create a model explaining the factors whom influence and impact an individual's attitude and online behavior. Shin describes how in his study he tries to analyze how a user's perceived security and privacy affect people's attitude towards the social networking sites.

Items of note are among others Shin's used definitions of privacy, trust and security. For privacy being defined as an individual's ability to control the terms by which their personal information is acquired and used (Metzger, 2004). In addition to this Shin refers to privacy in regard to SNS as the control one has over the flow of one's personal information, including the transfer and exchange of that information (Shin, 2010).

Shin also expands on the concept of perceived security, for which the degree to which people believe in the security of a particular SNS, was used for definition, by (Yenisey et al. 2005). The Incorporation by Shin for SNS application states how security relates to users' perception on security, that is perceived security. This is defined as the extent to which a user believes that using a SNS application will be risk-free (Shin, 2010).

Another important concept that is touched on is trust. Defined in the paper as the willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party (Dwyer et al, 2007).

Shin also found that his method and approach to data collection of SNS users for perceived privacy and security proved solid. Something we will look back on in the methods section of this paper.

In another article, Ralph Gross & Alessandro Acquisti describes the possible privacy implications from potential identifiability of social networking sites. He highlights the practice of re-identification, meaning the practice of matching similarities from accounts on SNS and deriving originate from the same individual. A practice which now is likely applied globally and with much greater ease due to technological advancements.

Ralph Gross & Alessandro Acquisti also raise the point to whom identifiable information should be made available? He raises the point that due to lack of transparency and the attribute of accessibility make it easy for any third parties to acquire a user's data with or without the hosting site's collaboration. These authors also describe the demographic composition of Facebook at the CMU university and measures how often certain pieces of information are shared. They however sadly do not expand on the possible implications age may have on use of and behavior on social media.

Lastly we will look into the development of third party integration into social networking platforms and the accessibility to user data. This article by Adrienne Felt and David Evans covers the topic of privacy protection for social networking platforms. Adrienne and David outline the threat of how open applied programming interfaces (API's) on social networks and how this decreases the overall safety of information on social networking sites. Though it probably can be argued that open API's are a logical step in the evolution of the digital landscape, it should be noted that the resulting loss of privacy should not be overlooked as it can could have potentially severe consequences for individual users.

It should be a vital concern that, due to the popularity of the Facebook Platform and the ongoing development of new APIs, it is important to address the privacy risks inherent in exposing user data to third-party applications (Felt & Evans, 2010). A question resulting from this is whether users currently are informed enough and the preferred level of transparity is reached. Or rather that ignorance to the consequences of the use of modern day social networking sites is to blame for any uninformed users in this day and age.

Additional sections in order articles cover the remaining definitions we'd like to outline which in order comprise, motivation, attitude and social media behavior.

Motivation can be seen as all aspects of a person's intention and activation (Ryan & Deci, 2000). Motivation can be summarized into two main groups: knowledge sharing and emotional motives (self-expressions) in addition to that entertainment can also be seen as a motive for consumers to be active on social media (Heinonen, 2011). Attitude can be summarized as an individual's positive or negative feeling about performing the target behavior, while subjective norm refers to a person's perception that most people who are important to him or her think he or she should or should not perform the behavior in question (Shin, 2010). Lastly we have social media behavior, which is we interpret as that a person's performance of a specified behavior is determined by his or her behavioral intention to perform the behavior, and behavioral intention is jointly determined by the person's attitudes and subjective norms (Ajzen & Fishbein, 1980).

2.2 Research Goal & Theoretical Framework

2.1.1 Research Question

Based on the concepts above we will now explain our used theoretical model as well as elaborate on the research goal and derived research questions.

This study its primary focus is exploring whether and how privacy and security perceptions affect social media behavior. For this we use Facebook as the social networking platform in order to allow for more concrete data gathering. We aim to make a first effort in determining the effects of how our perception of security, the perceived safety of your information and our perception of privacy, how free we are from unwanted incursions into our private life and affairs. As such our primary research question states :

What is the effect of privacy and security perceptions of users on their social media behavior?

Accompanying this main research question follow the sub questions:

- Does age affect this relationship?

- Does gender affect this relationship?

-Does nationality affect this relationship?

2.1.2 Hypotheses

Now that we have our research questions we made some hypotheses we formulated based on our expectations. In general we expect social media behavior to be lower for older millennials, mainly due them likely having less free time to spend on social media as well as be more skeptical of platforms like Facebook and thus will be more reluctant to using it.

Concretely this gives the following hypothesis.

H1, we expect a negative relationship between age and trust.

H2, expect a negative relationship between attitude and age.

H3, we expect a negative relationship between age and self-disclosure.

In addition to this we also expect perceived privacy to have a significant negative impact on the variables trust and attitude.

H4 we expect a positive relationship between perceived privacy and attitude

H5 we expect a positive relationship between perceived privacy and trust

2.1.3 Relevance

The relevance of this study originates from the ever growing online marketing, continuously happening on many online services and platforms we use daily. With this study we seek to explore a means of deriving relationship between social media behavior and the independent variables, (privacy & security perception), appear to influence this behavior. If indeed there is a connection, this may lead to more, larger scale studies which in turn give new insights to the online behavior of (potential) consumers, which may prove valuable to for example online marketers. Or working from the other angle it may cause companies to re-access how heavily they value the consumer's perceived privacy and security in their service platform and adjust accordingly.

For measuring the effect of nationality we will check for significant differences between the Dutch and the German respondents, given they make up the majority of entries. For gender we compare the Male and Female respondents.

In order to analyze social media behavior we use the variables trust in the platform, attitude towards the platform and quantity of personal information shared. We will not aggregate the scores of these values as we are unable to determine how heavily each of these variables accounts for the explained variance of social media behavior. We adopted the trust and attitude variables to measure privacy and security from Shin who argues the following whilst we added self-disclosure ourselves.

"The Theory of Reasoned Action (TRA) suggests that a person's performance of a specified behavior is determined by his or her behavioral intention to perform the behavior, and behavioral intention is jointly determined by the person's attitudes and subjective norms (Ajzenand Fishbein, 1980). The best predictor of behavior is intention, which is the cognitive representation of a person's readiness to perform a given behavior, and it is considered the immediate antecedent of behavior. The TRA defines attitude toward a behavior as an individual's positive or negative feeling about performing the target behavior, while subjective norm refers to a person's perception that most people who are important to him or her think he or she should or should not perform the behavior in question. In addition, a person's attitude toward a behavior is determined by his or her salient beliefs and evaluations. Given the wide applicability of the TRA in emerging technologies, it is expected that general causalities found in the TRA also apply in a social networking context" (Shin, 2010).

In addition to this we will be looking if age effects privacy and security perceptions as well as our dependent variables. In order to establish or disprove that age effects this relationship we will compare younger millennials, (age 18-24) with the older millennials (age 25-35). Age acts in this case as a moderator variable. This means that we are checking if the variable age affects the direction or strength of the relation between dependent and independent variables. In this case we check whether age affects the relation between privacy and security perceptions and social media behavior. Consequently our theoretical framework became what you see depicted below.

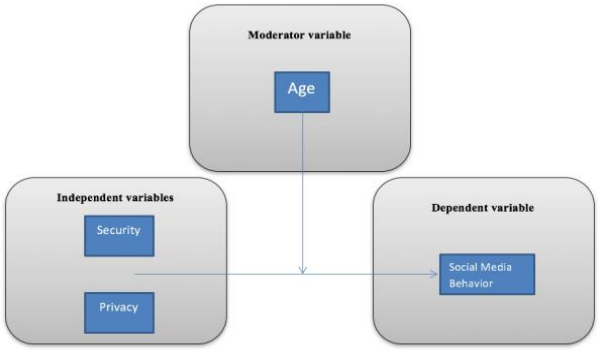

Figure 1. Graphic depiction of theoretical framework

3. METHODOLOGY

In the following sections we will dissect how we performed our measurements, created our survey and how we chose to operationalize the variables. We will also elaborate on how we collected the data and how we approached respondents.

3.1 Study Design

For our study we aim to collect the privacy and security perceptions of younger and older millennials as mentioned before. In order to obtain this data we created a survey using Qualtrics which we spread on the Facebook pages of all members of the bachelor circle we worked with. We opened the survey on the 11th may and closed it on the 23th of May. We both opened and closed the survey around midday, giving us 12 days in which to collect responses. We estimate that in these 12 days we reached approximately 4349 people, being the number of Facebook friends we collectively have. There are of course some of our friends who shared the survey request post, but we also likely have friends who did not see our post in Facebook and since we are unable to gain specific estimates let alone values we choose to omit this factors whilst determining the reach and response rate.

Of these 4349 people we received 368 responses to our survey posts of which we in total had 338 valid responses to work with for our research. This resulted in an response rate of about 8.5%, which is not that horrible given that we ran our survey for a relatively short amount of time. Given that according to a blog on Surveygizmo the estimated response rate for an survey like ours lies between the 10% and 15%, something that we would most likely have reached if we ran the survey for a longer period of time.

We make use of a digital survey for data collection as this is the most fitting method of data gathering given we seek to collect quantitative data in a relatively short time frame. In addition the benefit of the ease of distribution and recollection also provides us a means to gather a usable sample size for our research adding some robustness to our results. We can more easily assume the sample is more representative of the population and as such the validity of our research is slightly increased.

3.2 Operationalization

So in order to construct our survey with the thesis circle and after having built the framework we first chose a medium with which to make the survey. We had several options with regard to what to use like Google Forms, Surveygizmo and Surveymonkey we decided upon Qualtrics. We did so mainly because our supervisors has heard of colleagues whom have had good experiences with the service and the university has a deal with this medium, granting us more than the standard tools available to normal free users.

In order to construct the survey we first made a list of all variables and topics we wanted to cover in our survey. These comprised the Demographic information such as Age, Gender, Nationality and Education, our independent variables Perceived Privacy and Perceived Security and our dependent variables Trust, Attitude and Self-Disclosure. In addition to this we asked on which devices respondents used Facebook as well as their estimated time per visit and visits per week.

After creating the questions for the demographics, we analyzed how Shin created his questions for Trust, Attitude, Perceived Privacy and Perceived Security and copied those for the most part. A correction we applied is adjusting few words in order for the question to cover Facebook instead of SNS in general as

Shin uses. Also in addition we included a couple extra Facebook specific questions for Perceived Security, in order to better capture all facets people may associate with the variable. We also added two additional questions to Attitude for the same reason. We also added the question if and to what degree people read the privacy policies of Facebook as this might give input as to why people share as much or little as do if they appear to be uninformed users of the platform.

For answering the questions we used a 7 point Likert scale ranging from strongly disagree to strongly agree, with the middle of the scale indicating no real identification with either stance on a particular question.

For the variables time spend on Facebook and amount of time on Facebook we chose a 5 point Likert scale as it seemed to better divide the possible answer results opposed to splitting the range of possibilities in 7. For the question regarding Self-Disclosure we took the 11 items we valued the most used and most privacy sensitive items to create our list of options.

Now that we had all questions complete we mixed up the order a little in order to limit the possible affect that people losing interest whilst filling in the quiz may have on the assault, e.g. persons clicking all left on the last 5 questions so they are done with it.

3.3 Analysis Method

Before we started analyzing the data we first reflected on how well our survey measures what it is supposed to measure. In order to control validity we did a factor analysis in order to determine how well the constructs for our given variables correlate in answer. We do this in order to determine whether all questions we use for computing the variable are coherent and if proven not to be, should be considered for omission from the constructed variable.

In the appendix below one shall find the most important tables regarding the mentioned factor analysis. Resulting from the SPSS data and after face checking each question in comparison to its related constructs we determined to omit several questions from the final variable construction. As such the final questions used for the variable construction are the ones who make up the last item-total statistics tables for each variable. This adjustment was done in favor of increasing the reliability of the data we are working with, however slightly as we consider the most reliable and accurate data the best data to use.

Of note is that both the independent variables even after removal of the lesser fitting questions leaves us with a sub-par Cronbach alpha of 0,413 for Perceived Security and 0,422 for Perceived Privacy respectively. In addition we discovered a Cronbach alpha value of 0,619 for the variable attitude and 0,769 for the variable trust. Given that the strived goal for Cronbach alpha lies above 0,8 preferably we have to conclude that the inter correlations of our constructs is far less robust than we would like it to be. As such we should keep in mind that any conclusions following this study may be statistically invalid as we were unable to use a valid Cronbach alpha for our research. We would really have liked to pre-test our survey and analyze the reliability before distributing a final version. Sadly due to time constraints we were unable to do this.

The curious phenomenon here is that the Cronbach Alpha's found by Shin in his original study is over 0,8 for all his variables. The main cause for this difference may be that we are using the questions Shin created for measuring SNS sentiment for analyzing Facebook behavior specifically. The difference in Cronbach Alpha's indicates that making this adjustment has a significant impact on the subsequent reliability of the survey, as the internal consistency is notably lower.

For data analysis of the variables we calculated the correlation tables for all continuous variables and nominal variables respectively. In addition to this we also used a One Way Anova to compare the means for all variables between our two age groups, the younger millennials (18-24) and the older millennials (25-35). In addition to these tests we also ran linear regression calculations to determine the strength and possible relationship for each the dependent variables with the control variables and age. The findings of all these tests will be noted and explained, in addition to the outcome of our sub-questions.

Part of the survey also contains questions regarding motivation , this a topic we in this study will not use but other thesis circle members chose to and as such can be found as part of the questionnaire and some of the SPSS output.

4. FINDINGS

n the next part we will elaborate on our findings from analyzing the obtained data. Firstly we will cover the relationships between variables, followed by the regression and Anova results. We would also like to note we used an Alpha of 5% with regard to determining the significance of results meaning if the significance value of the statistical test is below 5 % the result is statistically valid. This means that the chance of the correlation occurring by chance is so small that we can assume the relationship between the variables is real and not an anomaly of chance.

4.1 Main Findings

4.1.1 Correlations

The first step of data analysis we conducted was analyze what correlations there are between the variables. We computed the correlation tables for all continuous and ordinal variables separately as shown in the appendix, with R referring the strength of the relationship between the two variables. As shown in our correlation table 15 in the appendix you can see that the following variables have significant relations to one another, whom we summarized in the table below. We also compared the nominal variables Gender and nationality, but no significant results were found as seen in table 16 of the appendix.

Table 1. Variable Correlations explained variance and significance.

Related Variables	Explained variance (R)	Significance (p)
Age & Education	0,433	< 0,001
Age & Trust	- 0,160	0,018
Perceived Privacy & Perceived Security	0,367	< 0,001

Perceived Privacy & Attitude	0,188	0,005
Perceived Privacy & Trust	0,365	< 0,001
Perceived Security & attitude	0,252	< 0,001
Perceived Security & Trust	0,366	< 0,001
Attitude & Trust	0,410	< 0,001

So now we know what variables are related, at least based on our sample. However we do not know why for the most part. We also of course do not know if variable X causes variable Y to change as we know relation does not equal causation. For explaining why certain variables are related we have come up with possible explanations for some of these relationships.

First we'll talk about Age and Education. These variables have a moderately weak significant positive relationship according to our data. These variables being related is quite logical to us as people of older age are more likely to have finished their bachelor, master or other education and as such score higher for Education. Similarly the negative relationship between Trust and Age is also not very surprising as this relationship indicates that older people are more skeptical and hesitant with their trust, likely due to experience and giving more thought to decisions such as who and what to trust. Like Shin we also found the exact same significant relationships for all other variables In addition to age.

There also appears to be a weak relationship between perceived privacy and perceived security something which was also expected since in the original article by Shin of which we based the questionnaire he also found a similar relation however slightly stronger than ours. It is not really surprising that these variables have some relation given that you are more likely to trust your information to an entity, in this case Facebook, if you are confident the platform is secure.

We also found a very weak relationship between perceived privacy and attitude. This would indicate that if you have a positive sentiment regarding Facebook you are probably slightly more likely to also feel more inclined to share as you deem it safer, and vice versa of course. The weak relationship between perceived privacy and trust is logical and follows the same reasoning as with attitude. If you feel that you can trust Facebook you may also have less reservations to share.

For the relationship between perceived security & attitude and perceived security & trust we can also follow similar logic. This being that if a person feels his information is very secure on a particular platform it is quite possible this will have a positive effect on his attitude towards the platform and may be more inclined to trust said platform.

Lastly we have the moderate relationship between trust and attitude which is a relation established many times before this study. According to Eiser et al, there is substantial empirical evidence that both trust and risk perceptions influence public acceptance of new technologies (Eiser et al 2006). Now assuming we can view the acceptance of new technologies as being an attitude towards new technologies this article reaffirm the relationship as factual.

4.1.2 Regression

For regression we analyzed which dependent variables are predictable by the control variables. For self-disclosure we have not found any significant results. The results for trust and attitude are shown in the table below.

Table 2. Variable Regressions, explained variance and its significance.

Related Variables	Beta (B)	Significance (p)
Attitude & Gender	0,302	< 0,001
Attitude & Age	- 0,191	0,011

These results tell us that females have a more positive attitude than males. We base this on the fact of how we coded the variables gender and attitude. For attitude we calculated a mean from the responses of the 7 point Likert scale ranging with 1 referring to a very negative sentiment and 7 to a very positive sentiment. For Gender we coded 1 as male and 2 as female.

Based on the results above we can say that if Gender improves by 1, Attitude is predicted to improve by 0,302. Translated this means that if a respondent is female her predicted Attitude mean is expected to increase by a 0,302 on the used scale for Attitude being 1 through 7.

For how age effects attitude we see that as age increases trust will is expected to be lower by a 0,191 factor. To put this in normal English we state that older people are expected to be slightly less trusting and the other way around that younger people are slightly more trusting.

4.1.3 ANOVA

ANOVA is used to determine the difference between groups based on the mean. Furthermore we would like to determine for which variables there is a significant difference based on age. In order to compute this we first made an overview comparing the means for both our continuous independent, dependent and control variables, as shown below based on table 23 of the appendix.

Table 3. Mean comparison of continuous variables by Age

Age groups	Perceived Privacy	Perceived Security	Trust	Attitude	Self-Disclosure	Education
Young millennial	3,1495	3,4263	3,4263	4,7879	5,8788	3,58
Old millennial	3,1538	2,8654	3,0128	4,5385	5,1154	4,65

Despite that this table does give an indication of differences between the age groups it does not provide an answer to whether these differences shown are significant. In order to determine this we made use of One Way ANOVA in order to determine for which variables there is a significant deviation based on age as shown in table 20. We summarized the significant differences as shown in the table below.

Table 4. One Way ANOVA significant relationships for age groups, Critical value and significance of the relationship.

Variable	Critical Value (F)	Significance (p)
Perceived security	0,188	0,005
Trust	0,365	0,028
Education	0,410	< 0,001

From these results we had already established that there were relations between age and trust and age education, so we will leave further discussion regarding these outcomes to the discussion section. Something we have not looked into is the apparent significant difference in perceived security whilst comparing the age groups. This is curious given that there was no significant correlation between these variables in the correlation table as shown in table 15.

This is the case because when computing the correlation tables we used age as a continuous variable. Had we used the dichotomous variable for age the correlation must have been significant. However for the ANOVA analysis we had to recalculate the variable into a dichotomous one, namely the age groups younger millennials and older millennials. This had to be done as we can only calculate the correlation between variables of the same type and using age as a continuous variable would be very unlikely to produce any meaningful results being a statistical invalid way of comparing data. The underlying statistical problem here is that we cannot assume that the variable gender is normally distributed, which is one of the necessary assumption for computing correlations.

We also computed the ANOVA results for Gender and Nationality in order to analyze whether our sub questions prove true or false, the significant results of which are shown in the tables below.

Table 5. One Way ANOVA significant relationships for gender, Critical value and significance of the relationship.

Variable	Critical Value (F)	Significance (p)
Attitude	19,962	< 0,001

Table 5. One Way ANOVA significant relationships for nationality , Critical value and significance of the relationship.

Variable	Critical Value (F)	Significance (p)
Perceived privacy	1,574	0,039

These findings indicate that gender has a direct impact on social media behavior whilst nationality appears to only have an indirect effect, both of which we will discuss in the discussion section of the paper.

4.2 Limitations In Findings

In this study we did our best to reliably capture the data needed to analyze social media behavior. However we must note several shortcomings and limitations regarding the collected data which impact the validity of the results. One of the first and most obvious limitations is that with a sample of 165 younger millennials and 52 older millennials we do not have a large enough sample to effectively represent the population. Given we had more time to reach people and collect data this potential problem may be mitigated.

Another criticism of note is the low internal consistency in our questionnaire. As shown in the Reliability analysis tables our Cronbach alpha for most variables was far below the required level in order for the questionnaire to be considered valid. Given more time we may have known that our questionnaire would need improvement if we had been able to pre-test our survey, refine it and use the improved version.

In addition to this it may have been wise to turn the study model into a more longitudinal form. This could be done by for example a form of panel study, measuring responses from the same respondents twice or more and use the averages of their scores on each question for data analysis. This would mitigate any possible bias caused by external factors who may influence the respondents and thus improve the validity of our research.

Another curious finding regarding the measured Cronbach alpha's is that when comparing the reliability of our data versus Shin's data only using Shin's original questions we also get a much lower Cronbach alpha. Possible explanations for this are that for one using the questions to measure a different concept than for the purpose they were originally created. Social Networking Sites overall encompass a much broader spectrum of sites and services compared to Facebook itself. There is a great opportunity for future studies to compare Facebook to the encompassing spectrum it belongs to and investigate what differences in behavior and attitude there are. We know that chancing subject is likely to have some effect on the data as seen in the paper by Dwyer et al in which he measures among other things the difference in sentiment, privacy concerns and self-disclosure between Facebook and Myspace users (Dwyer et al 2007). In this article they also outline that despite normally a Cronbach alpha of 0,8 or higher is wanted, for new research results as low as 0,50 are acceptable, although a more established value is 0,7 (Goodhue et al, 2000).

Another possible cause for the difference in significance is the origin of the respondents. In our study we used mostly students of the university and their friends and relatives to act as respondents. Shin on the other hand drew his participants from students enrolled in IS courses at an east coast university in a city in the United states. Sadly we do not know the age range and composition of Shin's sample as he as far as his paper indicates has not included questions regarding age in his survey.

As mentioned before having lower reliability than the preferred norm and using the survey we did means that we have few validity measures to support the robustness of the conclusions of this study. The validity measures we of course do have comprise the results Shin had and face validity by our thesis circle peers and our supervisor.

5. DISCUSSION

In the following section we will discuss and elaborate on how to interpret the collected data and what implications this study has, both in theoretical and practical relevance.

5.1 Implications for research goal

We will start with discussing what our collected data means for our research questions. Firstly the results to our main research question, ***What is the effect of privacy and security perceptions of users on their social media behavior?***

According to our data we must conclude that both perceived privacy and perceived security have an impact on social media behavior on Facebook. According to our study Perceived privacy accounts for 18,8 percent of the explained variance of attitude towards Facebook. Similarly perceived privacy explains 36,5 of the variance for trust. Perceived security has a slightly larger impact on social media behavior for 25,2 percent

determining the value of attitude and 36,6 percent of trust respectively. At least so our study indicates.

We also formulated two sub questions regarding factors that might influence social media behavior which both also appear to hold true.

When looking if age affects the relationship between social media behavior and perceived security and perceived privacy we find that age most definitely has some influence. We argue that as age negatively correlates to perceived security which we know correlates with trust and attitude, age indirectly does have a negative impact on social media behavior. As expected in the hypotheses discussed later in this document we found that older people appear to be more skeptical of Facebook partly because they perceive their data to be not secure enough.

In addition to age we also wanted to determine if gender affects this relationship. For this we have to also establish that gender in fact does have some impact on social media behavior. We state this as mentioned in the findings ANOVA section the variable attitude has significantly different results depending on the gender. When looking at the data we see that females score significantly higher for attitude, meaning according to our data females have a more positive opinion of Facebook and consequently would than use the platform more, would it be the that attitude is the only explanatory factor.

We also looked at how nationality effects the relationship. We can state here that perceived privacy is affected by nationality. The most logical reason for this being the case would to us be that cultural differences are responsible for this deviation in perceived privacy. According to our data the Dutch appear to have a more positive perception of privacy on Facebook than their Germanic neighbors as shown in the mean comparison in table 21 of the appendix.

Regarding the hypotheses for the results we formulated we can state we assumed correctly for most predictions. The negative relationship between attitude and age was predicted correctly, This is as the idea that older people are more skeptical of some of the new wonders of technology such as social networking sites appears to be confirmed.

Also contrary to our prediction, in our study attitude is not significantly affected by age. We speculated that since people are less trusting of Facebook we could also predict that older people have a more negative attitude towards the platform, something which we now have seen is not true. As shown in table 15 of the findings we found no significant relationship between the variables.

Regarding our predictions for the independent variables we can state that both our predictions hold true. This means that there is indeed a positive relationship between perceived privacy and attitude and perceived privacy and trust. This indicates that perceived privacy indeed should be considered an important part of the image of a social networking platform if it wishes to become more popular and successful.

5.2 Theoretical Implications

The results we present in this paper also hold meaning for both this and adjacent academic fields. This study showcases that in order to effectively analyze social media behavior for a specific platform or social networking site a tailor made measure for data collection is a must. As shown in our reliability analysis our survey was not up to the preferred standard in terms of reliability. This means that researchers should give attention to the fact that pre testing of all means of data collection is a must in order to validly and reliably collect data.

Furthermore this study also reaffirms the works of other researcher in the field of online media behavior in that perceived privacy and security indeed do partially predict the facets which together drive social media behavior. Something of note is that apparently for each platform or service the strength of the determinant varies, a phenomenon

Another insight and possible topic of research is how research data is affected by the change of use of the measurement instrument. This paper shows that even when you use a data collection model for a closely related subject of its original purpose the reliability of the results changes. A similar note should be stated regarding the attributes of the units of analysis, in this case the respondents. This study thus also reaffirms that based on the population to be analyzed the measurement method should be tested and altered in order to effectively and reliably capture the wanted data.

5.3 Practical Implications

This study also has insights for multiple facets of the world around us. Firstly it reaffirms the idea that the percepted security and privacy of online services is important in order to be an attractive medium people trust. Another business application is the realization that the older people get the warier they become of who has their identifiable information and how secure it is. As such services like Facebook would be wise to be very proactive and clear in their privacy agreements as to who knows what information.

Sadly according to most the current form in which privacy agreements are formulated on online web services in such a manner that users often do not even read them. The walls of high English text give the impression that services seek to obscure information and as such are perceived very negatively by most users.

Both for clarity and honesty users of websites such as Facebook would probably benefit greatly if for example an extract summarizing the most important facets of a privacy agreement is presented before the whole legal document. Maybe the Government should through legislation incentive a measure for users to easily understand what they are accepting when using a social networking site, which at least to us would be a logical next step in socially responsible use of social networking sites. We should note that privacy related digital legislation has already been done to an extent through the mandatory notification we know as ‘Cookies’ by which users agree they are aware the site collects data about their activity on a site.

6. CONCLUSIONS

In recent years the user of social networking platforms has grown exponentially as are the technologic possibilities surrounding these technologies. As such users should be adequately informed as to what happens with any and all personal data for ignorance may very well result in unwanted consequences. Thankfully most users have at least some notion to the dangers of providing personal information to social networking sites such as Facebook. We also know that a decent group of individuals is very wary and skeptical about the security and privacy of their information.

In this study we determined that the perceived privacy of security of a social media platform such as Facebook definitely affects the online behavior and the amount of personal information people share online. We furthermore determined that age, gender and nationality also have an impact on the perception of Facebook and the consequent online behavior. More specifically that older millennial demographic is has less confidence in the privacy and security of their information shared on Facebook.We also conclude that there is a wide range of perceptions in each of the age groups and that as with most things, opinions vary strongly.

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9. APPENDICES

9.1 Survey

You are being invited to participate in a research study. This survey is part of bachelor theses from students of the University of Twente.

The survey will take you approximately 5 minutes to complete. Your participation in this study is entirely voluntary and you can withdraw at any time. We ask you kindly to complete the whole survey.

By participating in this research study are no risks involved. Your answers in this survey will remain confidential.

Thank you for participating in this survey!

Please only fill in this survey if you are a Facebook user and 18 years or older.

1. What's your nationality?

o Dutch

o German

o Other (please fill in below)

2. What's your age?

o Age:

3. What's your gender?

o Male

o Female

4. What's your highest level of completed education?

o Did not complete high school

o High school

o Trade / technical / vocational training

o Some college

o Bachelor's degree

o Master's degree

o Advanced graduate work or PhD.

PP1: I am confident that I know all the parties who collect the information I provide during the use of Facebook.
PP2: I am aware of the exact nature of information that will be collected during the use of Facebook.
PP3: I am not concerned that the information I submitted on Facebook could be misused.
PP4: I believe there is an effective mechanism to address any violation of the information I provide to Facebook.
PS1: I believe the information I provide with Facebook will not be manipulated by inappropriate parties.
PS2: I am confident that the private information I provide with Facebook will be secured.
PS3: I believe inappropriate parties may deliberately view the information I provide with Facebook.
PS4: I have adjusted my privacy settings on Facebook in order to make my post visible to a specific group of people.
PS5: I make use of the private group function of Facebook.

USE: How often do you use Facebook?

o Less than once a week

o Once a week

o At least once a day

o 11-20 times a day

o More than 20 times a day

TIM: About how much time do you spend on Facebook a week?

o 0-5 hours

o 5-10 hours

o 10-15 hours

o 15-20 hours

o 20+ hours

DEV: On which devices do you use Facebook? You can give multiple answers.

o Desktop computer

o Laptop computer

o Smartphone

o Tablet

o Other (please fill in below)

ADD: Which of the following have you added to Facebook, even when it is not visible to all users? You can give multiple answers.

o Photographs of yourself

o Real name

o Hometown

o Email Address

o Phone number

o Relationship status

o Sexual orientation

o Work

o Religion

o Political preference

o Education

TR1: Facebook is a trustworthy social network.

TR2: I can count on Facebook to protect my privacy.

TR3: Facebook can be relied on to keep its promises

TR4: I never read Facebook's privacy policies.

AT1: I would have positive feelings towards Facebook in general.

AT2: The thought of using Facebook is appealing to me.

AT3: Facebook has become part of my daily routine.

AT4: The facts that my posts on Facebook may be viewed by other individuals in my social environment influences my behavior on Facebook.

NEX: Do you have any negative experiences with Facebook? Please explain.

9.2 SPSS Tables

9.2.1 Reliability Analysis tables

Tables 7a & 7b. reliability of perceived privacy all questions.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,268	,289	4

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
PP1	11,44	10,933	,227	,083	,129
PP2	9,45	9,267	,149	,083	,196
PP3	9,20	10,076	,073	,022	,308
PP4	9,99	11,116	,121	,018	,232

Tables 8a & 8b. reliability of perceived privacy adjusted

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,401	,422	2

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
PP1	3,91	3,760	,267	,071	.
PP2	1,92	1,826	,267	,071	.

Tables 9a & 9b. reliability of perceived security all questions

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,200	,202	5

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
PS1	19,15	16,250	,053	,076	,202
PS2	19,12	14,649	,181	,080	,076
PS3	17,72	15,701	,092	,028	,165
PS4	16,61	16,442	,026	,010	,229
PS5	17,22	13,534	,105	,026	,150

Tables 10a & 10b. reliability of perceived security adjusted

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,413	,413	2

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
PS1	3,34	2,929	,260	,068	.
PS2	3,30	2,963	,260	,068	.

Tables 11a & 11b. reliability of attitude all questions

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,284	,374	4

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
AT1	14,73	8,245	,229	,186	,127
AT2	14,83	7,244	,441	,278	-,123[a]
AT3	14,86	8,638	,196	,197	,170
AT4	14,18	10,068	-,125	,050	,617

a. The value is negative due to a negative average covariance among items. This violates reliability model assumptions. You may want to check item codings.

Tables 12a & 12b. reliability of attitude adjusted

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,617	,619	3

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
AT1	9,38	5,366	,385	,173	,577
AT2	9,48	5,103	,516	,266	,389
AT3	9,51	5,529	,382	,171	,578

Tables 13a & 13b. reliability of trust all questions

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,486	,527	4

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
TR1	12,09	8,417	,447	,346	,259
TR2	12,86	8,067	,518	,381	,191
TR3	12,56	8,303	,452	,373	,251
TR4	9,98	12,657	-,109	,019	,769

Tables 14a & 14b. reliability of trust adjusted

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,769	,769	3

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
TR1	6,24	6,352	,585	,343	,707
TR2	7,01	6,305	,616	,380	,674
TR3	6,71	6,170	,605	,368	,686

9.2.2 Correlation tables

Table 15. Correlation table of continuous variables

Correlations

		AGE_1_TEXT	EDU	Perceived Privacy	Perceived Security	Attitude	Trust	Motivation
AGE_1_TEXT	Pearson Correlation	1	,433**	-,016	-,109	-,080	-,160*	-,077
	Sig. (2-tailed)		,000	,813	,108	,240	,018	,258
	N	217	217	217	217	217	217	217
EDU	Pearson Correlation	,433**	1	-,109	-,114	-,013	-,019	,112
	Sig. (2-tailed)	,000		,110	,094	,850	,785	,099
	N	217	217	217	217	217	217	217
Perceived Privacy	Pearson Correlation	-,016	-,109	1	,367**	,188**	,364**	-,013
	Sig. (2-tailed)	,813	,110		,000	,005	,000	,852
	N	217	217	217	217	217	217	217
Perceived Security	Pearson Correlation	-,109	-,114	,367**	1	,252**	,366**	,099
	Sig. (2-tailed)	,108	,094	,000		,000	,000	,144
	N	217	217	217	217	217	217	217
Attitude	Pearson Correlation	-,080	-,013	,188**	,252**	1	,410**	,420**
	Sig. (2-tailed)	,240	,850	,005	,000		,000	,000
	N	217	217	217	217	217	217	217
Trust	Pearson Correlation	-,160*	-,019	,364**	,366**	,410**	1	,248**
	Sig. (2-tailed)	,018	,785	,000	,000	,000		,000
	N	217	217	217	217	217	217	217
Motivation	Pearson Correlation	-,077	,112	-,013	,099	,420**	,248**	1
	Sig. (2-tailed)	,258	,099	,852	,144	,000	,000	
	N	217	217	217	217	217	217	217

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 16. Correlation table of nominal variables

Correlations

		NAT	GEN
NAT	Pearson Correlation	1	,057
	Sig. (2-tailed)		,407
	N	217	217
GEN	Pearson Correlation	,057	1
	Sig. (2-tailed)	,407	
	N	217	217

9.2.3 Regression tables

Tables 17a & 17b. Regression table Self-Disclosure and control variables

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,189[a]	,036	,017	2,08315

a. Predictors: (Constant), AGE_1_TEXT, GEN, NAT, EDU

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	7,715	1,018		7,576	,000
	NAT	-,508	,326	-,107	-1,558	,121
	GEN	,098	,286	,023	,344	,731
	EDU	-,137	,123	-,085	-1,114	,267
	AGE_1_TEXT	-,047	,044	-,079	-1,048	,296

a. Dependent Variable: Self-Disclosure Score

Tables 18a & 18b. Regression table Attitude and control variables

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,311[a]	,097	,079	1,01476

a. Predictors: (Constant), AGE_1_TEXT, GEN, NAT, EDU

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	4,492	,496		9,057	,000
	NAT	-,004	,159	-,002	-,024	,981
	GEN	,639	,139	,302	4,581	,000
	EDU	-,008	,060	-,009	-,127	,899
	AGE_1_TEXT	-,031	,022	-,103	-1,426	,155

a. Dependent Variable: Attitude

Tables 19a & 19b. Regression tables trust and control variables

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,216[a]	,047	,029	1,16886

a. Predictors: (Constant), AGE_1_TEXT, GEN, NAT, EDU

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	4,249	,571		7,436	,000
	NAT	-,105	,183	-,039	-,575	,566
	GEN	,307	,161	,129	1,910	,058
	EDU	,049	,069	,054	,709	,479
	AGE_1_TEXT	-,064	,025	-,191	-2,556	,011

a. Dependent Variable: Trust

9.2.4 Means tables

Table 20. Means comparison of all continuous variables by age group.

Report

Agegroups		Perceived Privacy	Perceived Security	Trust	Attitude	Self-Disclosure Score	EDU
Young millennial(18-24)	Mean	3,1495	3,4667	3,4263	4,7879	5,8788	3,58
	N	165	165	165	165	165	165
	Std. Deviation	,92350	1,34474	1,20500	1,03141	1,98405	1,143
old millennial (25-35)	Mean	3,1538	2,8654	3,0128	4,5385	5,1154	4,65
	N	52	52	52	52	52	52
	Std. Deviation	1,27223	1,32885	1,07448	1,12634	2,36522	1,454
Total	Mean	3,1505	3,3226	3,3272	4,7281	5,6959	3,84
	N	217	217	217	217	217	217
	Std. Deviation	1,01474	1,36239	1,18589	1,05766	2,10151	1,304

Table 21. Means comparison of dependent and independent variables by Nationality.

Report

NAT		Self-Disclosure Score	Perceived Privacy	Perceived Security	Attitude	Trust
Dutch	Mean	5,8454	3,2096	3,3789	4,7268	3,3608
	N	194	194	194	194	194
	Std. Deviation	2,05792	1,00181	1,36747	1,05973	1,18148
German	Mean	3,6000	2,5778	2,8667	4,7556	2,8000
	N	15	15	15	15	15
	Std. Deviation	1,72378	1,07250	1,35576	,94673	1,08963
Other	Mean	6,0000	2,7917	2,8125	4,7083	3,5000
	N	8	8	8	8	8
	Std. Deviation	1,85164	,92475	1,09992	1,32662	1,36858
Total	Mean	5,6959	3,1505	3,3226	4,7281	3,3272
	N	217	217	217	217	217
	Std. Deviation	2,10151	1,01474	1,36239	1,05766	1,18589

Table 22. Means comparison of dependent and independent variables by Gender.

Report

GEN		Self-Disclosure Score	Perceived Privacy	Perceived Security	Attitude	Trust
Male	Mean	5,6990	3,1230	3,3155	4,4045	3,1812
	N	103	103	103	103	103
	Std. Deviation	2,27016	1,03426	1,48521	1,11988	1,26351
Female	Mean	5,6930	3,1754	3,3289	5,0205	3,4591
	N	114	114	114	114	114
	Std. Deviation	1,94676	1,00070	1,24770	,90805	1,10009
Total	Mean	5,6959	3,1505	3,3226	4,7281	3,3272
	N	217	217	217	217	217
	Std. Deviation	2,10151	1,01474	1,36239	1,05766	1,18589

9.2.5 ANOVA tables

Table 23. Anova table of all continuous variables by age group

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Perceived Privacy	Between Groups	,001	1	,001	,001	,979
	Within Groups	222,415	215	1,034		
	Total	222,416	216			
Perceived Security	Between Groups	14,295	1	14,295	7,949	,005
	Within Groups	386,624	215	1,798		
	Total	400,919	216			
Attitude	Between Groups	2,460	1	2,460	2,211	,138
	Within Groups	239,166	215	1,112		
	Total	241,625	216			
Trust	Between Groups	6,759	1	6,759	4,892	,028
	Within Groups	297,011	215	1,381		
	Total	303,770	216			
Motivation	Between Groups	1,049	1	1,049	1,541	,216
	Within Groups	146,291	215	,680		
	Total	147,339	216			
NAT	Between Groups	,323	1	,323	1,642	,201
	Within Groups	42,249	215	,197		
	Total	42,571	216			
GEN	Between Groups	,182	1	,182	,725	,395
	Within Groups	53,929	215	,251		
	Total	54,111	216			
EDU	Between Groups	45,440	1	45,440	30,349	,000
	Within Groups	321,915	215	1,497		
	Total	367,355	216			

Table 24. Anova table of all dependent and independent variables by gender.

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Self-Disclosure Score	Between Groups	,002	1	,002	,000	,983
	Within Groups	953,924	215	4,437		
	Total	953,926	216			
Attitude	Between Groups	20,528	1	20,528	19,962	,000
	Within Groups	221,097	215	1,028		
	Total	241,625	216			
Trust	Between Groups	4,177	1	4,177	2,998	,085
	Within Groups	299,593	215	1,393		
	Total	303,770	216			
Perceived Privacy	Between Groups	,149	1	,149	,144	,705
	Within Groups	222,267	215	1,034		
	Total	222,416	216			
Perceived Security	Between Groups	,010	1	,010	,005	,942
	Within Groups	400,910	215	1,865		
	Total	400,919	216			

Table 25. Anova table of all dependent and independent variables by nationality.

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Self-Disclosure Score	Between Groups	70,965	2	35,483	8,600	,000
	Within Groups	882,961	214	4,126		
	Total	953,926	216			
Attitude	Between Groups	,015	2	,007	,007	,993
	Within Groups	241,610	214	1,129		
	Total	241,625	216			
Trust	Between Groups	4,627	2	2,314	1,655	,194
	Within Groups	299,142	214	1,398		
	Total	303,770	216			
Perceived Privacy	Between Groups	6,628	2	3,314	3,287	,039
	Within Groups	215,787	214	1,008		
	Total	222,416	216			
Perceived Security	Between Groups	5,814	2	2,907	1,574	,210
	Within Groups	395,105	214	1,846		
	Total	400,919	216			