Personality Type Effects on Perceptions of Online Credit Card Payment Services

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Abstract

Credit cards and the subsequent payment of credit card debt play a crucial role in e-commerce transactions. While website design effects on trust and e-commerce have been studied, these are usually coarse grained models. A more individualized approach to utilization of online credit card payment services is examined that utilizes personality as measured by the Myers-Briggs personality type assessment to determine variances in perception of online payment service features. The results indicate that certain overriding principles appear to be largely universal, namely security and efficiency (or timeliness) of the payment system. However there are differences in the perceived benefit of these features and other features between personality types, which may be capitalized upon by payment service providers to attract a broader base of consumers and maintain continuance of existing users.

Keywords: Credit-card, Electronic commerce, Myers-Briggs, Payment portals, Personality, Portal features
1 Introduction

Which e-commerce website features and mechanisms promote user perceptions of perceived ease-of-use and perceived benefit and consequently their intention to continue utilizing these e-commerce websites has been previously studied [43]. As an example, Walczak and Gregg [14], [38] demonstrate that website content features promote trust and consequently engender perceptions of corporate capability and intention to transact. However, these studies are all based on a generic user-type representing an average consumer across a particular region or even across the world, similar to personas. Variance among individuals is mostly ignored. While personas have been shown to be a beneficial tool for systems development [8], [24], [32], they provide too coarse a screen and designate all users into a very small number of prototypes (typically 3 or 4). To capture more individual nuances in e-commerce perceptions and utilization, a finer grained sieve is needed.

Examining electronic commerce utilization from an individual perspective is problematic due to the sheer volume of data that must be analyzed to ensure accuracy of the research model. Therefore, a classification schema for research populations that helps preserve individual differences is desired. Utilizing personality type indicators may provide such a classification technique. Personality profiling is becoming a more accepted and utilized methodology in education for better understanding individual student learning mechanisms [35] and in business to facilitate teamwork and customer relationship management [10]. Personality profiling has reportedly been used by a wide variety of organizations [11] including: Bank of America, Blue Cross Blue Shield, Cisco, Cricket, Denver International Airport, Great West Life, Hilton and Marriott hotels, Microsoft, National Semiconductor (Malaysia), Pratt & Whitney (Canada), Sembawang Logistics (Singapore), and the United States Air Force among others. Utilizing personality type in e-commerce research has been limited and merits further attention.

The research presented in this paper is a descriptive study that examines how personality type, as classified by the Myers-Briggs personality Type Indicator (MBTI) [27], affects perceptions of features that promote utilization of e-commerce payment portals by individuals and also which website features are considered as unimportant by different personality types. The examination of e-commerce payment portals and credit card online payment services (CCOPS) in particular is important because e-commerce business relies heavily on credit card payments. In the USA alone in 2010, consumers carried $835.5 billion in credit card debt [12], which is distributed across 576.4 million individual credit cards [29]. In 2003, 13.8 percent of consumers paid some credit card bills online [18] and this number continues to grow. If personality dependent payment service website features can be identified, then e-commerce payment service designers may utilize these findings to understand how to customize web portals to attract or maintain usage of users with different personality types.

2 Background

Previous research examining interaction effects between personality and website usage typically examine a single trait or two and do not try to examine the whole personality. Early research on personality and Internet usage examined the relationship between extraversion and Internet usage [6], [16], [33]. One research study implied that extroverted versus introverted personality types account for much of the variance of Internet service usage and explained differences in utilization of Internet leisure services and social services [1]. Another study addressed Internet user behavior in light of a particular personality trait, focusing on the usage patterns of commercial websites by individuals with varying levels of a need for closure [17].

The Five Factor Model based on trait theory is one of the major frameworks currently used in the field of psychology to describe human personality traits [22]. Tuten and Bosnjak [36] make use of the Five Factor Model of personality, compared with cognition, to examine web usage preferences and found cognition to be a better overall predictor of website preferences than any of the Five Factor Model traits. However, they also indicate that extraversion had no effect on the type of web usage, it did negatively affect the duration of use compared to introversion. Guadagno, Odkie, and Eno [15] also used the Five Factor Model to discover that openness to new experience and neuroticism were positive predictors of blogging.

Amichai-Hamburger [2] and others [4], [17] have argued that web designers tended to ignore the personality types of users when making design decisions to the detriment of the end product. The usage of personality type indicators in website design facilitates development of a conceptual model, identifying essential elements of the graphical interface, and defining usability, and functionality of the web design.

2.1 Myers Briggs Type Indicator

Personality tests are instruments designed to ascertain various attributes of the psychological profile and character of individuals. They fall in to two main categories: those which test higher level traits and those that test lower level primary types. Some research considers traits as classifying the qualitative differences of individuals, while types classify them quantitatively [5]. Trait based tests such as the Big Five, NEO PI (Personality Inventory), or Circumplex Seven consider broad upper level comprehensive traits [9]. The MBTI®, Kirton Adaptors Innovators, Eysenck's
Personality Indicator, and other type tests like them are based on Jung's work founded on cognition which acts at a more primary psychological level [20]-[21], [23], [25], [33].

Cognition deals with how an individual acquires information and makes decisions, and has been found to be more determinant in predicting behavioral intent than those higher level traits dealt with by the Big Five [9], [30]. Therefore, the MBTI® was chosen for this research as it is based on cognition with its predictive capability, is generally seen as reliable and valid, and is the most widely accepted and recognized of the type tests used to measure cognition based on Jung's concepts [7], [40]. The MBTI® is used across a spectrum of scientific disciplines as a psychometric survey administered to subjects to ascertain their psychological attributes [25]-[27]. Jung [20] extrapolated eight psychological types based on permutations of two basic functions, extraversion and introversion, and four attributes, sensation, intuition, thinking, and feeling.

The MBTI® employs four diametric scales. The pairs are Extroversion (E) and Introversion (I), Sensing (S) and Intuition (N), Thinking (T) and Feeling (F), and Judgment (J) and Perception (P) [25], [28]. These are usually treated categorically; that is for any and each one of the four diametric scales, depending on the value of an individual's survey answers for that scale, the individual is assigned either one or the other of the diametric poles as a category. The respondent is assigned a category for each of the four scales, giving rise to 16 possible personality types.

3 Methodology

A survey was developed based on personality type expectations and current CC-OPS portal features and is shown in the Appendix A. The survey was tested on a small focus group to make sure that the questions were easily understandable. The first part of the survey acquired demographic data and the subsequent part utilized eight 5 point Likert scale questions and 3 open-ended questions to gather perceptions about credit card payment website features. The survey was combined with the short version of the MBTI assessment questionnaire (20 questions, not shown) to determine the survey respondents' personality type, which was administered between the demographic questions and the credit card payment website feature questions.

Potential respondents were invited from both undergraduate and graduate courses in the Business School of a selected urban state university, with the qualification that they own at least one credit card and that they pay their own credit card bills. The University was a metropolitan university and thus had a blend of older and employed students taking courses with more traditional students. Most of the students received course assignment credit for completion of a course requirement to participate in external research activities. No other compensation was offered.

A total of 266 respondents started the survey, but 48 of these indicated they did not pay their own credit card bills and were disqualified from completing the survey. The remaining 218 respondents were divided into two categories: regularly pays their credit card online (n=201) and rarely or never paid their credit card online (n=17). The number of respondents causes some limitations in generalizing the results and further in interpreting results for subgroups or personality types with very small response populations (less than 5 percent of the total response population). Demographics for the 218 usable respondents are given in Table 1.

Table 1: Credit card website perception survey respondent demographics

<table>
<thead>
<tr>
<th>Sex</th>
<th>55.96% male</th>
<th>44.04% female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.05% 18-20</td>
<td>63.30% 21-29</td>
<td>23.85% 30-39</td>
</tr>
<tr>
<td>6.88% 40-49</td>
<td>0.92% 50-59</td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.75% High School</td>
<td>37.16% Some college or Associate degree</td>
<td>49.08% Bachelor’s degree</td>
</tr>
<tr>
<td>Income in $</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 10,000</td>
<td>11.93% 10,000-19,999</td>
<td>18.35% 20,000-29,999</td>
</tr>
<tr>
<td>7.34% 40,000-49,999</td>
<td>7.80% 50,000-59,999</td>
<td>12.64% 60,000-69,999</td>
</tr>
<tr>
<td>3.21% 80,000-89,999</td>
<td>4.13% 90,000-99,999</td>
<td>7.8% ≥ 100,000</td>
</tr>
</tbody>
</table>

The demographics indicate that the respondents, even though students, are more mature than traditional college age students. Slightly more males than females responded. Sixty percent of the respondents had already finished their first Bachelor’s degree or higher. Interestingly, the income question has a bubble below 30,000 which may indicate full time students who can only work part-time and thus have more limited income and a second, almost normal curve above the low income bubble, with a median around the 60K income range. The low income bubble represented just slightly less than 50 percent of the respondents, indicating that over half of the respondents are earning income well above the poverty guideline level for the USA [37] and should therefore have disposable income for making and paying credit card purchases.
4 Results and Discussion

There are two ways to examine the survey’s results: looking at individual aspects of each personality type, recalling that they are in diametric pairs; or looking at each of the 16 complete personality types as defined by MBTI. First it must be noted that the responses did not vary significantly by sex as measured by a Kolmogorov-Smirnov test, with \( p = 0.97936 \), indicating that the two populations of responses have nearly identical distributions. A cluster analysis is performed first to identify relevant conceptual groupings of data from the survey for further analysis of personality effects on perceptions of these concepts.

4.1 Cluster Analysis

A hierarchical cluster analysis with dendrograms is carried out for respondents who use a CC-OPS. This was not conducted for non-users of CC-OPS due to the small sample size. The Complete-Linkage technique is employed to leverage tight clustering [34]. The furthest neighbor cluster method is used with a squared Euclidean method, clustering on the preference variables as shown below in the Agglomeration Schedule in Table 2.

<table>
<thead>
<tr>
<th>Stage</th>
<th>Cluster Combined</th>
<th>Coefficients</th>
<th>Stage Cluster First Appears</th>
<th>Next Stage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cluster 1</td>
<td>Cluster 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>2</td>
<td>24.098</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
<td>9</td>
<td>46.005</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>5</td>
<td>8</td>
<td>56.649</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>6</td>
<td>57.980</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>3</td>
<td>5</td>
<td>88.417</td>
<td>0</td>
</tr>
<tr>
<td>6</td>
<td>1</td>
<td>7</td>
<td>89.622</td>
<td>4</td>
</tr>
<tr>
<td>7</td>
<td>1</td>
<td>4</td>
<td>109.030</td>
<td>6</td>
</tr>
<tr>
<td>8</td>
<td>1</td>
<td>3</td>
<td>169.328</td>
<td>7</td>
</tr>
</tbody>
</table>

Clustering analysis is employed to identify meaningful groups in the data. The dendrogram for this cluster analysis is shown in Figure 1 and gives a visual representation of the correlation of concepts with each other. There is no commonly used heuristic for drawing the line. Drawing the line at this point creates the most detail while maintaining the most homogenous of groups. When analyzing the dendrogram the logical place to draw the cut off line is at approximately 14 on the distance scale.

This resolves into three distinct and informative groups pointing to the individual respondent’s preferences. The first group clusters the Latefees, OnTime, CreditScore, and Confirmation variables. These are all issues that relate to insuring payments are made on time and their impact on late fees and maintenance of good credit standing. The second cluster comprised of the Security and Safeway variables both address online security issues. These users are mainly concerned with protection of information assets. The third cluster groups Tutorial tightly with OLHelp, and loosely includes SocialMedia. This group would appear to be primarily interested in ease of use factors, where social media might be interpreted as a signal for an easy to understand service. The homogenous natures of these clustering groups imply that the survey questions measure the intended factors.

4.2 Examining Individual Aspects of Personality Types

Table 1 shows the demographic percentage of each personality type aspect along with response percentages for each of the measured factors, where percentages for the perceptions are within that specific personality aspect. The presence of security features was deemed as very important by all personality type aspects and was seen as the most important feature (indicated in bold) for all personality aspects. This is not unexpected with the prevalence of identity theft [19].
The results for personality type aspects from Table 3 indicate that it is very important in decreasing order of importance for CC-OPS to maintain high security standards, facilitate making on time payments, and promote a general feeling of safety of information and privacy of information. Since these are the three most important features perceived by current CC-OPS users, it is important for these service providers to advertise and keep the public informed of their capabilities surrounding these three issues. The only other online credit card payment feature that is perceived as important at the 80 percent level or above for some personality aspects is avoiding late fees, which intuitively is correlated with making on time payments. Interestingly, except for the Judging aspect where it was second and the Thinking aspect where it was tied for second, feeling safe online was only the third most important feature of CC-OPSs. The reason this is interesting is that feeling safe and the need for online security should be highly correlated. Though both security and safety are perceived as important features, the reason why making payments on time is perceived as more important than the need to feel safe when making online payments to credit card accounts should be further analyzed.

Making on time payments may be perceived as a result of the anytime and anywhere nature of the Internet and consequently e-commerce in general. These users may be correlating making on time payments with the efficiency and ease-of-use offered by online payment systems, thus making them compatible with varying work schedules. As long as the method of payment is secure, then the perceived benefits to the user from being able to make payments on time at any time and from almost any location outweighs their need for a feeling of safety.

A potential drawback of utilizing MBTI personality types influence on individual e-commerce utilization decisions may be examined through the impact of external influences (via social media in this case). Only 2 of the respondents, or under one percent of the total population of respondents, indicated that social media influences are important in their adoption of CC-OPS. While social media has been widely studied, the results of our survey indicate that for CC-OPS users.
OPS utilization, any effect is minimal. Since credit card payments affect the financial status and wellbeing of an individual, they want to make an objective decision about how to pay, and may see prior experience of social media acquaintances as irrelevant data for determining a factual real-world outcome.

<table>
<thead>
<tr>
<th>MBTI aspect</th>
<th>Percent of total</th>
<th>Avoid late fees</th>
<th>Make payments on time</th>
<th>Tutorial available</th>
<th>Online Help or Chat</th>
<th>Confirmation of payment</th>
<th>Improve Credit Score</th>
<th>Heard about it on Social Media</th>
<th>Security features</th>
<th>Perception of Safety</th>
</tr>
</thead>
<tbody>
<tr>
<td>E</td>
<td>57.71%</td>
<td>65.52%</td>
<td>73.28%</td>
<td>15.52%</td>
<td>7.76%</td>
<td>62.93%</td>
<td>48.28%</td>
<td>1.72%</td>
<td>86.21%</td>
<td>72.41%</td>
</tr>
<tr>
<td>I</td>
<td>42.29%</td>
<td>80.00%</td>
<td>91.76%</td>
<td>16.47%</td>
<td>7.06%</td>
<td>55.29%</td>
<td>57.65%</td>
<td>0.00%</td>
<td>98.82%</td>
<td>88.24%</td>
</tr>
<tr>
<td>S</td>
<td>67.66%</td>
<td>66.18%</td>
<td>75.00%</td>
<td>16.18%</td>
<td>6.62%</td>
<td>55.88%</td>
<td>47.06%</td>
<td>1.47%</td>
<td>89.71%</td>
<td>74.26%</td>
</tr>
<tr>
<td>N</td>
<td>32.34%</td>
<td>83.08%</td>
<td>93.85%</td>
<td>15.38%</td>
<td>9.23%</td>
<td>67.69%</td>
<td>63.08%</td>
<td>0.00%</td>
<td>95.38%</td>
<td>89.23%</td>
</tr>
<tr>
<td>F</td>
<td>24.36%</td>
<td>81.63%</td>
<td>93.88%</td>
<td>18.37%</td>
<td>8.16%</td>
<td>79.59%</td>
<td>48.98%</td>
<td>0.00%</td>
<td>100.00%</td>
<td>85.71%</td>
</tr>
<tr>
<td>T</td>
<td>75.62%</td>
<td>68.42%</td>
<td>76.97%</td>
<td>15.13%</td>
<td>7.24%</td>
<td>53.29%</td>
<td>53.29%</td>
<td>1.32%</td>
<td>88.82%</td>
<td>76.97%</td>
</tr>
<tr>
<td>J</td>
<td>65.67%</td>
<td>79.55%</td>
<td>88.64%</td>
<td>17.42%</td>
<td>7.58%</td>
<td>68.94%</td>
<td>58.33%</td>
<td>0.00%</td>
<td>100.00%</td>
<td>91.67%</td>
</tr>
<tr>
<td>P</td>
<td>34.33%</td>
<td>56.52%</td>
<td>66.67%</td>
<td>13.04%</td>
<td>7.25%</td>
<td>42.03%</td>
<td>40.58%</td>
<td>2.90%</td>
<td>75.36%</td>
<td>55.07%</td>
</tr>
</tbody>
</table>

There is a definite consequence to making payments on time, avoiding late fees, and impact on credit scores, which helps explain why most individuals do not rely on external social influences when making this decision.

However, can MBTI be used to explain why a small percentage of the population did perceive external social network influences as important? The personality type of both respondents indicating importance of social media external influences is ESTP. Perceiving types are commonly seen as flexible and adaptable to the world and like to utilize external input for decision making instead of imposing order [26]-[28]. Extroverts are also prone to seek recognition and approval from peer groups [26]-[28]. Both of these personality types would be more likely to utilize social media influences over their MBTI counterparts of introversion and judgment. The E aspect provides insights into where an individual focuses their attention, while the P aspect is more about how an individual deals with the outer world [26]. The sensing, S, and thinking, T, aspects of personality type do not on the surface offer any intuitive reasons or counter reasons why social network influence would influence decision makers of this personality type. The S aspect is about how individuals take in information and the T aspect corresponds to how individuals make decisions [26].

4.3 Utilizing the Full MBTI for Evaluating Perceptions of Online Payment Service Features

According to Jung [20] and consequently the Myers-Briggs MBTI [27], individuals’ personality types are a composition of multiple aspects. Next we examine the 16 personality types. Figure 2 shows the percentage of each of the MBTI present in the survey response population for users of CC-OPS. It is interesting to note that the two largest user populations are for ESTJ and ISTJ personality types with the next largest personality type being ESTP. These three personality types represent over 50 percent of the total user population. A total of 5 out of the 16 different personality types each had sufficient responses to represent at least 5 percent of the total population respectively. According to [41], the top three personality types of CC-OPS users (those representing 10 percent or greater of the respondent population) are also among the top five personality types found in the United States. The ENFP, ISTP, and ISFJ personality types were below the 5 percent population criteria, but were relatively close at 4.48 percent of the total user population. Results for the remaining 8 personality type groups, since they are based on very small numbers should be seen as only as early preliminary results with no statistical significance implied.

The MBTI types for the largest groups of users of CC-OPS reveals that they tend to have the STJ aspects in their personality and secondarily EST personality aspects. As mentioned in the individual personality type aspect analysis, these two partial types both make sense. The STJ type likes to take the world (or electronic world) as it is, dealing in facts, and finally imposing order through their decisions [26]-[28]. Using an electronic resource enables the STJ to get the facts of their account and deterministically decide how to affect their account through an online payment and impose this reality immediately. The EST type is similar, but substitutes Extroverted interaction with the online world for the methodical scheduling from the J personality aspect.

Table 4 reports for each of the 16 types results corresponding to those reported for the individual aspects, but the percentages are with respect to all respondents with the same MBTI (hence, ESTJ percentages represent the percentage of only ESTJ respondents that selected a value of 4 or 5 for the respondents CC-OPS feature). The gray shading indicates MBTI personality types that did represent at least 5 percent of the overall population and thus should not pose an analysis limitation due to few responses for that category.
The questions in the survey correspond to several distinct factors: security (Security features and perception of safety), timeliness (make on time payments and avoid late fees), personal benefit (avoid late fees and improve credit score), ease of use (tutorial and online help/chat), confirmation of a completed transaction, and external social influences (recommendation from friends or social media). From Table 4, looking at only the shaded rows and thus those personality types that represent at least 5 percent of the population of respondents, it may be seen that the average of the security factor (average of the security and safety items) is the most important (or tied for most important) for all personality types except for ENTJ, where it is tied with the timeliness category. As a cautionary note on interpreting this result, this may not be a feature of personality type so much as it is a necessity in today’s online society with hackers and identity theft threats causing people to desire the appearance of secure online transactions.

The second most influential feature factor and for the ENTJ personality type tied for first, is the timeliness factor. Thus it appears that the ability to make payments anytime and anywhere in an efficient manner is highly important to online payment adopters. The confirmation factor, with confirmation of the fact that the payment has occurred, is the third most significant factor for the three Extrovert personality types identified in Table 4. Whereas, the personal benefit factor was third most important for the Introvert personality types identified in Table 4. This could be a result of Extroverts valuing validation of their actions by a third party, the benefit factor was third most significant for the Introvert personality types valued confirmation at all then may be due to the possible use of confirmation for purposes of non-repudiation of the payment, thus transforming it into a personal benefit factor element.

Table 4: Important credit card payment service features for MBTI personality types

<table>
<thead>
<tr>
<th>MBTI type</th>
<th>Avoid late fees</th>
<th>Make payments on time</th>
<th>Tutorial available</th>
<th>Live Chat available</th>
<th>Confirmation of payment</th>
<th>Improve Credit Score</th>
<th>Social Media</th>
<th>Security features</th>
<th>Perception of Safety</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESTJ</td>
<td>70.21%</td>
<td>82.98%</td>
<td>23.40%</td>
<td>4.26%</td>
<td>70.21%</td>
<td>89.57%</td>
<td>0.00%</td>
<td>95.74%</td>
<td>91.49%</td>
</tr>
<tr>
<td>ESTP</td>
<td>35.00%</td>
<td>45.00%</td>
<td>15.00%</td>
<td>15.00%</td>
<td>45.00%</td>
<td>35.00%</td>
<td>10.00%</td>
<td>70.00%</td>
<td>35.00%</td>
</tr>
<tr>
<td>ESFJ</td>
<td>83.33%</td>
<td>50.00%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>83.33%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>100%</td>
<td>66.67%</td>
</tr>
<tr>
<td>ESFP</td>
<td>75.00%</td>
<td>75.00%</td>
<td>25.00%</td>
<td>0.00%</td>
<td>25.00%</td>
<td>75.00%</td>
<td>0.00%</td>
<td>75.00%</td>
<td>100%</td>
</tr>
<tr>
<td>ENTJ</td>
<td>100%</td>
<td>100%</td>
<td>0.00%</td>
<td>15.38%</td>
<td>76.92%</td>
<td>61.54%</td>
<td>0.00%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>ENTJ</td>
<td>50.00%</td>
<td>75.00%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>12.50%</td>
<td>50.00%</td>
<td>0.00%</td>
<td>62.50%</td>
<td>62.50%</td>
</tr>
<tr>
<td>ENFP</td>
<td>66.67%</td>
<td>77.78%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>68.89%</td>
<td>55.56%</td>
<td>0.00%</td>
<td>100%</td>
<td>55.56%</td>
</tr>
<tr>
<td>ISTJ</td>
<td>77.14%</td>
<td>82.86%</td>
<td>20.00%</td>
<td>11.43%</td>
<td>45.71%</td>
<td>80.00%</td>
<td>0.00%</td>
<td>80.00%</td>
<td>80.00%</td>
</tr>
<tr>
<td>ISTP</td>
<td>77.78%</td>
<td>77.78%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>22.22%</td>
<td>11.11%</td>
<td>0.00%</td>
<td>77.78%</td>
<td>55.56%</td>
</tr>
<tr>
<td>ISFJ</td>
<td>55.56%</td>
<td>100%</td>
<td>11.11%</td>
<td>0.00%</td>
<td>77.78%</td>
<td>44.44%</td>
<td>0.00%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>ISFP</td>
<td>100%</td>
<td>100%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>75.00%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>100%</td>
<td>50.00%</td>
</tr>
<tr>
<td>INTJ</td>
<td>81.82%</td>
<td>81.82%</td>
<td>18.18%</td>
<td>0.00%</td>
<td>63.64%</td>
<td>72.73%</td>
<td>0.00%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>INTP</td>
<td>80.00%</td>
<td>100%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>60.00%</td>
<td>80.00%</td>
<td>0.00%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>INFP</td>
<td>75.00%</td>
<td>100%</td>
<td>25.00%</td>
<td>0.00%</td>
<td>75.00%</td>
<td>75.00%</td>
<td>0.00%</td>
<td>75.00%</td>
<td>100%</td>
</tr>
<tr>
<td>INFP</td>
<td>83.33%</td>
<td>100%</td>
<td>16.67%</td>
<td>33.33%</td>
<td>50.00%</td>
<td>83.33%</td>
<td>0.00%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>
Since security and efficiency of making payments with a subsequent confirmation that the payment has in fact been made have been identified as very important features to current CC-OPS users based on their personality types, these are the specific features that need to be promoted by credit card payment service providers to existing customers for purposes of continuation of their payment services. Service providers need to make sure that users and potential users are well aware of their security features and not simply bury this information in a long and often unread user agreement [3]. New marketing campaigns could promote the safety and peace of mind achieved from utilizing CC-OPS. Additional marketing aimed at retaining existing customers and attracting personality type users who are not yet CC-OPS users, but willing to become one based on personality, could emphasize the timeliness of making payments. Payments can be made any time that is convenient, from most mobile devices and can be made within a short time period prior to payment deadlines.

The open ended questions also supported the importance of the timeliness feature of CC-OPSs. Samples of some of the open-ended question responses for various respondents who pay regularly online to the question Why do you pay your credit card bills online are (see the Appendix A, question 41):

- I pay my credit card bills online because it is convenient, fast, and hassle free.
- Easy and convenient for a busy lifestyle. (This exact same comment was given by two different respondents.)
- It's easier and faster than paying by snail mail.
- I pay online because of the increased access to information, instant payment, and to save stamps and paper.
- Convenience. Traditional mail, phone banking, or paying in person are all unpleasant and time consuming.
- It's fast, easy, and I know it's done.
- EASY!! I click and I am done. No stamp no paper no worries. Hassle free! I forget to make my payment I don't need to look for the bill I just login and click pay and walk away.
- I can pay it up until the due date without worrying if the payment in the mail will get there or if the bank payment will get there on time.
- Easy, quick, so I don't make any late payment.
- Convenience. Immediate / can pay anytime and are reminded to pay.
- I find it efficient and less time consuming compared to fill out a check and mail it or drive to the credit card branch to make a payment.

While this small sample of open-ended responses represents only six percent of the responses, many other responses were highly similar and are not displayed for purposes of brevity, but over 62 percent of all respondents indicated timeliness or convenience was a factor in utilizing a CC-OPS in their responses to the open ended question. The fourth item in the responses list shown above also indicates another theme in the open ended question responses that occurred second most frequently, which is personal benefit or in this case cost savings. Over 16 percent of the respondents mentioned cost saving, usually in reference to cost of postage stamps, as a reason for utilizing CC-OPSs.

Security is indicated as the number one required feature uniformly across all personality types with feeling safe being the second or more regularly third most important feature of CC-OPSs. However, only slightly less than five percent of the respondents mentioned either security or safety in their open ended responses. Again, this may be caused by society’s expectation that CC-OPSs of any kind must be secure and is therefore assumed to be present. Several of the security comments were comparative, indicating that the respondent felt that paying online was more secure than utilizing traditional mail payment methods.

The next two most frequent open ended responses identified confirmation of payment or a paper trail as being important for almost 6 percent of the respondents and that paying online was environmentally friendly or green through reduction in paper utilization for bills and payments for almost 4 percent of the respondents. This last feature, the greenness of the process is a novel finding and was not part of the original survey. Although a relatively small percentage, this finding suggests additional marketing strategies for CC-OPSs, to appeal to potential users to not only achieve security and efficiency in their transactions, but also help reduce waste and lessen the impact on the environment from commerce.
4.4 Examining Preferences of Non-Users

The survey has indicated the features perceived as beneficial or necessary by CC-OPS users. However, a small population of credit card owners that did not pay regularly online also answered the survey (n=17). The small number indicates that any results should be taken as purely exploratory in nature. We now examine features non-users perceived as being desired as well as features not perceived as beneficial and as such would not lead to utilization.

The MBTI personality type for non-users are varied and included at least one respondent for ten different personality types. The individual aspects for the composite types were evenly distributed, except for Extroverts (59%) and Judging (71%) personalities appearing more frequently. The distribution of the individual MBTI aspects is similar to the distribution for users of CC-OPSs which is counter intuitive.

Table 5 represents the responses for questions similar to what is asked of the CC-OPS users, but this time with a focus on what features would promote utilization for non-users. The five features: security, safety, improve credit score, receive payment confirmation, and social media influence, for which non-users could agree, meaning a simple majority or greater held the same attitude, are represented in bold. The correspondence between the desired features of current users and non-users is displayed in Figure 3 using both a bar graph and a line graph for visualization.

<table>
<thead>
<tr>
<th>Feature</th>
<th>Feature UNIMPORTANT</th>
<th>Feature DESIRED</th>
<th>Neutral</th>
</tr>
</thead>
<tbody>
<tr>
<td>Security</td>
<td>100%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Feel safe</td>
<td>18%</td>
<td>76%</td>
<td>6%</td>
</tr>
<tr>
<td>Make payments on time</td>
<td>35%</td>
<td>47%</td>
<td>18%</td>
</tr>
<tr>
<td>Avoid late fees</td>
<td>35%</td>
<td>41%</td>
<td>24%</td>
</tr>
<tr>
<td>Improve my credit score</td>
<td>18%</td>
<td>29%</td>
<td>53%</td>
</tr>
<tr>
<td>Receive confirmation</td>
<td>29%</td>
<td>65%</td>
<td>6%</td>
</tr>
<tr>
<td>Tutorial</td>
<td>35%</td>
<td>29%</td>
<td>36%</td>
</tr>
<tr>
<td>Online chat available</td>
<td>41%</td>
<td>12%</td>
<td>47%</td>
</tr>
<tr>
<td>Hear about it on social media</td>
<td>88%</td>
<td>6%</td>
<td>6%</td>
</tr>
</tbody>
</table>

Figure 3: Comparison of desired online credit card payment service features between users and non-users

The features shown in Figure 3 which are most similar between CC-OPS and non-users are feeling that the payment transaction is safe and receiving a confirmation of payment. The most significant differences between users and non-
users are the total lack of desire for security and a much lower desire to be able to pay on time. The general shapes of the two line graphs indicate that the relative importance of all other features is similar between users and non-users.

The slightly greater importance of a tutorial and online help features is a reasonable assumption for a need of current non-users as this will increase their perceived ease of use of the online payment systems and consequently help reduce barriers to adoption. Additionally, the increased need for confirmation of payment may be seen as a part of feeling safe. Being unsure of how online payment systems work, the non-users may feel stress over knowing whether or not their payment transaction has been completed. While this same stress exists with other types of credit card payment systems, the long term usage of prior systems has led to an accepted assumption of this risk, but potential users will feel safer using CC-OPSs when their transaction is confirmed bringing it to a definite conclusion.

A confusing but important difference between non-users and users of CC-OPSs is the lack of recognition of security as an important feature. All respondents who did not pay regularly online indicated that security features of CC-OPSs were not important. Additionally, although the non-users indicated that security was not important, the majority did indicate that they wanted to feel the transaction was safe, indicating a disparity in their responses. Television, news, and other media have attempted to make the public aware of identity theft, which is a personal and financial safety issue. The security responses given by non-users may be explained either by them not understanding the technical aspects of security or alternately simply assuming that all websites, including CC-OPS sites, already have security. Some of the open ended comments from the non-users demonstrate this lack of understanding between security features and perceived safety (see the Appendix A, questions 51):

- I don't trust to type all of that information in online because I am afraid of any form of identity theft.
- Still writing checks, worried about identity theft.
- Because of the risks of sharing your information online.
- It makes me nervous putting my information online.

(and question 52 from the Appendix A):

- If there was any way to make the process more trustworthy so that I didn't have all of the fears surrounding identity theft looming in my head. If it was easier that my way of paying credit cards then I would also be more prone to pay my credit card online.
- Security measures that prevent hackers from breaking into databases.
- Even though the sites are secured & protected, I would like some type of reassurance that my credit information won't be compromised in any way.
- If it's more secure.

As may be seen from the open ended responses, individuals do not use CC-OPSs because they feel it is unsecure and additional security is given as a feature that would encourage the respondents to start using CC-OPSs. Security is mentioned by almost 53 percent of the non-user respondents in their open ended responses. Further research is needed to examine this disparity and help determine why non-regular users of CC-OPSs do not see a correlation between the security features of a web service and the consequent privacy and safety of their information. The disparity between the lack of recognition of security features as being important and the specified desire to feel safe during these transactions indicates that CC-OPSs, and perhaps any e-commerce credit card transaction, will not be able to convert these individuals into users of their service by simply advertising new or better security features. Conversion of this type of non-user requires addressing their specific safety needs by perhaps talking about how online payers are protected from identity theft or other safety issues.

A few additional comments from the non-users of CC-OPSs deserve attention. One comment illustrates how education and advertising from CC-OPS providers might help increase user adoption: Due [to] my erroneous schedule, I often don't have the time to pay for credit card bills online, so I usually pay by phone or postage mail before the payment due date. This comment indicates that the individual is unaware of the potential for efficiency and consequent time savings through e-commerce utilization. Marketing focusing on the time savings and additionally the anytime anywhere nature of CC-OPSs could help convert this type of non-user. Other comments indicated desired features that might lead to conversion are ease-of-use and a heightened awareness of convenience:

- If the website was user friendly.
• It’s fast, easy, and convenient.
• Guidelines that make the payment process quick and easy.

Just over 47 percent of the non-user respondents indicated that user-friendliness, ease of use, or convenience were features that would lead them to adopt online CC-OPSs. Thus, service companies may attract these current non-users by providing user-friendly interfaces, friendly helpful customer support, and advertising these features along with the convenience of paying credit card bills anytime.

5 Limitations Future Research

The descriptive exploratory research presented in this article attempts to answer the question if personality affects CC-OPS perceptions and utilization and present strategies for how to exploit any personality dependent relationships to e-commerce. The research, which has a couple of limitations, also raises several questions to inspire future research. Personality should be considered as an influencing effect in future research of human interactions with e-commerce.

5.1 Limitations

There are two primary limitations for the research reported in this article. The largest and most significant limitation is the respondent sample size. Although this research is a descriptive exploratory research, the small population size indicates that the results should not be interpreted as predictive, but rather as indicating the perceptions of a small population which may or may not be generalizable. One could argue that a respondent N over 200 is reasonable for making generalizations however, further compounding the impact on generalizability is the fact that personality types necessitate further dividing the respondent population into smaller subgroups. Using the MBTI personality type this requires sixteen subgroups. Because each of these personality types is not represented equally in the general population [41], the same effect is seen in the respondent population creating very small sample sizes within specific personality type groups.

The second limitation is in the fact that almost all of the respondents were students. Some faculty and some non-academics did respond however the majority of responses (91%) were students. The value of generalizing research results based on student response subjects has been called into question previously and caution should be used when generalizing any research findings from college student subjects to nonstudent populations [31]. This limitation is at least partially balanced by using real world result versus intentions which have been found to be notoriously misleading [42]. All respondents were required to not only have a credit card, but to also be the owner/bill payer, which provides actual utilization perceptions as opposed to simple intentions for the CC-OPS users.

5.2 Future Research

As indicated, the small sample size and further requirement to partition this small sample into even smaller groups creates generalizability concerns. The current study should be interpreted as an indicator that the described relationships are in fact possible. Future and ongoing research should continue to collect data to greatly expand the research population size and try to determine if the initial descriptive results reported in this article are consistent with a larger population and generalizable to the population of credit card owners/bill payers at large.

Perceptions of safety or feeling safe intuitively should be closely correlated with security features of CC-OPS. However a couple of interesting disparities are observed in the reported research results in this article. Using the individual aspects of personality and the five MBTI types that represented at least 5 percent of the population, CC-OPS users perceive that security is the most important feature of a CC-OPS. However the individual aspects of the MBTI indicate that for all aspects except for the judgment (J) their need for feeling safe was secondary to paying on time. Using the full MBTI personality, 57 percent of the overall population, or 54 percent of those personality types representing a minimum of 5 percent of the population, felt that paying on time was more important or equally important to feeling safe while paying their CC bill online. Future research is needed to further investigate this phenomena to determine the precise causes of why either convenience or making an on time payment is perceived as more important than safety needs of many individuals. The second disparity is that non-users of CC-OPS uniformly felt that security features were unimportant, but that feeling safe while paying their CC bill is of highest importance. This raises issues and the need for future research to identify the potential causes of this disparity between the recognition of security features of a website and actual feelings of security or safeness while conducting business at CC-OPSs.

An interesting corollary finding from the open ended responses of CC-OPS users is that paying their CC bills online is perceived as environmentally friendly by eliminating paper from postal bill paying. Future research may be used to focus on the environmental consciousness of e-commerce users and their desire to be green as a motivating factor for starting to use new online services.
An open-ended comment from a non-user of CC-OPSs identifies that at least some CC-OPSs and possibly other e-commerce users are analyzing their utilization of online services using a cost benefit analysis approach. The comment: There is no advantage to me paying online. I’m saving the company money on mailing me bills and processing checks but how does that translate to my benefit? Lower interest rate? Rewards points? I save a stamp and check but that apparently is not enough incentive for me, indicates that the respondent perceived that paying online was producing a cost savings to the credit card companies, however the respondent did not feel he would be compensated adequately for paying his credit card bill online. This indication of intolerance for helping organizations improve their revenue without being compensated is present in other e-commerce areas as well. Electronic book and textbook costs frequently cause disgruntlement and possibly aversion to adoption of electronic texts due to the perceived discrepancy between production costs and lack of subsequent savings passed on to the consumer [13]. Future research is needed to identify if this lack of transmission of savings or other benefits to consumers is a barrier to adoption of CC-OPSs or may explain other e-commerce adoption reluctances.

Assuming future research confirms the descriptive findings reported in this article, a potential issue is how e-commerce service providers that want to take advantage of the differing perceptions associated with different personality types reliably capture the personalities of their users or potential users visiting their websites. Asking every visitor to take the 92 question MBTI test or the 20 question short-form MBTI test is not realistic. However, since our research indicates the varying preferences of different personality types with regard to service features, it may be possible to determine the personality of service website visitors by tracking which website feature links they click on or how much time they spend on each feature or portion of the corresponding website FAQ (frequently asked questions). These observations and calculations can easily be made unobtrusively and recorded for individual users using cookies [39]. Future research is needed to investigate the efficacy of automatic personality type recognition methodologies and their subsequent application to help reduce barriers to adoption.

6 Conclusions

The research presented in this paper is descriptive research that attempts to better understand how individual personality may affect which features of CC-OPSs are perceived as useful and also those perceived as unnecessary by both users and non-users of these services. The research demonstrates that individual personality types affect user perceptions of e-commerce credit card payment services. The research’s first round of survey responses only produced responses from 80 users of CC-OPSs, which were analyzed using the same measures and techniques described in this article. A second round was conducted which produced the additional 121 responses from CC-OPS utilizers, bringing the total responses to 201, or over 251 percent of the original survey responses. The analysis for the larger group of 201 respondents was nearly identical to the results from the original smaller response which lends intuitive support that the results are generalizable, at least to populations of university educated credit card users.

For CC-OPSs, security, followed closely by timeliness or efficiency in making payments were the two most valuable features of CC-OPSs. Additionally, receiving confirmation of payment was also viewed as a valuable service.

For some reason, non-users of CC-OPSs uniformly disagreed that security was a desirable feature of such websites. However, these non-users also indicated they wanted to feel safe in making an online payment should they ever use such a service and their open ended question responses indicated that security of some type was indeed a critical feature.

The results in Table 4 may be used by CC-OPS providers and other e-commerce transaction providers to determine how to increase utilization of their services. As an example, the ESTJ personality was indicated to be the personality that most frequently utilizes CC-OPSs. Noticing differences between this personality type’s perceptions and other personality type perceptions may enable CC-OPS providers to attract individuals with other personality types. For example, the row indicating the perceptions of ENTJ (more intuitive thinkers than the ESTJ type [28]) indicates that this personality type places more emphasis on both avoidance of late fees and also on a general feeling of safety than their ESTJ counterparts. Therefore, payment service providers can attract this type of possible user but current non-user by promoting avoidance of late fees through the anytime payment capabilities of their service, which in turn would help these individuals achieve a sense of wellbeing (safety), possibly by improving their credit scores and knowing that their payment is completed through receipt of a notification confirming their payment.

Likewise, ISTJ personality types indicated that with regard to security and timeliness of payments, they were very similar to ESTJ users, but they placed slightly more emphasis on the presence of tutorials and live chat help. The ISTJ increased emphasis on tutorials and help over their ESTJ counterparts indicates that even though they prefer to solve problems on their own, because of this they may require some additional learning or other help to feel confident in their decisions. Therefore CC-OPS providers would attract more of the ISTJ type users if they put in place an easy to use, self-guided tutorial and advertised this service. Additional personality type based recommendations have been made throughout the Discussion section and are meant to serve as recommendations for how to interact with different personality types in the online credit card payment environment.
Although the response size may be considered small and therefore places limitations on the generalizability of the results of this study to credit card holders at large, the fact that the results were nearly identical when the population size of the respondents was increased 251 percent indicates that at least for university educated credit card users, the results may be generalizable. Since personality has been shown to have an impact on how website features are perceived and consequent adoption of e-commerce services, future research is needed to examine if personality may explain differential utilization of other types of e-commerce sites or even websites in general.

The results of our research, both the smaller preliminary study and the larger study reported in this article, indicate how personality has a definite impact on perceptions of website service features. These differing perceptions have been implied to impact adoption of e-commerce services and websites. Future research analyzing adoption of new e-commerce technologies, including new website features and services, must consider the varying effects of personality type and its consequent impact on the corresponding research studies.

References

Appendix A: Survey to Measure User Perceptions of Online Credit Card Payment Services and MBTI Personality Type

Section 1 demographics

1. Are you male or female?

2. Which category below includes your age?
   1. 17 or younger
   2. 18 - 20
   3. 21 - 29
   4. 30 - 39
   5. 40 - 49
   6. 50 - 59
   7. 60 or older

3. What is the highest level of school you have completed or the highest degree you have received?
   1. Less than high school degree
   2. High school degree or equivalent
   3. Some college but no degree
   4. Associate degree
   5. Bachelor degree
   6. Graduate degree

[Questions 4 and 5 omitted for space, as they are not reported in the article]

6. How much money did YOU personally earn in 2012? This includes money from jobs; net income from business, farm, or rent; pensions; dividends; interest; social security payments; and any other money income received by You. Please report the total amount of money you earned - do not subtract the amount you paid in taxes or any deductions listed on your tax return.
   1. $0 - $9,999
   2. $10,000 - $19,999
   3. $20,000 - $29,999
   4. $30,000 - $39,999
   5. $40,000 - $49,999
   6. $50,000 - $59,999
   7. $60,000 - $69,999
   8. $70,000 - $79,999
   9. $80,000 - $89,999
   10. $90,000 - $99,999
   11. $100,000 or More

7. Do you pay your credit card bills yourself?
   1. Yes
   2. No (if No selected, end survey and disregard answers)

Section 2 (Questions 8-27) are the MBTI questions

Section 3 online credit card service feature perceptions

28. Do you pay your credit card bills online?
   1. Never pay online. (skip to question 42)
   2. Seldom pay online (skip to question 42)
   3. Often pay online
   4. Always pay online

29. When I pay my credit card bills online I prefer to
   1. Pay using my card issuers/providers own payment site
   2. Pay through a third party such as the online bill payer services of my checking/savings
   3. Pay using my Bank account or Credit Union website.

The following questions use a 5 point Likert Scale

1. Disagree Totally
2. Disagree Somewhat
3. Neither Disagree nor Agree
4. Agree Somewhat
5. Agree Totally

30. One reason I pay my credit card bills online is because it helps me avoid late fees.

31. One reason I pay my credit card bills online is it helps me make my payments on time.

32. One reason I pay my credit card bills online is that my Facebook, or Twitter, or other friends recommend paying online.

33. I feel the site I make my payments on is secure enough to protect my identity and information.

34. One reason I pay my credit card bills online is that there is a self-guided tutorial on how to correctly make the payment.

35. One reason I pay my credit card bills online is that I feel it will help improve my credit score because I have fewer late payments.

36. One reason I pay my credit card bills online is that I receive an email and/or confirmation code confirming that my credit card bill has been paid.

37. One reason I pay my credit card bills online is that my payment site provides a live chat feature allowing me to ask questions or get directions.

38. One reason I pay my credit card bills online is that I feel it is a safe way to make my payments.

The next questions are open ended questions using the respondents own words.

39. On the site where you make your payments what features do you find useful?

40. What features might your online credit card payment site offer that would increase your usage of online payments?

41. Why do you pay your credit card bills online?

END OF SURVEY FOR ONLINE PAYERS

The following questions use a 5 point Likert Scale

1. Disagree Totally
2. Disagree Somewhat
3. Neither Disagree nor Agree
4. Agree Somewhat
5. Agree Totally

42. I would be more willing to pay my credit card bills online if I knew it would help me avoid late fees.

43. I would be more willing to pay my credit card bills online if I knew it would help me make my payments on time.

44. I would be more willing to pay my credit card bills online if my Facebook and Twitter or other friends told me they pay online.

45. I would be more willing to pay my credit card bills online if I knew my identity and information would not be stolen.

46. I would be more willing to pay my credit card bills online if there was a self-guided tutorial on how to correctly make the payment.

47. I would be more willing to pay my credit card bills online if I thought it would improve my credit score because I would make fewer late payments.

48. I would be more willing to pay my credit card bills online if I could chat with a person online to help explain the process.

49. I would be more willing to pay my credit card bills online if I received an email and/or confirmation code confirming that my credit card had been paid.

50. I would be more willing to pay my credit card bills online if the site made me feel safe making my payment.
The next questions are using the respondents own words.

51. Why don't you pay your credit card bills online?
52. Explain any features, benefits, or other factors which would make you more likely to pay your credit card bills online.

END OF SURVEY FOR NON ONLINE PAYERS