



Article

Designing for Trust on E-Commerce Websites Using Two of the Big Five Personality Traits

Chian Chyi Saw ¹ and Anushia Inthiran ^{2,*} 

¹ Business Taught Masters Degree Programme, Business Information Systems, University of Canterbury, Christchurch 8041, New Zealand; chianchyi.saw@gmail.com

² Department of Accounting and Information Systems, University of Canterbury, Christchurch 8041, New Zealand

* Correspondence: anushia.inthiran@canterbury.ac.nz

Abstract: Online consumers perceived performing an online transaction as risky. The inability to trust the website is one reason why online consumers are reluctant to perform an online transaction. In this research study, 46 design features are examined to identify features that are able to increase the value of trust. Eighty-nine individuals participated in this research study. Participants completed one questionnaire which was divided into four parts. The questionnaire collected information on demographics, personality traits, trust and website design features. Data were analysed using quantitative statistical methods. A pilot test was conducted prior to the main experiment. Results indicate there are sixteen design features that have the ability to increase the level of trust amongst participants with the neuroticism trait. Fourteen design features had the ability to increase the level of trust amongst participants with the conscientiousness personality trait. E-commerce website designers could use these design features to increase the online consumer's perception of trust on e-commerce websites.



Citation: Saw, C.C.; Inthiran, A. Designing for Trust on E-Commerce Websites Using Two of the Big Five Personality Traits. *J. Theor. Appl. Electron. Commer. Res.* **2022**, *17*, 375–393. <https://doi.org/10.3390/jtaer17020020>

Academic Editor: Eduardo Álvarez-Miranda

Received: 10 February 2022

Accepted: 21 March 2022

Published: 25 March 2022

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Keywords: keyword trust; personality traits; e-commerce websites; design features; human computer interaction; psychology

1. Introduction

For several decades, online consumers have utilized e-commerce websites to perform online shopping [1,2]. Online shopping brings about a new level of convenience in comparison to traditional brick and mortar stores [3]. Consumers retrieve information more efficiently as they can easily search and browse products through online catalogues and websites rather than walking from aisle to aisle in a traditional shopping environment [4]. Online shopping provides the ability for consumers to interact with the site using features such as rating, comment, reputation and the chat function [5]. Online shoppers also benefit from having the option of comparing products, services and prices between numerous sites to get the best deal with little effort [5].

Many engage in online shopping [6,7]; however, some are still reluctant to utilize this convenient platform. Whilst there are, many reasons for this, factors associated with risk are acknowledged as a major reason for not engaging in online shopping. In addition, there is persistent mistrust amongst online consumers [8]. Consumers tend to perceive online shopping as risky because of the inability to physically witness the transaction, see the vendor and examine the product [9]. As a result, online consumers are advised to take precautionary steps to reduce risk [10] and behave more securely when shopping online [11].

Thus, it is pertinent that online retailers take active steps to reduce mistrust amongst online consumers. The presence of 'trust' in a website is capable of changing consumers' attitude and behaviour towards online transactions [12]. For example, consumers more likely to allow themselves to engage in risky behaviour will transact with vendors' perceived to

be trustworthy [12]. This means, in order to reduce online consumers' perception of risk, it is important for e-commerce websites to increase the level of trust.

There are many research studies that examine how design elements influence trust on e-commerce websites [13–24]. However, there are limited studies that bring in two fields that are closely related. These fields are human/computer interaction and psychology. These are two important fields that need to be brought closer together as psychology is one of the earliest approaches to human/computer interaction [25] and many human/computer interaction usability methods have been drawn up based on principles of psychology [26]. Psychology is viewed as an intersection of human/computer interaction [27] and is an aspect that should be focused on when designing an e-commerce website. As trust is an important criterion in e-commerce, attention should be given to how design features can influence trust from a psychological aspect [28,29]. However, there are limited research studies pertaining to design features and trust from a psychological aspect. Some researchers have examined how user interface design features influence trustworthiness judgement based on the personality plus model [30,31]. On the other hand, some used the big five personality traits model to identify a set of antecedents of trust in e-commerce sites amongst university students [30].

Within the field of psychology, the big five personality traits (openness, conscientiousness, extraversion, agreeableness, neuroticism) are considered as the most widely accepted personality traits [31], broadly encompass personality traits [32] and have been meta-analytically found to subsume all other personality traits [31]. It is expected that results of this research study would enhance existing knowledge in the area of trust, "the attitude that an agent will help achieve an individual's goals in a situation characterized by uncertainty and vulnerability" [33], with a specific focus on e-commerce website design as the agent alongside psychology. Results of our Google Scholar search only returned one research article that analysed the use of personality traits during human/computer interaction design [34]. It is perceived that results of this study would also contribute to the Technology Acceptance Model (TAM) [35]. Thus, in this research study, design features on an e-commerce website are examined to understand which features have the ability to enhance trust using the big five personality traits. This information is important as the big five personality traits indicate that people with the neuroticism and conscientiousness personality trait are less likely to trust and less likely to engage in e-commerce [30]. This could lead to loss of customers and reduction in conversion rates. Without consumer trust, e-commerce will never reach its full economic potential [34–36]. Trust is an order qualifier for consumers' purchase decisions [37]. Consumers are unlikely to patronize Internet stores that fail to create a sense of trust [38]. The aim of this research study is to identify design features that will enhance consumers' trust towards e-commerce websites. The research question set out for this research study is: what design features should e-commerce websites have in order to increase the perception of trust based on personality traits?

The rest of this paper is organised as follows. First, related work is reviewed, then the methodology used to conduct this research study is explained. Next, results are presented and this is followed by a discussion section. Information on future work and limitations are provided in the conclusion.

2. Related Work

2.1. Trust

The term trust is closely linked with e-commerce. E-commerce is one of the first disciplines to analyse trust within the online context. E-commerce is also one of the first applications made widely available which required trust to be incorporated within its service. In the late 1990's and early 2000's, trust in the e-commerce domain was mostly measured with terms like willingness to rely when there is vulnerability [36], willingness to depend [38] and benevolence and integrity [39]. The concept of trust then evolved to trust in institutional structures, consequence of trust [40], trust in the seller and trust in

the platform. This indicates that the definition of term 'trust' has evolved and continues to broaden as the discipline of e-commerce matures.

The term 'trust' is closely related to 'risk' and in the mid 2000's, research studies focused on risk, trust and website design features. Perceived risk [41] is the feeling of uncertainty regarding a possible negative outcome whilst using a product or service [42]. The risk is especially high when purchasing from a non-store context—thus, e-commerce [42]. The impression of risk also signifies the lack of trust towards online shopping [30]. Hence, with the presence of trust within the design of an e-commerce website, could issues related to perceived risk be potentially reduced? Another research study indicates that factors such as purchase intention, and general and specific trust intentions influence the online purchasing process [43]. Though some consumers may find performing an e-commerce transaction risky, the presence of trust in a transactional website will encourage consumers to engage in online shopping [12]. A later research study indicates that perceived risk and trust are decisive antecedents in end user decision-making [44].

Due to the nature of e-commerce transactions, most consumers will never come in contact with the business owner or employees of the business. Products and goods will never be examined like those in the brick and mortar store. This highlights the need to 'build in' trust in an e-commerce website. Furthermore, the lack of face-to-face contact makes trust building activities difficult. To assist in this matter, recommender systems endeavour to make up for the lack of human contact by achieving higher trust for online stores [44]. Similarly, recommending interfaces allows for optimization of user experience and subsequently, trust building and increased sales [9]. If trust is built in, then this could have the potential of changing one's mind set and encourage consumers to take the risk and engage in e-commerce [9]. Newer research studies echo these sentiments as well. Research studies conducted in the late 2000's continue to emphasize that designing trustworthy websites would have an impact on e-commerce transactions. For example, the presence of trust in a website has the potential of altering behavioural intentions [9]. The ability to trust an e-commerce site is favourably associated with online purchase intention [44]. The establishment of online trust allows for repurchase intention [9]. More recently, results of a research study using neural mechanisms indicate that lack of trust in a website is the main reason for purchase abandonment [45]. Furthermore, some online customers trust information provided by social media influencers [46]. In addition, an organization's efforts in complying with corporate social responsibility and employee green behaviour can be viewed as a mediating factor for trust [47]. Results of these research studies indicate it is important to consider implementing trust elements when designing an e-commerce website.

2.2. Website Design Features

Website design features are defined as components, elements or information used in the development of the site [48]. In this section, seminal research studies are examined to provide an overview of how website design features on an e-commerce site can be used to increase the level of trustworthiness. Website design features are an important element as this has the ability to change a consumer's attitude from negative to positive and ultimately, increase their willingness to purchase [49]. The website is the first form of contact consumers will have with a business [48]. An online consumer's impression of the website influences their decision to further explore the site [50]. Early research studies indicate that ease of navigation, support and ease of learning have the ability to increase the value of trust [51]. The visual design of a site has the ability to increase the level of trust in the website [52]. The inclusion of trust, product and store seals on a website can engender trust [53,54]. There are five main categories of design elements in an e-commerce website [48]. These categories are promotion, service, ease of use and navigation and purchase facilitation. When implemented well, these categories have the ability to increase the value of trustworthiness. Ease of use and visual appeal directly influence the perception of trust [55,56].

As technology supporting e-commerce transaction continued to evolve, this allowed for the advancement of website design features. Embedding facial photos, video streams, assistive web applications and privacy and security policies have the ability to increase the trustworthiness value of the website [57]. Ease of use is an important feature to increase the value of trust in a website [58,59]. Others categorise e-commerce websites into four website personalities: sincerity, competence, excitement and sophistication [60]. Results of this research study indicate websites that fit into the sincerity and competence personalities were able to exert an influence in building consumers' trust upon their first visit to the website [61]. Users trust pages with higher text-based complexity [22]. Navigation, information and visual cues on a website had the ability to increase the level of trust on a page [55]. The usage of colour influenced trust, and blue coloured websites generated more trust in comparison to green coloured websites [53]. Another research study highlights that visual content and social cue design are used as trust inducing factors [61].

In the late 2000's, most research studies focused on user generated content and the quality of the website. The navigation and content quality as well as typography were strong factors in influencing trustworthiness judgement [62]. A large number of reviews enhances the effect of a positive summary review on trust while shopping for high priced experience products [63]. In a research study where the quality of the website and subjective user perception were analysed [64], results indicate that website user interface quality, information quality, awareness of e-commerce and perceived privacy are significant predictors of trust on an e-commerce page [64]. An updated research study mimicking [61,65] continues to highlight that professional, attractive and contemporary visual design continues to have a strong positive relation with trust.

In summary, many design elements have the ability to increase trust value. Results of the research studies mentioned above provide rich information. However, none of these research studies have taken the psychological approach of getting to know the customer and examining what web design features has the potential of increasing trust value on an e-commerce page. Hence, business owners and designers of e-commerce websites should get to know and understand their consumer pool [49]. The suggestion in this research study is to understand the consumer pool from a psychological perspective using the Big Five Personality Trait model.

2.3. Big Five Personality Traits

Within the field of psychology, the big five personality traits [29] are the most widely accepted personality framework [28]. They are also the most influential personality traits [29,66]. This personality model has the ability to contribute to explaining human behaviour in different situations; one case is the individual's acceptance of e-commerce purchasing [28]. The model is acknowledged as having five broad dimensions explained in common language to describe the human personality and psyche [29,67]. This personality trait model has been used widely in many disciplines outside of psychology, including medicine, [68], education [69] and technology [70]. This model consists of five personality traits: neuroticism, extraversion, agreeableness, openness and conscientiousness. A definition of these traits is provided in Table 1. The definition provided is adapted from [28], as these definitions have nuances in relation to e-commerce and trust.

Based on the definitions provided in Table 1, individuals of a certain personality trait tend to trust easily except for the conscientiousness and neuroticism trait. This finding is similar with the results of a research study [71] which states that individuals with high conscientiousness and neuroticism have low levels of trust when performing an e-commerce activity. Thus, in this research study, the interest is in enhancing trust for individuals with the conscientiousness and neuroticism trait. The following two hypotheses are generated:

Hypothesis 1. *Neuroticism is a significant predictor of trust towards e-commerce.*

Hypothesis 2. *Conscientiousness is a significant predictor of trust towards e-commerce.*

Table 1. Big Five Personality Traits and Definition.

Personality Trait	Definition
Extraversion	• being focused on the outside world • like to be in other people's company • more sociable, careless, and adapt to change faster • more likely to trust e-retailers
Neuroticism	• emotional instability, pessimism, and low self-esteem • unfavourable position in transaction processes and has no control • negative influence on trust.
Agreeableness	• positive beliefs toward others and appreciates their values and convictions • people having respect for others also believe that others have respect for them • expected to be more trustful
Conscientiousness	• responsible, dutiful, and trustworthy • more serious and cautious in making decisions • expect others to be conscientious also and hence, they are more likely to trust
Openness	• open mindedness • make liberal decisions • more willingness to embrace new concepts and be more careless with respect to new situations and experiences. • more likely to trust

3. Research Methodology

3.1. Research Approach

A deductive approach was used for this research study. This approach was used in line with other similar research studies [48,61]. Instruments used for data collection in this research study were used in previous research studies [48,61,65,71,72]. These instruments include questionnaires and scales. The deductive approach allowed for the use of reliable and valid tools to address the research questions set out for this research study [49,62].

3.2. Recruitment of Participants

Participants were recruited using the convenience sampling method because the researcher wanted to collect data from participants who were readily available to participate in the research study. here was no specific exclusion criteria except that participants had to be 18 years old and above. The study was conducted fully online and participants were recruited through social media (Facebook). The researcher advertised the study on her personal Facebook page and invited people from her social network to participate. In the advertisement, it was stated clearly that the study was fully voluntary and there was no compensation. Those who were interested in participating would click on the link on the advertisement and this would lead them to a Google Form. The estimated time taken to complete the study was 10 min.

3.3. Data Gathering Techniques

In this research study, one questionnaire was utilized. The questionnaire was divided into four parts. These parts needed to be filled up in order. The first part was the demographic questionnaire, the second part was the personality traits questionnaire, the third part was the trust in e-commerce questionnaire and the fourth part was the website design features questionnaire. The first part of questionnaire was generated by the researcher. The purpose of this questionnaire was to collect demographic information. Demographic information was collected to provide contextual information about the participants. The

three questions in this part of the questionnaire were age, gender and highest academic level of qualification.

The second part of the questionnaire was used to measure participants' personality trait. This part of the questionnaire was adopted from a research study conducted by [72]. As the focus of this research study is on two of the big five personality traits, only 17 questions were selected. Please refer to Appendix A for the list of questions. Participants were instructed to rate each statement by using a 7-point Likert scale, with 1 being "strongly disagree" and 7 being "strongly agree". The higher number on the rating indicates the higher trait of that personality. There were eight questions for the neuroticism personality trait and nine questions for the conscientiousness personality trait.

The third part of questionnaire was a trust in e-commerce questionnaire developed by [71]. As the name implies, it is used to measure participants' trust towards e-commerce. Please refer to Appendix B for the list of questions. The questionnaire instructs participants to indicate their feeling towards e-commerce by using a 7-point Likert scale with 1 being "strongly disagree" and 7 being "strongly agree". A higher rating represents a higher level of trust that participants have towards e-commerce; except for questions 1, 2, 3, 6, 7 and 9, which were reverse scored—the higher the rating represents a lower level of trust.

The fourth part of the questionnaire is the website design feature questionnaire. This part is used to understand participants' attitude towards different website design features: specifically, which of these design features instils trust. This part of the questionnaire was adapted from [48,61,65] and additional questions from the researchers' observation of e-commerce websites. This questionnaire contained 46 questions. The first 40 questions were adapted from [48]. These questions had a direct link to dimensions of visual, content and social cue design [61,65]. The last six questions were generated by the researcher based on the researcher's observation of common design features that appear on the top 10 e-commerce websites. This part of the questionnaire contains questions that aim to set participants in the situation of engaging in an online shopping experience. Please refer to Appendix C for the list of questions. Participants rated the features on a 6-point Likert scale with 0 being "unlikely" and 5 being "very likely". A higher rating indicates a higher likelihood of purchasing from a website with the presence of the said design feature. In summary, the instruments used were taken from previous research studies to ensure continuity and adherence to best practices.

3.4. Experiment Phases

There were two phases to this experiment. A pilot test was conducted first, and this was followed by the main experiment. The purpose of the pilot test was to check the questionnaires and the experiment methodology. There were five participants who took part in the pilot study. A common piece of feedback received from the pilot test was that for the website design feature questionnaire, the probe question was misleading and participants were unable to understand the instructions. To solve this issue, the researcher had changed the probe question to "I will trust a website which has to perform transactions/purchase items; and/or, I will not trust a website which has to perform transactions/purchase items", instead of the original question, which is "I will trust a website which has to perform transactions/purchase items". Results of the pilot test are not reported.

There were a total of 89 participants in the main experiment. Prior to the study, a power analysis was conducted by the researcher using G*Power software with the effect size of 0.15 and a power of 0.8 [73]. By doing so, the researcher was able to obtain the minimum sample size required for this study. Results of the power analysis indicate that 68 participants were needed. As there were 89 participants, this means the requirement for minimum sample size was met.

3.5. Experiment Procedure

This research study was approved by the University of Canterbury's Human Ethics Committee. The study was conducted fully online and participants were recruited through social media (Facebook). On arriving on the Google link, participants were instructed to read the information sheet which introduces the nature of the study. Participants who wanted to participate then read the consent form. Participants then had to agree to the terms on the consent form by clicking on the "Agree" button. Participants then had to complete the questionnaires. Upon completion of all the questionnaire, participants were thanked for their time and participation.

3.6. Reliability and Validity Procedures

According to [74], data quality is important to increase consistency, validity, accuracy and reliability. Hence, the researchers took several measures to adhere to best practices. First, before the main experiment, the researchers conducted a pilot study to eliminate potential errors that might arise based on the experiment methodology. Second, the researchers utilized "reverse scoring" in the Trust in e-commerce questionnaire. This helped to improve data quality because it reduced response bias [75]. This is a situation where participants respond to questions inaccurately by giving a socially desirable or "best" answer. The response bias impacts the accuracy and validity of the result. Third, to ensure internal consistency the researchers conducted reliability testing on the questionnaires using the Cronbach's alpha. Based on the value obtained, irrelevant questions were eliminated. Fourth, to reduce issues with missing data and/or duplication of data, the researchers ensured that the final data obtained was filtered based on the requirements, and duplicates were discarded. Fifth, to ensure that all data collected are complete, the researchers used the "required to be answered" tool on the online survey platform to act as a reminder for participants to complete all questions.

3.7. Demographic Details of Participants

From the 89 participants, 31 were male and 58 female. Participants were between the ages of 18 to 56 years old with a median of 26.44. As for their education level, it ranged from high school graduates to postgraduate degree graduates. Most participants were undergraduate degree holders (50.56%). This was followed by postgraduate degree holders (21.35%), high school graduates (19.10%) and those with college diplomas or pre-university programme certificates (8.99%). Based on time and budget limitations and that recruitment was done based on convenience sampling methods, the recruitment of participants stopped at 89 participants.

4. Results

Participants' scores for the personality traits questionnaire and trust in e-commerce questionnaire were calculated by totalling up the score for all items in the questionnaire. The website design feature questionnaire scores were calculated differently as each question represented a feature, and therefore could not be calculated by obtaining its sum. The calculation method used for this questionnaire will be discussed below. The personality traits questionnaire has two sections measuring: (1) Neuroticism and (2) Conscientiousness. The part measuring neuroticism had eight questions and was measured on a 7-point Likert scale ($M = 34.29$, $S.D. = 4.98$). For conscientiousness, it had nine questions ($M = 42.71$, $S.D. = 4.97$). The higher the total score, the higher the focal construct of the variables. For the trust in e-commerce questionnaire, questions 1, 2, 3, 6, 7 and 9 were first reverse scored before this was totalled up with the remaining questions from the questionnaire. This questionnaire had a total of seven questions rated on a 7-point Likert scale ($M = 36.53$, $S.D. = 7.20$). The higher the score, the more the participant trusts e-commerce websites.

A regression test was used as the statistical test for the first two hypotheses. A normality test was first conducted for the outcome variable, which is trust in e-commerce, to ensure that data obtained were normally distributed [76]. According to [76], if the assumption

is not violated, data will be normally distributed and hold a value of $p > 0.05$; whereas if $p < 0.05$, the assumption is violated. As for the kurtosis and skewness of the data, if the value ranged from -1.96 to 1.96 , the normality of the data is sufficient to be established (86). From the normality test, results show that assumption of normality for trust in e-commerce was assumed ($SW = 0.99$, $df = 89$, $p > 0.05$), skewness (-0.23), kurtosis (-0.14), meaning that data were normally distributed. Please refer to Appendix D for results of the normality test. A preliminary analysis was conducted for all three variables mentioned above (Neuroticism, Conscientiousness and Trust in e-commerce) as they represent continuous variables. Please refer to Appendix E for results of this preliminary test. A reliability test was also conducted for each variable to test the consistency of the construct; please refer to Appendix F for results of this test. Table 2 provides information on details on mean, standard deviation and bivariate correlations between the variables.

Table 2. Means, Standard Deviation and Bivariate Correlations between the Variables ($n = 89$).

	1	2	3
1. Neuroticism	34.29	4.98	(0.40)
2. Conscientiousness	42.71	4.97	0.43 ** (0.18)
3. Trust in e-commerce	36.53	7.20	$-0.20 -0.27^* (0.62)$

Note. Diagonally values represent the Cronbach's alpha of the respective variable, * $p < 0.05$, ** $p < 0.001$.

Results from Table 1 indicate that there is a significant positive relationship between neuroticism and conscientiousness, $r(87) = 0.43$, $p < 0.001$. This means that the more neurotic a person is, the higher their level of conscientiousness. There is also a significant negative relationship between conscientiousness and trust in e-commerce, $r(87) = -0.27$, $p = 0.012$. This means that the higher the level of conscientiousness is, the less they trust e-commerce. The relationship between neuroticism and trust in e-commerce shows that although there is a negative relationship between both (the more neurotic a person is, the less trust they will have in e-commerce), this was not significant, $r(87) = -0.20$, $p > 0.05$.

The aim of this study is to identify design features that e-commerce websites have in order to increase trust value based on personality traits. Prior to discussing the design elements, the researchers first wanted to analyse the two hypotheses set out for this research study. To do this, a simple linear regression analysis on SPSS was performed. A statistical test is ideal to find the influence of the predictor (personality traits) on the dependent variable (trust in e-commerce). The first hypothesis is (1) neuroticism is a predictor of one's trust in e-commerce, and the second, (2) conscientiousness is a predictor of one's trust in e-commerce. For both the hypotheses, the personality trait neuroticism and conscientiousness are the predictor variables, whereas trust in e-commerce is the dependent/outcome variable. Results of this test are provided in Table 3. Results in Table 3 indicate that there is no significant predictive relationship between neuroticism and trust in e-commerce, $t = -1.86$, $B = -0.28$, $p > 0.05$. This means the null hypothesis failed to be rejected; neuroticism is not a significant predictor of one's trust in e-commerce. Please refer to Appendix G for details.

Table 3. Simple Linear Regression Analysis for Neuroticism and Trust in e-Commerce.

	R ²	F	t	B
Model	0.04	3.44	-1.86	-0.28

Results in Table 4 indicate that there is a significant predictive relationship between conscientiousness and trust in e-commerce, $t = -2.58$, $B = -0.39$, $p = 0.012$. This means the null hypothesis is rejected, and conscientiousness is a significant predictor of one's trust on e-commerce. Please refer to Appendix H for details.

Table 4. Simple Linear Regression Analysis for Conscientiousness and Trust in e-Commerce.

	R ²	F	t	B
Model	0.07	6.64	−2.58	−0.39 **

Note: ** $p < 0.001$.

For the purpose of categorizing design elements based on the two personalities, the researcher utilized the Pearson's Product-Moment Correlations (Pearson's R) on SPSS for the hypothesis: "the higher one's (personality trait), the more the (website design feature) increases their trust towards purchasing from the e-commerce platform". Table 5 presents the results of this test. Results in Table 5 indicate there is significant positive relationships between neuroticism and design features. These features are: price comparison, greeting message, product recommendation, information about sales representatives, product rating, expert comments/testimonials, not a crowded page, currency conversion, language translation, picture of product, detailed product description, option to zoom/enlarge product picture, payment option, ability to personalize orders, ability to test product and up-to-date information/"last updated". Please refer to Appendix I for details. This means that the higher the neurotic trait, the more the abovementioned features are used as trust features when engaging on an e-commerce site. The rest of the design features do not show a significant relationship with neuroticism, meaning that the presence of these design features does not influence trustworthiness judgements.

Table 5. Correlations between the Variables ($n = 89$).

Website Design Feature	Personality Trait	
	Neuroticism	Conscientiousness
1. Price Comparison	0.22 *	0.12
2. Price Discounting	0.02	0.01
3. "What's New"	0.19	0.1
4. Gift Certificate	0.15	0.19
5. Greeting Message	0.33 *	0.19
6. Product Recommendation	0.31 *	0.22 *
7. Receiving E-mails about New Products	0.03	0.24 *
8. Information about Security	0.14	0.22 *
9. Information about Customer Privacy	0.12	0.2
10. Guarantee/Warranty Policy	0.17	0.24 *
11. Tracking Order/Services	0.2	0.26 *
12. Information about Sales Representative	0.24 *	0.2
13. Product Rating	0.35 *	0.32 *
14. Customer Comments	0.16	0.16
15. Expert Comments/Testimonials	0.26 *	0.22 *
16. Item Sales Rank	0.07	0
17. Discussion Forum	0.09	0.23 *
18. Product Cancellation	0.15	0.28 *
19. Graphical Information	0.07	0.11
20. Colour-Coded Information	0.04	0.12
21. Information in Table Form	0.16	0.11
22. Price Information in Product Listing	0.2	0.2
23. Minimal Clicks to "Order" Page	0.13	0.22 *
24. Not Crowded Page	0.26 *	0.12
25. Uniform Webpage Design Formats	0.11	0.11
26. Option to Store Personal Information	0	0.01
27. Audio Interaction	0.09	0.07
28. Personalized Information for Customers	0.04	0.17
29. No "Scroll Down"	0.17	0.25 *
30. Currency Conversion	0.26 *	0.16
31. Language Translation	0.27 *	0.18
32. Picture of Product	0.23 *	0.2
33. Detailed Product Description	0.22 *	0.19
34. Option to Zoom/Enlarge Product Picture	0.24 *	0.18
35. Payment Option	0.34 *	0.24 *
36. Shipping Option	0.18	0.17
37. Ability to Personalize Order	0.28 *	0.34 *
38. Ability to Test Product	0.25 *	0.44 **
39. Links to Other Related Websites	0.06	0.07
40. Frequently Asked Questions (FAQ) Page	0.11	0.18
41. Global "Search" Bar	0.13	0.13
42. Indication of Secure Site	0.2	0.17
43. Presence of "Shopping Cart"	0.2	0.13
44. Up-to-date Information/"Last Updated On"	0.26 *	0.22
45. Simple and Professional Company Logo	0.05	0.03
46. Number of Visitors to Site	0.01	−0.08

Note. * $p < 0.05$, ** $p < 0.001$.

Results in Table 5 also show a significant positive relationship with conscientiousness and website design features. These features are: product recommendation, receiving an e-mail about new products, information about security, guarantee/warranty policy, tracking order/services, product rating, expert comments/testimonials, discussion forum, product cancellation, minimal clicks to “order” page, no “scroll down”, payment option, ability to personalize order and ability to test product. Please refer to Appendix I for details. This means that the higher one’s conscientious trait, the more likely that these design features would be able to increase the level of trustworthiness. The presence of other design features does not influence one’s trustworthiness judgement.

5. Discussion

The aim of this study is to identify design features that e-commerce websites should incorporate in order to increase the level of trust based on personality traits. The results of this study indicate that there is a significant positive relationship between neuroticism and conscientiousness. There is a significant negative relationship between conscientiousness and trust towards e-commerce. However, there is no significant relationship between neuroticism and trust towards e-commerce. For the first hypothesis, there is no significant predictive relationship between neuroticism and trust in e-commerce. The second hypothesis is supported because there is a significant predictive relationship between conscientiousness and trust in e-commerce. In relation to web design features, online consumers with the neuroticism personality trait are able to select 16 design features that have the ability to increase the level of trust. Online consumers with the conscientiousness personality trait are able to select 14 design features that have the ability to increase the level of trust on an e-commerce website.

The results of the study indicate online consumers with the neuroticism and conscientiousness personality traits have several design features in common that have the ability to increase the level of trustworthiness in a page. These design features are: product recommendation, product rating, payment option, ability to personalize order and ability to test product. It is noted that these design features relate to options available for consumers to gain assurance about product. Hence, the more options available for the consumer to gain assurance, the more they trust the website. In addition, it is important for online businesses to demonstrate social proof on websites and the lack of trust is acknowledged as a reason for purchase abandonment [45,60]. This means using social masses to create a positive connection [61]. Social masses can be also viewed as co-opting social media influencers on online website advertising [47]. The product recommendation and product rating design features are example implements of social proof.

When comparing the results of this research study to [26], it is noted that the results of this research study are dissimilar to [26]. Most people categorized under the Personality Plus model used the following design features as trust triggers: information about the company profile, professional looking website, easy to find contact information and availability of personal contact (phone rather than email) [26]. However, the results of this research study do not indicate that these design features are used as trust triggers. Amongst the top reasons for having had a bad experience when purchasing online was that the ‘product was not as expected when it arrived’ [26]. This could be related to the lack of assurance of design features on the website. The availability of assurance of design features would allow consumers to scrutinize the product better; hence, avoiding disappointment when the product arrives. Similarly, an organization’s effort in complying with cooperate social responsibility and employee green behaviour can be viewed as a mediation factor for trust [47] and could assist in trust building in a company and thereafter, transferring this trust feature to their products.

Results of previous research studies provide rich information on design features that are able to increase the level of trustworthiness on a page [13–24]. However, results of this research study only highlight three design features between both personality traits that are able to increase the level of trustworthiness. These features are: (i) a page that is not

crowded (Neuroticism), (ii) a minimal number of clicks to checkout and (iii) no option to scroll down (Conscientiousness). This indicates that typical design features that fit the visual design definition [61,65] are not regarded as trust enhancing features based on the personality trait.

Two design features that had the ability to enhance trust preferred by participants with the neuroticism trait are (i) currency conversion and (ii) language translation. This is an interesting observation. There are many business-justified reasons for providing a currency converter. For example, an online consumer must be given the option to relate the price to their country of origin and that customers want to feel like the experience is tailored to their needs [60]. Results of a research study shows that 25% of shoppers will leave a website if their preferred local currency is not offered [60]. However, how and why these features relate to trust requires further investigation. As for language translation, it is important to take this design feature into consideration. Without language translation, consumers may mistrust the brand due to poor quality content, as translation engenders trust [77]. The lack of translation services also creates issues in relation to cultural understanding of a product [78], thus, impacting the overall trust of the website.

It is difficult to design an e-commerce page that will suit and please a whole host of online consumers. The results of this research study offer some insight into how to tailor a page to increase the level of trustworthiness. The inclusion of every single design feature mentioned in Table 4 is not the best option as the webpage will end up looking cluttered, messy and complicated. Instead, the recommendation is that website owners can first carry out a survey to find out details of the majority of their customers. This survey should include questions that are able to decipher a consumer's personality trait. Website owners should analyse the results of this survey to determine their consumer pool. This then provides information of the different type of consumer pools that visit and engage on the website. User profiles are then generated and the website is personalized to each consumer pool with design features that enhances the website's trustworthiness. As an online consumer arrives on the page, the online consumer selects a use profile that describes their personality trait using a generic logon method and the page is personalized for that particular personality trait. This recommendation has the potential to increase sales.

6. Conclusions

This research study was conducted to identify design features e-commerce websites should have to increase trust value based on personality traits. Results are summarized below:

- Results indicate there are sixteen design features that have the ability to increase the level of trust amongst participants with the neuroticism trait.
- Fourteen design features had the ability to increase the level of trust amongst participants with the conscientiousness personality trait.

From a theoretical standpoint, the results of this research study add to the domain of knowledge of e-commerce trust, human/computer interaction and psychology. Our results provide information on the design features preferred by online consumers who fit the conscientiousness and neuroticism personality trait. There is also some similarity in preferences of design principles between both personality traits. The results of this research study are some of the first to provide information on design principles that exude trust for the two personality traits, conscientiousness and neuroticism, for the purpose of designing e-commerce websites.

From a managerial standpoint, the results of this research study provide information to owners of e-commerce websites on the need to design sites that enable the enhancement of trust. It specifically provides information on the exact design feature that should be visible on an e-commerce page. This information could be utilized by website designers. Additionally, we also propose the possibility of personalizing e-commerce webpages to fit personality traits with the aim of enhancing trust and thus, translating to a sale, which leads to profit for the organization.

This research study is not without limitations. The sampling method used may have influenced the results. It is possible to suggest that results may differ if a different sample of participants participated in this research study. Similar to all other types of user studies, the results of this research study cannot be replicated. Whilst participants were asked to select a design feature that engendered trust, the reason as to why these design features exude trust is not known. A qualitative approach is needed here to understand why these design features exude trust. This will provide richer information and add to the domain of knowledge of human/computer interaction and psychology. Similarly, there were only 89 participants in this research study; thus, a larger sample would more closely approximate the population.

In future work, we propose several phases for this research study. The first is to recruit a narrower sample of participants to only those who have online shopping experience. This will provide richer data. The second phase is to recruit a large sample with varied demographic make up to see if there will be a difference in the selection of design features based on participants of different demographics. In the third phase of this research study, the intention is to develop prototypes of websites that contain the design features that exude trust for each personality trait. Online consumers are then shown these prototypes and asked if they found these prototypes trustworthy. This provides a tried and tested method in relation to whether these design elements actually exude trust.

Author Contributions: Conceptualization, A.I. and C.C.S.; methodology, A.I. and C.C.S.; validation, C.C.S.; formal analysis, C.C.S.; investigation, A.I.; resources, A.I. and C.C.S.; data curation, C.C.S.; writing—original draft preparation, A.I. and C.C.S.; writing—review and editing, A.I. and C.C.S.; visualization, C.C.S.; supervision, A.I. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: This research study was approved by The University of Canterbury's Human Ethics Committee HEC/2018/02/BL on July 2019.

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: Data is contained within the article or supplementary material.

Acknowledgments: We thank participants for their willingness to participate in this study.

Conflicts of Interest: The authors declare no conflict of interest.

Appendix A. Personality Traits Questionnaire

"I see myself as someone who . . . "

Please rate all the following items from 1 = "strongly disagree" to 7 = "strongly agree"

Appendix A.1. Neuroticism

1. is depressed, blue
2. is relaxed, handles stress well
3. can be tense
4. worries a lot
5. is emotionally stable, not easily upset
6. can be moody
7. remains calm in tense situations
8. gets nervous easily

Appendix A.2. Conscientiousness

1. does a thorough job
2. can be somewhat careless
3. is a reliable worker
4. tends to be disorganized

5. tends to be lazy
6. perseveres until the task is finished
7. does things efficiently
8. makes plans and follows through with them
9. is easily distracted

Appendix B. Trust in E-Commerce Questionnaire

Please rate all the following items from 1 = “strongly disagree” to 7 = “strongly agree”

1. Generally speaking, e-retailers are not trustworthy
2. I feel that after I make a credit card payment, the e-retailer will deny that I paid and thus not send me the ordered product/service
3. I am concerned about the technical skills and knowledge with respect to security of most e-retailers
4. I expect that most e-retailers will refrain from unfair advantage taking
5. I am comfortable buying something from an Internet store
6. I rather expect a traditional retailer than an e-retailer to carry out his/her contractual agreements
7. There exists a lot of unfair and untruthful advertising on the Internet
8. I trust e-retailers with respect to my credit card information
9. I am worried that my privacy will be invaded if I buy something from an e-retailer

Appendix C. Website Design Features Questionnaire

Website Design Elements Questionnaire

“I will trust a website which has to perform transactions/purchase items; and/or, I will not trust a website which has to perform transactions/purchase items”

Please rate all the following items from 0 = “unlikely” to 5 = “very likely”

- | | |
|--|---|
| 1. Price Comparison | 27. Audio Interaction |
| 2. Price Discounting | 28. Personalized Information for Customers |
| 3. “What’s New” | 29. No “Scroll Down” |
| 4. Gift Certificate | 30. Currency Conversion |
| 5. Greeting Message | 31. Language Translation |
| 6. Product Recommendation | 32. Picture of Product |
| 7. Receiving e-mails about New Products | 33. Detailed Product Description |
| 8. Information about Security | 34. Option to Zoom/ Enlarge Product Picture |
| 9. Information about Customer Privacy | 35. Payment Option |
| 10. Guarantee/Warranty Policy | 36. Shipping Option |
| 11. Tracking Order/Services | 37. Ability to Personalize Order |
| 12. Information about Sales Representative | 38. Ability to Test Product |
| 13. Product Rating | 39. Links to Other Related Websites |
| 14. Customer Comments | 40. Frequently Asked Questions (FAQ) Page |
| 15. Expert Comments/Testimonials | 41. Global “Search” Bar |
| 16. Item Sales Rank | 42. Indication of Secure Site |
| 17. Discussion Forum | 43. Presence of “Shopping Cart” |
| 18. Product Cancellation | 44. Up-to-date Information/ “last updated on” |
| 19. Graphical Information | 45. Simple and Professional Company Logo |
| 20. Colour-Coded Information | 46. Number of Visitors to Site |
| 21. Information in Table Form | |
| 22. Price Information in Product Listing | |
| 23. Minimal Clicks to “Order” Page | |
| 24. Not Crowded Page | |
| 25. Uniform Webpage Design Formats | |
| 26. Option to Store Personal Information | |

Appendix D. SPSS Output: Normality Test

SPSS Output: Normality Test

Tests of Normality						
	Kolmogorov–Smirnov ^a			Shapiro–Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
eCommTrust	0.064	89	0.200 *	0.986	89	0.456

*. This is a lower bound of the true significance. ^a. Lilliefors Significance Correction.

Descriptives				
			Statistic	Std. Error
eCommTrust		Mean	36.53	0.763
	95% Confidence Interval for Mean	Lower Bound	35.01	
		Upper Bound	38.04	
	5% Trimmed Mean		36.62	
	Median		37.00	
	Variance		51.843	
	Std. Deviation		7.200	
	Minimum		17	
	Maximum		53	
	Range		36	
	Interquartile Range		10	
	Skewness		−0.233	0.255
	Kurtosis		−0.135	0.506

Appendix E. SPSS Output: Pearson's R (Preliminary Test)

SPSS Output: Pearson's R (Preliminary Test)

		Correlations		
		Neuroticism	Conscientiousness	eCommTrust
Neuroticism	Pearson Correlation	1	0.428 **	−0.195
	Sig. (2-tailed)		0.000	0.067
	N	89	89	89
Conscientiousness	Pearson Correlation	0.428 **	1	−0.266 *
	Sig. (2-tailed)	0.000		0.012
	N	89	89	89
eCommTrust	Pearson Correlation	−0.195	−0.266 *	1
	Sig. (2-tailed)	0.067	0.012	
	N	89	89	89

**. Correlation is significant at the 0.01 level (2-tailed). *. Correlation is significant at the 0.05 level (2-tailed).

Appendix F. SPSS Output: Reliability Test

Reliability Statistics: Neuroticism		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.391	0.400	8

Reliability Statistics: Conscientiousness		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.181	0.212	9

Reliability Statistics: Trust in e-Commerce		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.615	0.614	9

Appendix G. SPSS Output Simple Linear Regression Neuroticism

(Neuroticism on Trust in e-Commerce)

Descriptive Statistics			
eCommTrust	Mean	Std. Deviation	N
Neuroticism	36.53	7.200	89
	34.29	4.980	89

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.195 ^a	0.038	0.027	7.102

^a. Predictors: (Constant), Neuroticism.

		ANOVA ^a				
	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	173.718	1	173.718	3.444	0.067 ^b
	Residual	4388.461	87	50.442		
	Total	4562.180	88			

^a. Dependent Variable: eCommTrust. ^b. Predictors: (Constant), Neuroticism.

Coefficients ^a						
	Model	Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	46.203	5.268		8.771	0.000
	Neuroticism	−0.282	0.152	−0.195	−1.856	0.067

^a. Dependent Variable: eCommTrust.

Appendix H. SPSS Output: Simple Liner Regression Conscientiousness (Conscientiousness on Trust in e-Commerce)

Descriptive Statistics			
	Mean	Std. Deviation	N
eCommTrust	36.53	7.200	89
Conscientiousness	42.71	4.973	89

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.266 ^a	0.071	0.060	6.980

^a. Predictors: (Constant), Conscientiousness.

		ANOVA ^a				
	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	323.641	1	323.641	6.643	0.012 ^b
	Residual	4238.539	87	48.719		
	Total	4562.180	88			

^a. Dependent Variable: eCommTrust. ^b. Predictors: (Constant), Conscientiousness.

Coefficients ^a						
	Model	Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	52.997	6.432		8.239	0.000
	Conscientiousness	−0.386	0.150	−0.266	−2.577	0.012

^a. Dependent Variable: eCommTrust.

Appendix I. SPSS Output Summary: Person's Correlation (Website Design Feature)

		Neuroticism		Conscientiousness	
		r	p	r	p
F1	Price comparison	0.223	0.036	0.116	0.278
F2	Price discounting	0.022	0.836	0.012	0.914
F3	“what’s new”	0.192	0.071	0.101	0.347
F4	Gift certificate	0.149	0.163	0.192	0.071
F5	Greeting message	0.327	0.002	0.185	0.082
F6	Product recommendation	0.313	0.003	0.216	0.042
F7	Receiving email about new products	0.033	0.756	0.243	0.022
F8	Information about security	0.144	0.178	0.218	0.040
F9	Information about customer privacy	0.118	0.272	0.199	0.061
F10	Guarantee/Warranty policy	0.173	0.105	0.242	0.022
F11	Tracking order/services	0.200	0.060	0.257	0.015
F12	Information about sales representative	0.244	0.021	0.196	0.066

		Neuroticism		Conscientiousness	
		r	p	r	p
F13	Product rating	0.346	0.001	0.321	0.002
F14	Customer comments	0.163	0.126	0.156	0.143
F15	Expert comments/testimonials	0.256	0.015	0.215	0.043
F16	Item sales rank	0.069	0.522	−0.003	0.977
F17	Discussion forum	0.092	0.349	0.229	0.031
F18	Product cancellation	0.148	0.166	0.280	0.008
F19	Graphical information	0.068	0.527	0.111	0.302
F20	Colour-coded information	0.043	0.690	0.123	0.251
F21	Information in table form	0.157	0.142	0.110	0.305
F22	Price information in product listing	0.198	0.063	0.204	0.055
F23	Minimal clicks to “order” page	0.130	0.225	0.217	0.041
F24	Not crowded page	0.255	0.016	0.119	0.266
F25	Uniform webpage design formats	0.109	0.311	0.113	0.293
F26	Option to store personal information	−0.002	0.986	0.009	0.936
F27	Audio interaction	0.094	0.382	0.066	0.536
F28	Personalized information for customers	0.042	0.696	0.174	0.103
F29	No “scroll down”	0.174	0.102	0.252	0.017
F30	Currency conversion	0.259	0.014	0.160	0.134
F31	Language translation	0.272	0.010	0.184	0.085
F32	Picture of product	0.230	0.030	0.191	0.073
F33	Detailed product description	0.222	0.037	0.195	0.067
F34	Option to zoom/enlarge product picture	0.241	0.023	0.176	0.098
F35	Payment option	0.343	0.001	0.243	0.022
F36	Shipping option	0.184	0.085	0.168	0.116
F37	Personalized orders	0.278	0.008	0.337	0.001
F38	Ability to test product	0.250	0.018	0.442	0.000
F39	Links to other related websites	0.059	0.581	0.069	0.519
F40	FAQ Page	0.105	0.328	0.182	0.087
F41	Global “Search” bar	0.132	0.218	0.128	0.233
F42	Indication of secure site	0.201	0.059	0.173	0.105
F43	Presence of shopping cart	0.196	0.065	0.128	0.232
F44	Up-to-date information “last updated”	0.260	0.014	0.223	0.036
F45	Simple and professional company logo	0.052	0.630	0.027	0.802
F46	Numbers of visitors to site	0.005	0.964	−0.079	0.462

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