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E-S-QUAL dimensions of internet banking and customer satisfaction in the Nepalese banking sector: do they vary across demographic groups?

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ABSTRACT

Purpose: *This study examines the extent to which E-S-QUAL dimensions (efficiency, system availability, fulfillment, and privacy) affect customer satisfaction with internet banking in Nepal. It also aims to investigate whether customer perceptions on these dimensions and satisfaction differ significantly based on gender and marital status.*

Methodology: *This study adopted quantitative, causal-comparative research design. Convenience sampling technique was adopted to collect data from 398 respondent. Multiple regression analysis assessed the impact of E-S-QUAL dimensions on customer satisfaction. Independent samples t-test compared male vs. Female, and married vs. Unmarried respondents.*

Findings: *All the four dimensions of E-S-QUAL (efficiency, system availability, fulfillment, and privacy) affect customer satisfaction with internet banking in Nepal. Out of total variance in customer satisfaction, 48.1% is collectively explained by these dimensions (Adj. $R^2 = 0.481$, $F = 92.881$, $p < .001$). Privacy had the strongest effect on customer satisfaction among the e-service quality dimensions ($\beta=0.368$; $t=7.612$, $p =0.000$) followed by system availability, efficiency, and fulfillment. Gender revealed no significant differences on any of the service quality dimension and customer satisfaction. Marital status produced only one significant difference indicating that unmarried users perceive slightly higher efficiency than married users. The differences were insignificant for all other service quality dimension and customer satisfaction.*

Practical Implications: *Internet banking providers in Nepal should consider all E-S-QUAL dimensions collectively, with particular attention to privacy, as it has the strongest effect on customer satisfaction. Uniform service quality can be applied across gender and marital status segments, given that demographic differences were minimal.*

Originality/value: *This study extends E-S-QUAL research to the Nepalese banking context and demonstrates that privacy is the strongest driver of customer satisfaction. Gender and marital status have little practical relevance for service quality segmentation.*

Introduction

Technological development has led banking sector improve service delivery to customers (YuSheng & Ibrahim, 2019; Boateng et al., 2016). Internet banking is one of the technological advancement applied in banking sector that benefits banks and its customers simultaneously. With the advancement of the internet, banks let their customers transact independently (Pikkarainen et al., 2004). This has eased customers use banking service at their own time and preference (Sum & Ngai , 2010). Internet banking is known as banking application that provides customer perform transactions anytime, anywhere using internet, Wi-Fi, and World Wide Web (Shih & Fang, 2004). Financial transactions through internet banking include checking balances, paying bills, transferring funds, scheduling payments, topping up mobile phone credit, and foreign currency transactions (Yiu et al., 2007). Banks benefit from internet banking as it reduces operating cost, help its customer access the service which increases the transaction, eliminating the time and geographical barrier (Rawashdeh, 2015). Internet banking has been widely accepted as a trend in developed countries (Sharma et al., 2020) and is being adopted in emerging economies, like Nepal (Nepal Rastra Bank, 2024). In the banking history of Nepal, Kumari Bank introduced internet banking for the first time in 2002 (Banstola, 2007) and has been ever growing the use in Nepal.

Problem Statement and Research Gap

The use of internet banking in Nepal has been rapidly growing (Nepal Rastra Bank, 2024). Although the service has already been more than two decades in the country, however, significant challenges like poor infrastructure, disparity, and pathetic digital literacy level are evident (Paudel et al., 2024). Technological lag, high transaction costs, customer's reluctance to use the service poses challenges in Nepal (Mastran, 2021). data privacy, fraud online, and poor authentication procedures hinder customer satisfaction in Nepal (Shakya, 2016). In addition, risks associated to the digital financial system like online safety, socio-economic limitations, and security issues lower the user's confidence (Adhikari, 2019). These persistent customer's concern arising from technological issues like system outages, poor navigation, privacy and trust issues, delayed fulfillment, are the core E-S-QUAL dimension to be examined.

Service quality studies show mixed results in Nepalese context. Website efficiency leads in the study of Gautam and Sah (2023, β=0.84). In another study, tangibility is the most determining factor and empathy, the least as compared to other dimensions (Ghimire et al., 2025). Reliability tops the chart leaving Privacy, security and responsiveness negative and insignificant (Thakulla, 2025; Lamsal, 2022). In another study, security (Shrestha, 2019) has the strongest effect and reliability has the least effect, as compared to other factor. No study tests validated E-S-QUAL (efficiency, system availability, fulfillment, privacy) in Nepal. Gurau (2002) warned that transition economies face unique e-banking hurdles unlike developed nations, and Nepal's context demands similar analysis. Growing concern, developing economies, inconsistencies in the prior study, limited studies focused on E-S-QUAL provides

ground for the study. To the best of our knowledge, no prior Nepalese study has employed E-S-QUAL scale, measuring efficiency, system availability, fulfillment, and privacy to assess customer satisfaction with internet banking. This study addresses the gap by applying the E-S-QUAL scale in the Nepalese context.

Research Questions

Based on the above background, this study posit following research question:

RQ1: To what extent do E-S-QUAL dimensions (efficiency, system availability, fulfillment, and privacy) affect customer satisfaction with internet banking in Nepal?

RQ2: Which E-S-QUAL dimension affects customer satisfaction the most in the Nepalese context?

RQ3: Do internet banking users' perceptions of E-S-QUAL dimensions (efficiency, system availability, fulfillment, and privacy) and overall customer satisfaction differ significantly based on gender (male vs. female) in the Nepalese context?

RQ4: Do internet banking users' perceptions of E-S-QUAL dimensions (efficiency, system availability, fulfillment, and privacy) and overall customer satisfaction differ significantly based on marital status (married vs. unmarried) in the Nepalese context?

Literature Review

Theoretical foundation

This study builds on Parasuraman et al.'s service quality framework, that evolved from SERVQUAL to E-S-QUAL and davis's Technology Acceptance Model (TAM) that explains user responses to technology. Parasuraman et al. (1988) published SERVQUAL, specifying 10 original dimensions to five, viz., tangibility, reliability, responsiveness, assurance, and empathy to measure traditional service quality gaps in face-to-face encounters. Later, it was refined for the digital context and introduced E-S-QUAL specially for electronic services which prescribed four key dimensions, namely, efficiency, system availability, fulfillment, and privacy by Parasuraman ei al. (2005). The TAM, created by Davis (1989), is a theory that claims people use technology if they find it useful and easy to use. Its core constructs are perceived usefulness and ease of use which align naturally with E-S-QUAL dimensions. Efficiency and system availability enhance ease of use. Fulfillment and privacy boost perceived usefulness. Together, these technology perceptions drive satisfaction outcomes. This shape behavioural intentions and actual system use, making TAM valuable for studying technology adoption in service contexts like internet banking (Davis et al., 1989).

Researchers often link the four dimensions of E-S-QUAL (efficiency, fulfillment, system availability, and privacy) to the TAM model. These dimensions serve as building blocks that influence perceived ease of use (for instance, through fast interfaces and reliable access) and perceived usefulness (for instance, through dependable service and secure privacy). This eventually encourage users to adopt and satisfy with e-services such as internet banking (Amnas et al., 2025; Parasuraman et al., 2005).

Empirical Review

Some of the relevant empirical review has been presented in this section. The review highlights that internet banking dimensions affect the customer satisfaction.

Islam et al. (2023) examined the e-service quality dimensions and found that security risk, ease of use, website quality, and responsiveness significantly affect internet banking customer satisfaction in Malaysian banks.

Gazi et al. (2021) studied service quality dimensions and customer satisfaction and revealed that tangibility, reliability, and empathy have significant positive impact on customer satisfaction in the banking sector of Bangladesh

Hammoud et al. (2018) examined the impact of e-banking service quality on customer satisfaction in Lebanese banking sector and unveiled that efficiency, privacy and security, ease of use, responsiveness and communication have significant impact on customer satisfaction. Reliability played the strongest role on customer satisfaction.

Rai (2023) made a study in Khotang district of Nepal on the dimension of online banking and customer satisfaction and envisaged that security, reliability. Ease of use and convenience are related to the customer satisfaction.

Shrestha (2019) made a study on e-banking service and customer satisfaction considering private commercial banks of Nepal specifying the e-banking attributes, accessibility, reliability, convenience and security have effect on customer satisfaction.

Lamsal (2022) examined internet banking service and customer satisfaction in Nawalpur district of Nepal and highlighted that internet banking has made a positive impact on service delivery and customer satisfaction.

Limbu (2024) examined the customer satisfaction with regard to the online banking sector in Nepal and key finding state accessibility, dependability (accurate info/updates), ease of use (clear language/interfaces), and security (transaction privacy) are crucial drivers of customer satisfaction in online banking.

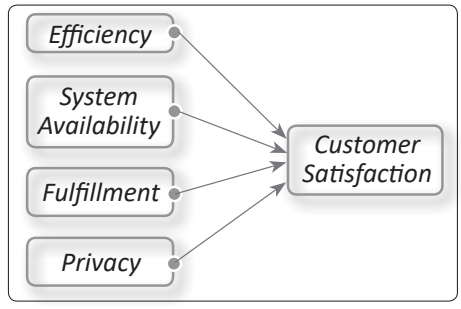
Kesharwani (2020) analyzed the literature related to the dimensions of e-service quality and concluded that reliability, efficiency, responsiveness, ease of use, security, website aesthetic, credibility, and personalization are the most significant dimensions to impact customers satisfaction in banking industry.

Research Framework

A research framework has been presented to portray the study of relationships between the variables considered in the study. E-S-QUAL dimensions as efficiency, system availability, fulfillment, and privacy are the predicting variables and customer satisfaction is an outcome/predicted variable.

Figure 1

Research framework of the study



Adapted from Parasuraman et al. (2005) and Sharma et al. (2020).

Research Methodology

The research adopted quantitative, causal-comparative research design. The population includes all the internet banking user throughout the country. Primary data were collected from 398 respondents adopting a convenience sampling technique. Convenience sampling technique is widely used in business and management research where the researcher has direct access to potential respondents (Memon, 2020), provides easiest reach for researchers (Sarstedt et al., 2018) and offers speed and minimal cost (Saunders et al., 2023). Convenience sampling is common and deeply enclosed in the empirical tradition of social science and management research (Bryman, 2005; Jager et al., 2017; Sarstedt et al., 2018; Bryman & Bell, 2019). Structured questionnaire was prepared and provided to 450 respondents, however, 410 were returned back out of which some were omitted as it lacked proper information and 398 were the final sample size undertaken for the study.

Presentation and analysis of the data.

Descriptive and inferential analysis have been carried out in the study. descriptive analysis is done on the basis of the presented table. Table 1 presents the demographic statistics of the respondents profile.

Table 1

Demographics of the respondents

Demographic	Category	Frequency	Percentage
Gender	Male	244	61.31%
	Female	154	38.69%
Marital Status	Married	133	33.41%
	Unmarried	265	66.59%
Age	Upto 20 Yr	74	18.6%
	21 to 30 Yr	143	35.9%
	31 to 40 Yr	98	24.6%
	41 and Above	83	20.9%
Education	Up to SEE/SLC	32	8.04%
	+2 Level	90	22.61%
	Bachelor Level	210	52.77%
	Master's and Above	66	16.58%

Respondents were predominantly male (61.31%) and unmarried (66.59%), reflecting demographics among general internet banking users in Nepal. Age distribution spanned from 18.6% (upto 20 Yrs) to 35.90% (21 to 30 yr), with over half (52.77%) holding bachelor's degree.This sample provides adequate representation for testing e-service quality perceptions across key internet banking user.

Table 2

Normality test results for all study variables

Variables	Skewness	Kurtosis	K-S D	p
Efficiency	0.335	0.158	0.126	< 0.01
System Availability	0.111	0.030	0.195	< 0.01
Fulfillment	-0.410	1.314	0.153	< 0.01
Privacy	-0.379	1.772	0.197	< 0.01
Customer Satisfaction	-0.327	1.875	0.177	< 0.01

To check the normality of the data, one-sample Kolmogorov-Smirnov test was carried and was found to be significant for all variables (p<.001), however, given the large sample size (N = 398), the test is overly sensitive to small, meaningless variation (Field, 2018). Table 2 shows that Skewness and Kurtosis values were all within acceptable limits, suggesting that data were normally distributed. Common criteria for skewness and kurtosis indicate normality when absolute values are within +2 and -2 for skewness and +7 and -7 for kurtosis (George & Mallery, 2010; Hair et al., 2010)

Table 3

Descriptive statistics of the variables

Variables	N	Mean	Standard deviation (SD)
Efficiency	398	3.3833	0.5093
System Availability	398	3.6168	0.5226
Fulfillment	398	3.6856	0.4622
Privacy	398	3.5846	0.5085
Customer Satisfaction	398	3.6422	0.4620

Major findings are presented in the table that demonstrate the summarized statistics regarding the measures of E-S-QUAL and customer satisfaction.The table no. 3 depicts the number of observation (N), mean value, and standard deviaiton (SD) of the variable undertaken in the study. A total of 398 respondents completed the survey. Mean scores for all four all four E-S-QUAL dimensions and customer satisfaction surpassed the midpoint of the 5-point scale (3.0). This indicates perceptions on the internet banking service is favourable. Among the E-S-QUAL dimensions, fulfillment has the highest mean rating (M = 3.6856, SD = 0.4622), followed by system availability (M = 3.6168, SD = 0.5226), privacy (M = 3.5846, SD = 0.5085), and efficiency (M = 3.3833, SD = 0.5093). Customer Satisfaction had a mean score of 3.6422 (SD = 0.460). Standard deviation ranged from 0.46 to 0.52, demonstrating moderate response variability across all measures.

Table 4

Reliability statistics

Variables	No. of items	Cronbach's alpha
Efficiency	7	0.751
System Availability	4	0.856
Fulfillment	7	0.768
Privacy	3	0.631
Customer Satisfaction	5	0.751

Table 4 presents Cronbach's alpha reliability estimates for the constructs of e-service quality dimensions of internet banking and customer satisfaction. Internal consistency ranged from acceptable (Privacy, α =0.631) to good (System availability, α =0.856), meets Hair et al.'s (2010) minimum threshold of 0.60 for exploratory research. The privacy dimension's cronbach's alpha resulted 0.631 which is less than the usual 0.70 cutoff, but this is acceptable for a short three-item scale. Cohen et al., (2018) call scores like this (0.60 - 0.69) "marginally reliable", which is acceptable for brief measures. Nunnally (1967) even stated 0.50 or 0.60 is enough in early research stages. Thus, the subscale's leanness, 0.631 holds up well.

Table 5

Correlation analysis

	Efficiency (EFFICIENCY)	System Availability (SYS_AVAIL)	Fulfillment (FULFIL)	Privacy (PRIVACY)	Customer Satisfaction (CUST_SATIS)
EFFICIENCY	1				
SYS_AVAIL	0.534**	1			
FULFIL	0.183**	0.332**	1		
PRIVACY	0.246**	0.354**	0.643**	1	
CUST_SATIS	0.408**	0.518**	0.497**	0.591**	1

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

Table 5 presents Pearson correlations among the e-service quality dimension (E-S-QUAL) and customer satisfaction. All the dimensions of E-S-QUAL showed statistically significant positive correlations with satisfaction ($r = 0.408$ to 0.591, $p < .01$), with privacy exhibiting the strongest relationship ($r = 0.591$, $p < 0.01$). These correlations (0.408 to 0.591) demonstrate strong relationships, consistent with Cohen's (1988) large effect sizes and Hair et al.'s (2019) medium-to-large range. Regarding the inter-correlations between the dimensions ranged from 0.183 (efficiency-fulfillment) to 0.643 (privacy-fulfillment), suggesting no multicollinearity concerns (Tabachnick & Fidell, 2019).

Table 6

Results of multiple regression analysis

Model	Unstandardized Coefficients		Standardized Coefficients	t	VIF	Sig.
	Beta (B)	Std. Error	Beta (β)			
Constant	.611	.166		3.679		.000
EFFICIENCY	.139	.039	.153	3.561	1.409	.000
SYS_AVAIL	.227	.040	.257	5.724	1.544	.000
FULFILL	.147	.048	.147	3.077	1.746	.002
PRIVACY	.334	.044	.368	7.612	1.785	.000
R^2	0.486					
Adjusted R^2	0.481					
F-statistics	92.881					

Dependent Variable: Customer Satisfaction

This section unveil major findings based upon the regression analysis. Table 6 presents several statistical figure related to model summary. The adjusted R2 value of 0.481 suggests that 48.1% of the variation in customer satisfaction (CUST_SATIS) can be explained by the independent variables, viz., efficiency, system availability, fulfillment, and privacy maintained in internet banking service by the commercial banks in Nepal. F-statistics of 92.881 suggest that the regression model was a good fit. Similarly, the variance inflation factor (VIF) of each of the independent variables in the study are less than 2.5, which justifies that the data are free from multi-collinearity issue (Johnston et al., 2018). Similarly, with a sample size of 398, OLS regression is reasonably robust to violations of homoscedasticity (Tabachnick & Fidell, 2013) and several scholars regard the assumptions (Gujarati, 2009).

Table no. 6 with regard to the model presents beta coefficient, t-value, and sig. value as well. Unstandardized beta coefficient of system availability (B) states that, every unit increase in efficiency, customer satisfaction increase by 0.139 unit (B = 0.139, t= 3.561, $p < 0.01$). Likewise, the beta coefficient of system availability (B=0.227; t=5.724, $p<0.01$), fulfillment (B=0.147; t=3.077, $p < 0.01$), and privacy (B=0.334, t=7.612, $p <0.01$)) reveals that with each unit increment in these factors of internet banking, will lead to increase customer satisfaction by 0.227, 0.147, and 0.334 unit respectively. All these factors have positive effect on e-customer's satisfaction. Likewise, standardized beta coefficients confirmed Privacy as the strongest driver of customer satisfaction among the e-service quality dimensions (β

= 0.368; t =7.612, p = 0.000) followed by system availability (β = 0.257, t = 5.724, p = 0.000) and efficiency (β = 0.153, t = 3.561, p = 0.000), with fulfillment (β = 0.147, t =3.077, p = 0.000) having the smallest relative effect. This means all e-service quality dimensions positively predicted customer satisfaction,

Findings and Discussion

All the dimensions of e-service quality positively influences the customer satisfaction which is in line to the previous findings of Parasuraman et al. (2005). Though, the study found that efficiency and fulfillment were the most critical factor among the four dimensions, however in this study we found that privacy accounts the most, followed by the system availability. This findings is not consistent with the previous findings. For instance, the study of Sakhaei et al. (2014) and Hammoud et al. (2018) accounted reliability as the most strongest factor. Within the Nepalese context, the findings diverges from the study of Ghimire et al. (2025) that envisaged tangibility while Gautam and Sah (2023) derived efficiency, as the most strongest factor in their study. Privacy is required to build the trust and confidence in using the service safely (Shin, 2010). In addition, system availability at any time, off or odd hour, is important for users to rely on the service consistently, which improves perceived reliability.

Demographic influence was tested using the independent sample t-test and found that marital status matters for efficiency only (t= -2.517, p =0.012). Unmarried customers (M=3.43, SD = 0.52) perceived efficiency higher than married customers (M = 3.29, SD = 0.47). No significant differences were observed for privacy, system availability, fulfillment, and customer satisfaction (all $p > 0.05$). Similarly, the demographic influence of gender proved no statistically significant differences for any variable (all $p > 0.05$), including efficiency (p = 0.891), privacy (p = 0.159), system availability (p = 0.326), fulfillment (p = 0.444), and customer satisfaction (p = 0.317).

Conclusion and Implications

The findings of this study provide a clear and consistent picture of how E-S-QUAL dimensions relate to customer satisfaction in the Nepalese internet banking context, and how demographic characteristics influence these perceptions.

First, every dimensions of electronic service quality contributes positively to customer satisfaction with internet banking. Regarding the relative importance of service quality dimensions, privacy emerged as the strongest predictor of customer satisfaction, followed by system availability, efficiency, and fulfillment. This suggests that Nepalese internet banking users are most concerned with the security and confidentiality and banks should prioritize in data protection, focus on privacy policies, and cyber-security measures. One key implication that privacy is the strongest predictor of customer satisfaction extends earlier E-S-QUAL research. While the findings from western studies highlight efficiency and fulfillment as influential (Parasuraman

et al., 2005), this study reveal that in the Nepalese context, where digital skills are still growing and concerns about online fraud are evident, privacy takes priority. This may be because, in Nepal, privacy issues stem from insufficient cybersecurity measures (Panta, 2021), with banks particularly vulnerable to phishing, malware, and insider threats (Bhattarai, 2018). This underscores the need for context-specific E-S-QUAL research rather than assuming universal applicability across settings.

Second, with respect to demographic differences, the results demonstrated lack of variation. Gender revealed no significant differences on any of the service quality dimension and customer satisfaction. Marital status produced only one significant difference indicating that unmarried users perceive slightly higher efficiency than married users. The differences were insignificant for all other service quality dimension and customer satisfaction. In aggregate, the study envisage that perceptions on E-S-QUAL dimensions and customer satisfaction are consistent across gender and marital status in the Nepalese internet banking context. This leads to an important practical implications that internet banking providers need not develop differentiated service quality strategies for male versus female customers, nor for married versus unmarried customers. A uniform approach on all the dimensions of E-S-QUAL, particularly emphasizing on privacy, produces customer satisfaction across these demographic segments.

Limitations and Future research

Although the study yields meaningful insights, it has certain limitations that provides avenues for future research. The study follows cross-sectional design. Future work could use longitudinal design to assess changes in customer's perception of electronic service quality and satisfaction over the time. Another limitation of this study is the use of convenience sampling which may limit how well the findings apply to the broader population of internet banking users. Future research could employ stratified random sampling to ensure better representation of different user groups. Comparing public and private banks or different region, and adding moderators like digital literacy or trust and mediators like engagement would produce more insightful findings on how e-service quality influences customer satisfaction. Moreover, this study examines mean differences, which do not test whether marital status or gender moderates the relationship between E-S-QUAL and customer satisfaction. Future research could explore these effects using interaction effects in regression.

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Appendix

Independent Samples Test (Gender)										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% confidence interval of the difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean difference	Std. Error difference	Lower	Upper
EFFICIENCY	Equal variances assumed	.985	.322	-.137	396	.891	-.00719	.05248	-.11037	.09598
	Equal variances not assumed			-.134	303.440	.893	-.00719	.05357	-.11262	.09823
SYS_AVAIL	Equal variances assumed	.351	.554	.983	396	.326	.05288	.05379	-.05287	.15863
	Equal variances not assumed			.974	315.565	.331	.05288	.05429	-.05394	.15969
FULFILL	Equal variances assumed	4.348	.038	.796	396	.426	.03790	.04759	-.05567	.13146
	Equal variances not assumed			.766	284.675	.444	.03790	.04947	-.05947	.13526
PRIVACY	Equal variances assumed	9.085	.003	1.492	396	.137	.07796	.05225	-.02477	.18068
	Equal variances not assumed			1.412	268.438	.159	.07796	.05521	-.03073	.18665
CUST_SATIS	Equal variances assumed	1.009	.316	1.003	396	.317	.04767	.04755	-.04580	.14114
	Equal variances not assumed			.972	292.151	.332	.04767	.04906	-.04889	.14422

Independent Samples Test (Marital Status)										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% confidence interval of the difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean difference	Std. Error difference	Lower	Upper
EFFICIENCY	Equal variances assumed	.880	.349	-2.517	396	.012	-.13534	.05376	-.24103	-.02964
	Equal variances not assumed			-2.600	288.362	.010	-.13534	.05206	-.23780	-.03287
SYS_AVAIL	Equal variances assumed	.139	.709	.195	396	.845	.01085	.05561	-.09847	.12017
	Equal variances not assumed			.193	258.207	.847	.01085	.05611	-.09963	.12134
FULFILL	Equal variances assumed	.131	.718	-.107	396	.915	-.00527	.04918	-.10195	.09141
	Equal variances not assumed			-.110	284.076	.912	-.00527	.04789	-.09953	.08899
PRIVACY	Equal variances assumed	1.327	.250	-1.412	396	.159	-.07623	.05397	-.18233	.02987
	Equal variances not assumed			-1.477	298.222	.141	-.07623	.05161	-.17779	.02534
CUST_SATIS	Equal variances assumed	4.165	.042	-.647	396	.518	-.03178	.04913	-.12836	.06481
	Equal variances not assumed			-.675	296.958	.500	-.03178	.04706	-.12438	.06083