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Impact of SNS Diversity and Privacy Concerns on Information Seeking through Smartphones

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ABSTRACT

The smartphone industry has innovated and advanced specifically in the last decade in order to modify smartphones into personal computers. This enables users to efficiently achieve many tasks including utilizing search engines for instant information retrieval anytime and anywhere. Yet many users choose not to use these smartphone features including search engines to seek information. This study investigates the factors that impact the likelihood of seeking information via smartphones. The diversity of social networking sites and privacy concerns are found to be two of the main factors influencing the likelihood of seeking information. Android users are more likely to seek information compared to IPhone users, which is perhaps due to the differences in the features of the operating systems of these phone. Motivation to seek information captured by technology ownership increases the likelihood of information seeking.

Keywords: Privacy Concern, Information Seeking, Smartphones, Search Engines, Social Networking Diversity

INTRODUCTION

The past decade has witnessed a meteoric rise in the innovation of smartphones. The two main players in smartphones operating systems are IOS and Android, the latter being used in several hardware sets while IOS is only used in Apple products. Recent innovations have resulted in remarkable changes in industries and fields outside the cell phone industry. Among these changes, search engines have taken on a new challenge since smartphone users may want to acquire and seek information using their smartphones rather than a desktop computer or a laptops. The traditional way of using public desktops or personal computers may not be practical nowadays as people are on the go all the time. Given these circumstances, search engine players such as Google, Bing, and Yahoo have made functional changes to make this experience (seeking information using smartphones) more practical and efficient. Search engines are now smartphone compatible and have been integrated into smartphones operating systems. Users can seek information without even going to a smartphone web browser. Smartphone applications for search engines can be downloaded which makes search functionality available quicker than ever. As of 2014, 34% of cell internet users don't use their laptops or desktops to go online but mostly use their cell phones. About 30% of cell owners think they cannot live without their phones (PewResearchCenter 2014). Indeed smartphones have become a primary tool in people's everyday personal, academic, and professional lives. However, some owners of smartphones don't use their device to seek information. This brings up a very important question: in the era of smartphone technology innovation, what would deter users from using some of the functionalities that make these innovations smart? Why do some people seek information

through smartphones while others do not? What factors contribute to more information seeking through smartphone search engines?

THEORY AND MODEL DEVELOPMENT

This study investigates the factors that impact users to utilize the search engines in their smartphone to seek information. The model has been theoretically developed based on the information foraging theory (IFT) (Pirolli and Card 1999). The behavioral patterns described in IFT were derived from Optimal Foraging Theory (OFT) (Stephens and Krebs 1986) and the Adaptive Control of Thought-Rational Theory (ACT-R) (Anderson et al. 2004). We adapt the theory to investigate users' information seeking behavior using the search engines of their smartphones. The theory explores users' online search behavior and the factors that impact their decisions to seek or search for information on the web (Pirolli 2007). The structure of the interface between the information seeker and information repositories determines the time costs, resource costs, and opportunity costs of different information foraging and sense-making strategies. Based on the trade-off between the value of information gained and the cost of foraging using a particular strategy drives the individuals towards adopting a particular foraging behavior. The theory is based on two important concepts namely "information patch" and "information scent". An information patch is an area of the search environment with similar information (McCart et al. 2013; Pirolli 2007). It may be defined based on the task in hand. Information scent is the driving force behind why a person makes a navigational selection amongst a group of competing/alternative options (McCart et al. 2013). The interplay between information foraging costs (including search effort) or information scent and the perceived value derived from pursuing an information patch determines the preference to search strategies. With recent advancement in the information technology industry, people have the ability to access and

seek information anytime, anywhere, and with minimal efforts (Pettigrew et al. 2002). Smartphones have many of the features that laptops or desktops have. It is, therefore, interesting to investigate why some users would choose not to utilize the features in their smartphones to seek information. We argue that users' decisions to use search engines in their smartphones for seeking information depends on Information Technology (IT) barriers and IT enablers, which essentially is an interplay between foraging costs and value derived.

The IT barrier is captured by the users' perceived privacy concerns. Smartphones are associated with a single user who uses a specific account to download applications and use the smartphone. Information about the user may be collected in real-time, which includes locations and online activities. Thus, privacy may be a bigger issue for smartphones compared to laptops or desktops.

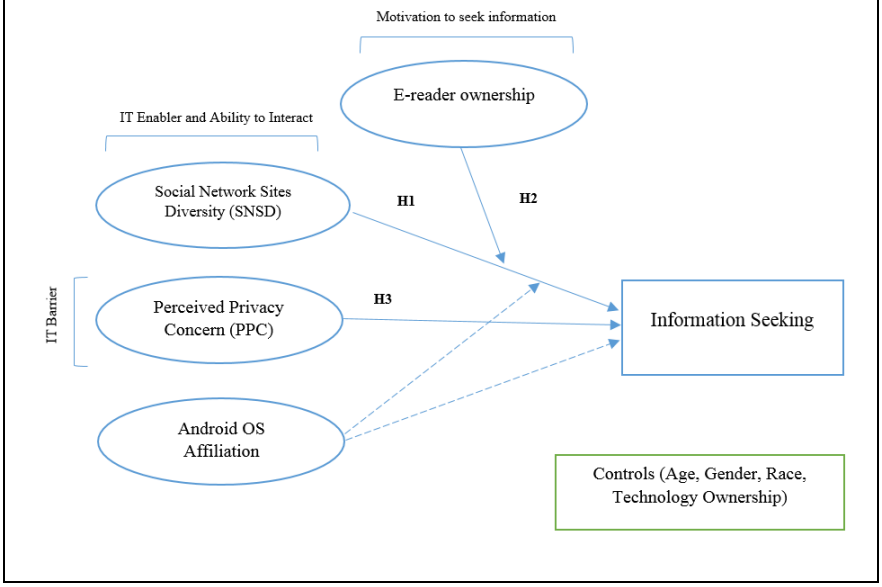
IT enablers are captured through the users' engagement and diversity in social networking sites such as Facebook, Twitter, YouTube, Google Plus, etc. The factor is captured through the diversity instrument of social networking sites, which consists of the total number of social networking accounts users have, and how often they use these accounts.

People who are more engaged in these social networking sites are usually keener on using digital technology. Frequency of use can be used as proxy for diversity (Gray et al. 2011). Diversity in social networking sites means that those people are more enabled by IT. Other studies have also found that diversity of information sources such as from social networking sites were found to improve the information seeking effectiveness (Chi and Pirolli 2006; Pirolli 2009). Moreover, people who are more involved on virtual social networks have less interactions with people offline (Kraut et al. 1998) and therefore may tend to use their smartphones to seek information when a need for information arises. Since users are IT enabled and less interactive with people in

non-virtual settings, they tend to seek information online via smartphones. Therefore, based on the theoretical foundation of Information Foraging Theory, we arrive at hypothesis 1

H1: The diversity of social networking sites is associated with increasing the likelihood of online information seeking via the search engines in smartphones.

Figure-1. Conceptual Model



Moreover, self-determination theory suggests that peoples' decisions to engage in a particular behavior depends on their ability to interact proficiently in the environment and their autonomous motivation (Grant 2007; Grant 2008). Motivation and ability have shown positive impact on seeking information (Reinholt et al. 2011). We argue that in the context of online information seeking, the ability to interact with the environment is captured through SNS diversity, which captures user memberships and their frequency of use. Thus, users who are very active and are members of multiple SNS are able to interact proficiently in an online environment.

Furthermore, people who have the ability to interact in the online environment are expected to be more likely to seek information via smartphone search engines. That relationship is expected to

have an interaction effect with the motivation to seek information. For the purpose of this study, e-reader ownership has been utilized to capture users' motivation to seek information.

H2: E-reader ownership and SNS diversity have a significant interaction effect on seeking information.

To test hypothesis 2 we capture the motivation of users to seek information through their ownership of e-readers such as kindle. People who own such devices are motivated to seek information and knowledge.

Based on the theoretical foundation of information foraging theory, privacy concern has been used as a factor to capture IT barrier that is expected to predict user behavior in information seeking. Chi and Pirolli (2006) argue that trust has been found to be an important barrier for information seeking while privacy concern is an important trust factor that can be a significant barrier. While information technology innovations solve some practical problems they bring other problems and issues in their wake. In this context, privacy is perhaps the most important issue when it comes to using some of the functionalities of smartphones. There are several issues that come with these functionalities. For example, a probable risk is that information seeking using a personal smartphone can always be associated and matched with the smartphone user. People use their personal emails and electronic IDs to register and use Android and IOS applications on their phones. People may avoid such engagement because they are concerned that their privacy may be violated. Users might not mind downloading a smartphone application to play a game for example, but seeking information may relate to sensitive personal information that the user would wish to keep private. Lindenbaum et al. (1988) describe privacy as a flexible concept, suggesting that it has little shared meaning amongst individuals. Even privacy scholars acknowledge that the construct has not taken on a common meaning as it applies to research (Margulis 1977).

Researchers have debated the conceptualization of privacy as a social and/or psychological construct (Margulis 1977). Recent research explores concerns about information privacy as reflecting the extent to which individuals are disturbed by the information collection practices of others and their anxiety over how the acquired information will be subsequently used. A stream of research in the context of privacy aims to investigate how people manage their privacy. Moreover, many researchers have investigated how different contextual factors play different roles that impact the decision making process when privacy is a concern (Bansal et al. 2010). Many studies try to explain the privacy paradox and clarify why the actual behavior of consumers do not always follow their revealed privacy preferences (Anderson and Agarwal 2011). Dinev and Hart (2006)) indicate the aggregated effects of both personal Internet interest and trust can dampen the negative effects of privacy concerns in conducting e-commerce transactions. In the context of online chat rooms, they show that the gratification that individuals derive from participating in interpersonal interactions offsets the restraining effects of their privacy concerns and leads to self-disclosure. Lab experiments have shown that consumers are more likely to purchase from retailers who have better privacy protection policies in place (Tsai et al. 2011). Based on the theoretical foundation of Information Foraging Theory and the prior literature on privacy, we arrive at hypothesis 3.

H3: Privacy Concern is negatively associated with the likelihood of online information seeking via smartphone search engines.

METHEDOLOGY

Data

The dataset used in this study has been obtained from Pew Research Center's Internet and American Life Project collected in 2012. The survey asked questions about search engine usage and interactions on social networking sites. Survey responses have been conditioned to include

observations from participants that use the internet, who have smartphone devices, and are members of social networking sites. The final number of participants after the conditioning was 953 participants for which 585 (61.4%) reported a use of smartphone search engines to seek information while 368 (38.6%) reported that they did not use smartphone search engines to seek information.

Measurements

Exploratory Factor Analysis (EFA) using Principal Component Analysis (PCA) and Principal Factor Analysis (PFA) have been used to construct the instruments. The PCA suggested two factors with eigenvalue higher than 1 to be extracted. Table 1 shows factor loading which indicate sufficient convergent and discriminant validity.

Table-1. Factor Loadings

Construct	Item	SNSD	PPC
Perceived Privacy Concern (PPC)	PrPrivacy1	-0.27297	**0.61815**
	PrPrivacy2	0.11431	**0.84753**
SNS Diversity (SNSD)	Frequency of Use	**0.81781**	-0.09939
	Total Accounts	**0.78440**	-0.02952

The amount of explained variance by each of the factors is relatively the same. The total explained variance is around 62%. Since correlations between factors are very low, the orthogonal rotation is more appropriate than oblique. The orthogonal rotation has been performed to obtain a clear pattern of loading. The method is used to maximize the correlation between variables that load high on factors and thereby this minimizes correlations between variables that load low on factors.

Table-2. Correlation Matrix

	Info. Seeking	SNSD	PPC	Tablet Ownership	E-reader Ownership	Age	Male	Facebook
Info. Seeking	1.00							
SNSD	0.31***	1.00						

PPC	-0.15***	-0.10***	1.00					
Tablet Ownership	0.17***	0.07**	-0.06*	1.00				
E-reader Ownership	0.08**	0.05	-0.06*	0.15***	1.00			
Age	-0.30***	-0.26***	0.19***	0.02	0.04	1.00		
Male	0.10***	0.00	-0.06*	0.02	-0.06*	-0.11***	1.00	
Facebook	0.12***	0.41***	-0.03	-0.01	0.09**	-0.17***	-0.07**	1.00
Android	0.37***	0.17***	-0.04	-0.01	0.05	-0.20***	0.04	0.11***
*****= p < .01; ** = p < .05; * = p < .10**								

Table-2 shows the correlation matrix and the level of significance among the main variables in the model. The numbers in the diagonal indicate the variable correlation with itself. The dependent variable seeking information is coded as a binary variable: 1 for seeking information through smartphones search engines, and 0 for not using smartphones search engines to seek information. Tablet ownership and e-reader ownership are both coded 1 and 0 indicating the ownership of such a device and not owning a device respectively. Facebook is also a binary variable indicating whether a user is a member of Facebook or not. The Android variable refers to whether the users have smartphone with an Android system or an IOS. Gender is coded Male=1 for males and Male=0 for females. Age is used as an integer to indicate the user's age.

Common Method Variance

Data collected through a common method can suffer from common method variance (CMV) in which the relationship between the construct is affected by the use of a single method (Podsakoff et al. 2003). Common method variance has been assessed through the marker variable technique (Lindell and Whitney 2001). The marker variable can be identified after data has been collected. The smallest positive correlation can be used to identify the MV. E-reader ownership has been used as marker variable since its correlation with SNS diversity is 0.05. Formulas introduced by Lindell & Whitney (2001) have been used to calculate the correlation of the constructs. After controlling for the MV, the level of significance between SNS diversity and every other variable does not change. Thus there is no evidence for common method variance.

Methods

SAS 9.4 base has been used to clean the data and run statistical analysis. Logistic regression is used to estimate the likelihood of seeking information via smartphone search engines using the reported dichotomous variable for seeking information via smartphone search engines; the variable is used as a response variable.

RESULTS AND ANALYSIS

Results

Logistic regression has been used to test the hypotheses. As reported in Table-5 four models are estimated. Model 1 is the most basic model without interaction effects. The c statistics for the models are between 0.822 and 0.823, which are above the 0.80 cutoff indicating that the model is a good model to distinguish between the people who seek information through smartphone search engines and those who don't. A c statistic higher than 0.8 indicates that the model is strong in discriminating the subjects (Hosmer et al. 2000). The c statistics increases incrementally from model 2 and model 4 indicating improvements of the models. Likewise, Pseudo R2 shows an improvement of the model especially in models 2 and 4. Model 4 shows the best fit statistics among all four models.

Social networking site diversity is found to have a significant effect on increasing the odds for seeking information through smartphone. The factor is found to be significant under all four models where the estimates hardly change. This result supports hypothesis 1. Therefore, SNS diversity does have a big impact on enabling users to take advantage of features available in their smartphones. This is a relatively positive impact of social networking sites on people's behavior which promotes knowledge and information seeking behavior.

Likewise, the estimates of perceived privacy concern don't change at all under all four models. Perceived privacy concerns are found to have a significant negative impact on the likelihood of information seeking. This finding supports hypothesis 3 indicating that the higher the privacy concern, the less likely it is that the users will seek information via their smartphones search engines. This finding perhaps suggests that as the smartphone industry continues to evolve and innovate, more and more information is collected from the users, invading their privacy and making their lives more traceable. These innovations could have a negative impact on the use of some of the smart features. The users might sacrifice using some of those advanced features such as the information seeking through smartphones because these features may involve putting their privacy at risk.

Although not hypothesized, the impact of operating systems on seeking information has also been investigated. The following questions need to be investigated: are Android users different from IPhone users in their information seeking behavior? If yes, then why? Are there features, advantages, or disadvantages that make certain users more likely to seek information through their smartphones than others? The findings show that Android users are more likely to seek information using their smartphones compared to IPhone users. Thus, the smartphone operating system has a significant impact on information seeking. This finding is quite interesting and calls for an explanation. There are two probable reasons that could have caused such behavior. The first possible reason comes from the fact that the IPhone screen size is much smaller compared to most Android phones screen sizes. This results in inefficiency when trying to use very small screen sizes to look for information and then read using those small screens. On the other hand, Android phones are very efficient and practical in this regard, offering relatively large screens that are easy to use and read from. Also, notice that the survey was collected in

2012 and IPhone screen size was very small at that time. Only recently has the IPhone started adjusting its screen size to compete with other players and has started gaining market share over them. The second explanation is an advantage of IPhones over other competitors especially at that time period (2012). IPhone introduced Siri in 2011 which is a feature that enabled users to search for information online using their voices and without the need to go to a search engine. The feature also supported earlier 3rd generation versions.

Since the survey specifically asked participants whether they used search engines or not to seek information, the users who use Siri do not need to use search engines and thus have answered no to the question. Android phones did not have a competing feature back then and have only recently started competing in this domain. It will be interesting to investigate the impact of the bigger screen sizes of the new IPhones generation on the likelihood of using search engines to search for information. Table-6 shows the logistic regression results of all four models.

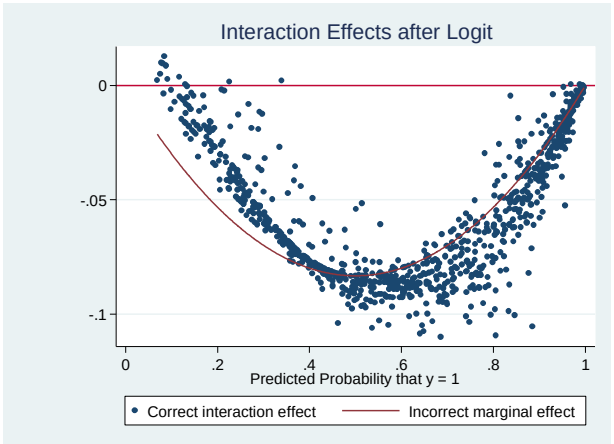
Table 3. Results of logistic Regression (DV: Seeking information via Smartphones)

Variables	Model 1		Model 2		Model 3		Model 4	
	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE
Constant	1.57***	0.52	-0.002	0.78	1.58***	0.52	1.61***	0.52
SNS Diversity	0.64***	0.10	0.67***	0.11	0.66***	0.11	0.73***	0.12
Privacy Concern	-0.20**	0.09	-0.20**	0.09	-0.20***	0.09	-0.21***	0.09
Android	2.16***	0.24	2.15***	0.24	2.13***	0.24	2.13***	0.24
E-reader ownership	0.41**	0.20	-0.76	0.69	0.41**	0.21	0.37**	0.20
Tablet ownership	1.07***	0.21	1.13***	0.21	1.07***	0.21	1.07***	0.21
Age	-0.03***	0.01	0.04	0.03	-0.03***	0.01	-0.03***	0.01
Male	0.39**	0.16	0.44***	0.17	0.40**	0.16	0.41**	0.16
Facebook	-0.32	0.27	-0.30	0.30	-0.33	0.27	-0.37	0.28
White	-0.45	0.41	-0.50	0.41	-0.45	0.41	-0.45	0.41
Black	0.15	0.47	0.12	0.47	0.15	0.47	0.15	0.47
Asian	-0.66	0.57	-0.65	0.57	-0.67	0.57	-0.66	0.57
Mixed race	-0.21	0.70	-0.23	0.71	-0.23	0.70	-0.18	0.70
Native	-0.18	0.74	-0.21	0.74	-0.17	0.74	-0.15	0.75

Diversity X E-reader ownership			0.167***	0.62			-0.33	0.22
Diversity X Android OS					-0.16	0.27	-0.16	0.27
c	0.822		0.823		0.822		0.823	
Pseudo R2	0.2486		0.2504		0.2489		0.2506	
Log likelihood	-477.6		-476.5		-477.4		-476.3	
***= p < .01; ** = p < .05; * = p < .10**								

To test hypothesis 2 we introduced the interaction term between e-reader ownership and SNS diversity. However, the interaction effect in a nonlinear model is more complex than in a linear model (Norton et al. 2004). The true level of significance cannot be derived from the basic logistic regression results and thus results may be biased. The interaction effect is not significant based on results from the logistic regression in model 2. However, these do not reflect true significance and standard errors of the interaction effect in a nonlinear model such as logistic regression. The method introduced by Norton (2004) has been used in this study. The method can be used for two continuous variables, a continuous and a dummy variable, or two dummy variables.

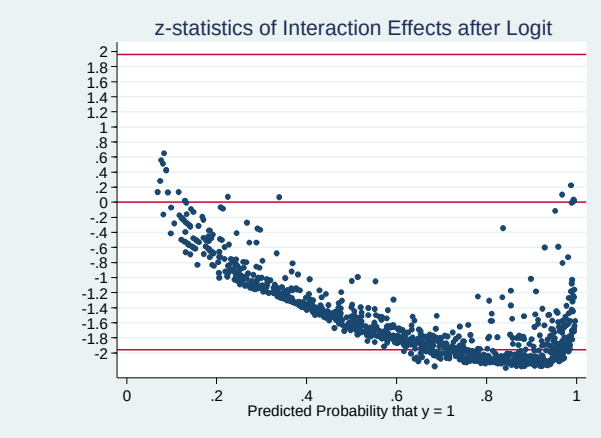
Figure-2. Interaction Effect Diversity * E-reader ownership



The interaction effect in a nonlinear model might not always be negative or positive, significant or insignificant. The predicted probability depends on other variables in the model. Thus as seen in Figure 2 and 3 the effect is positive for some observation around the 0.2 predicted probability

and is significant and negative for many observations above the 0.6 predicted probability. These results suggest that the users who have the ability to interact and the motivation to seek for information but are not extremely engaged in social networking sites are likely to seek information using their smartphones. However, users who are extremely involved in social networking sites perhaps lose their willingness to seek information. This may be associated with the time consumed by those social networking sites that do not leave room for information seeking.

Figure-3. Z-statistics of interaction effects Diversity X E-reader ownership



Limitation

Since this is a secondary dataset, there are limited variables to control. Also, some of the counterintuitive results (interaction of E-reader ownership and SNS Diversity) cannot be investigated further due to data limitation. The advantage of the dataset is its generalizability. It is advised that scholars investigate the problem using primary data.

Conclusion

A theoretical approach has been adopted to explain why users seek information through their smartphone search engines. IT enablers, IT barriers, and motivation are used to explain the behavior of smartphone users when it comes to seeking information. Social networking diversity

and perceived privacy concerns show significant effect on the likelihood of information seeking. Interaction effects have been investigated and show counterintuitive results. IS research needs to investigate further about the factors that impact IT use preferences of users towards newer technologies. As a future research, we aim to expand the theoretical model to account for technological design variables and affordances that may impact the usage preferences. Theoretical contribution towards Information foraging theory can be done by amalgamating it with socio-materialty related constructs which reflect the interplay among social and technological factors.

References

Anderson, C. L., and Agarwal, R. 2011. "The Digitization of Healthcare: Boundary Risks, Emotion, and Consumer Willingness to Disclose Personal Health Information," *Information Systems Research* (22:3), pp. 469-490.

Anderson, J. R., Bothell, D., Byrne, M. D., Douglass, S., Lebiere, C., and Qin, Y. 2004. "An Integrated Theory of the Mind," *Psychological review* (111:4), p. 1036.

Bansal, G., Zahedi, F., and Gefen, D. 2010. "The Impact of Personal Dispositions on Information Sensitivity, Privacy Concern and Trust in Disclosing Health Information Online," *Decision Support Systems* (49:2), pp. 138-150.

Chi, E. H., and Pirolli, P. 2006. "Social Information Foraging and Collaborative Search," *Human Computer Interaction Consortium, Colorado, USA*).

Dinev, T., and Hart, P. 2006. "An Extended Privacy Calculus Model for E-Commerce Transactions," *Information Systems Research* (17:1), pp. 61-80.

Grant, A. M. 2007. "Relational Job Design and the Motivation to Make a Prosocial Difference," *Academy of Management Review* (32:2), pp. 393-417.

Grant, A. M. 2008. "Does Intrinsic Motivation Fuel the Prosocial Fire? Motivational Synergy in Predicting Persistence, Performance, and Productivity," *Journal of applied psychology* (93:1), p. 48.

Gray, P. H., Parise, S., and Iyer, B. 2011. "Innovation Impacts of Using Social Bookmarking Systems," *MIS quarterly* (35:3), pp. 629-643.

Hosmer, D. W., Lemeshow, S., and Cook, E. 2000. "Applied Logistic Regression 2nd Edition," *NY: John Wiley & Sons*).

Kraut, R., Patterson, M., Lundmark, V., Kiesler, S., Mukophadhyay, T., and Scherlis, W. 1998. "Internet Paradox: A Social Technology That Reduces Social Involvement and Psychological Well-Being?," *American psychologist* (53:9), p. 1017.

Lindell, M. K., and Whitney, D. J. 2001. "Accounting for Common Method Variance in Cross-Sectional Research Designs," *Journal of applied psychology* (86:1), p. 114.

Lindenbaum, J., Healton, E. B., Savage, D. G., Brust, J. C., Garrett, T. J., Podell, E. R., Margell, P. D., Stabler, S. P., and Allen, R. H. 1988. "Neuropsychiatric Disorders Caused by Cobalamin Deficiency in the Absence of Anemia or Macrocytosis," *New England Journal of Medicine* (318:26), pp. 1720-1728.

Margulis, S. T. 1977. "Conceptions of Privacy: Current Status and Next Steps," *Journal of Social Issues* (33:3), pp. 5-21.

McCart, J. A., Padmanabhan, B., and Berndt, D. J. 2013. "Goal Attainment on Long Tail Web Sites: An Information Foraging Approach," *Decision Support Systems* (55:1), pp. 235-246.

Norton, E. C., Wang, H., and Ai, C. 2004. "Computing Interaction Effects and Standard Errors in Logit and Probit Models," *Stata Journal* (4), pp. 154-167.

Pettigrew, K. E., Durrance, J. C., and Unruh, K. T. 2002. "Facilitating Community Information Seeking Using the Internet: Findings from Three Public Library–Community Network Systems," *Journal of the American Society for Information Science and Technology* (53:11), pp. 894-903.

PewResearchCenter. 2014. "Mobile Technology Fact Sheet." Retrieved October, 2014, from http://www.pewinternet.org/fact-sheets/mobile-technology-fact-sheet/

Pirolli, P. 2007. *Information Foraging Theory: Adaptive Interaction with Information*. Oxford University Press.

Pirolli, P. 2009. "An Elementary Social Information Foraging Model," *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*: ACM, pp. 605-614.

Pirolli, P., and Card, S. 1999. "Information Foraging," *Psychological review* (106:4), p. 643.

Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y., and Podsakoff, N. P. 2003. "Common Method Biases in Behavioral Research: A Critical Review of the Literature and Recommended Remedies," *Journal of applied psychology* (88:5), p. 879.

Reinholt, M., Pedersen, T., and Foss, N. J. 2011. "Why a Central Network Position Isn't Enough: The Role of Motivation and Ability for Knowledge Sharing in Employee Networks," *Academy of Management Journal* (54:6), pp. 1277-1297.

Stephens, D. W., and Krebs, J. R. 1986. *Foraging Theory*. Princeton University Press.

Tsai, J. Y., Egelman, S., Cranor, L., and Acquisti, A. 2011. "The Effect of Online Privacy Information on Purchasing Behavior: An Experimental Study," *Information Systems Research* (22:2), pp. 254-268.