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Essays on the Influence of Online Relevant Others on Consumers' Online Product Choices

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RÉSUMÉ

Avec l'avènement d'Internet, et surtout du World Wide Web, les consommateurs et les entreprises ont à leur portée de nouveaux outils de communication. Cette recherche s'est intéressée à une utilisation spécifique de ces outils de communication : les recommandations de produits en ligne. Ainsi, l'objectif principal de cette recherche était de vérifier si les consommateurs utilisent les recommandations en ligne de produits et si ces dernières influencent leurs décisions.

Cette thèse est composée de trois essais. Le premier essai propose un cadre conceptuel permettant de catégoriser les différentes sources d'information et de recommandation disponibles aux consommateurs lorsqu'ils utilisent Internet pour rechercher de l'information sur des produits et services. Afin de tester ce cadre conceptuel, une expérience en ligne a été effectuée. Étant donné que les expériences en ligne sont encore peu courantes en recherche marketing, le deuxième essai illustre de façon détaillée les aspects méthodologiques reliés aux expériences en ligne. Finalement, le troisième essai présente les résultats de cette expérience en ligne.

Les principaux résultats de cette recherche sont les suivants. Les consommateurs utilisent et sont influencés par les recommandations de produits lorsqu'ils naviguent dans un site Web. Cette influence est modérée par le type de produit qu'ils recherchent et par la source de recommandation suggérant le produit. Ainsi, les consommateurs sont plus influencés par les recommandations en ligne lorsqu'ils ont à choisir un produit ne pouvant pas être évalué avant achat comparativement à un produit pouvant être évalué avant achat. De plus, parmi les trois sources de recommandations utilisées lors de l'expérience (autres consommateurs, experts humains et système de recommandation), les recommandations de produits provenant du système de recommandation ont eu davantage d'influence sur les choix des consommateurs. Le type de site Web n'a pas d'impact sur la propension des consommateurs à consulter ou à suivre une recommandation de produit.

Ces résultats ont des implications théoriques et pratiques significatives. Sur le plan théorique, les résultats de cette recherche permettent de comparer l'influence en ligne de sources d'information bien connues en marketing telles que les autres consommateurs et les experts avec l'influence de sources d'information relativement nouvelles telles que les systèmes de recommandation. Sur le plan pratique, les gestionnaires marketing peuvent s'inspirer des résultats de cette recherche pour développer des outils de recommandation en ligne efficaces.

Mots clés

- Consommateurs;
- Internet;
- Recommandation;
- Système de recommandation;
- Processus décisionnel;
- Commerce de détail;
- Source d'information.

SUMMARY

The advent of the Internet and the World Wide Web give consumers and firms new tools to communicate. This research investigated one usage of these communication tools: online product recommendations. The major objective of this research was to verify if consumers use online product recommendations and if the latter influence their online decisions.

This dissertation is composed of three essays. The first essay suggests a framework in order to categorize the different sources of information and recommendation available to consumers when using the Internet to obtain information about products and services. In order to test this framework an online experiment was conducted. Since online experiments are still emergent in marketing research, the second essay discusses in details methodological issues related to this relatively new data collection method. Finally, the third essay reports the results of the online experiment.

The major findings of this research are the following. Consumers use and are influenced by online product recommendations when shopping on a website. The type of product and the recommendation source moderate this influence. Thus, consumers are more influenced by online recommendations when they have to select a product that cannot be evaluated before purchase compared to a product that can be evaluated before purchase. In addition, of the three recommendation sources used in the experiment (other consumers, human experts, and recommender systems), the recommender system was the most influential. The type of website had not influence on consumers' propensity to consult of follow a product recommendation.

These findings have significant theoretical and managerial implications. From the point of view of research, the results make possible the comparison between well-known influence sources in marketing such as other consumer and human experts

with relatively new influence sources such as recommender systems. The research findings can also be used by marketing managers to design online product recommendation tools that will be effective.

Keywords

- Consumers;
- Internet;
- Recommendation;
- Recommender system;
- Decision-making process;
- Retail;
- Information source.

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À mes deux amours, Erika et Maélie

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CHAPITRE 1
Introduction

Les sources d'information personnelles (ex. : experts, amis) pouvant influencer les consommateurs ont depuis longtemps intéressé les chercheurs en comportement des consommateurs (Katz et Lazarsfeld, 1955). Grâce à Internet, ces sources ont maintenant un moyen de communication de plus à leur disposition pour échanger de l'information et, éventuellement, influencer les choix des consommateurs. De plus, Internet et les technologies de l'information en général donnent aux consommateurs accès à des outils d'aide à la décision (ex. : système de recommandation, agent intelligent) qui, eux aussi, peuvent influencer les choix de produits des consommateurs (Häubl et Trifts, 2000). À ce jour, seulement un nombre limité d'études ont empiriquement analysé l'utilisation et l'influence de ces outils d'aide à la décision ou de ces sources d'information personnelles dans Internet (Häubl et Trifts, 2000; Olson et Widing, 2002; Urban, Sultan et Qualls, 1999). De plus, aucune étude n'a encore comparé l'influence, sur les choix de produits des consommateurs, des sources d'information personnelles plus traditionnelles (ex. : experts) et des outils d'aide à la décision tels que les systèmes de recommandation de produits. Ainsi, cette thèse, composée de trois essais, explore l'influence de plusieurs sources d'information en ligne (autres consommateurs, experts humains, systèmes de recommandation) sur les choix de produits des consommateurs lorsque ces derniers magasinent en ligne.

L'objectif du premier essai est de proposer un cadre conceptuel permettant de catégoriser les sources d'information personnelles et les sources d'information offrant de l'information personnalisée dans Internet. Ce cadre conceptuel, basé sur les recherches portant sur les processus décisionnels des consommateurs, les sources d'information et la recherche d'information en ligne est composé de trois

dimensions : type de source d'information, type de promoteur de la source d'information et type de communication. En se basant sur ce cadre conceptuel, quelques propositions de recherche sont suggérées. De plus, les implications théoriques et pratiques de ce cadre conceptuel sont présentées.

Afin de tester de façon empirique les propositions avancées dans le premier essai, une expérience en ligne a été menée. Étant donné que ce type d'expérience est encore récent et assez peu fréquent en recherche marketing (Bruner et Kumar, 2000; Cho, Lee et Tharp, 2001; Coyle et Thorson, 2001; Häubl et Trifts, 2000; Lynch et Ariely, 2000; Murphy, 1999; Pederson, 2000; Stevenson, Bruner et Kumar, 2000), le deuxième essai discute essentiellement des aspects méthodologiques reliés à la conduite d'expériences dans Internet. Ainsi, les étapes nécessaires au développement et à la validation d'un design expérimental 3 (type de site Web) X 5 (type de recommandation et de source de recommandation) X 2 (type de produit) sont présentées. Ainsi, des sujets tels que l'affectation aléatoire des participants, la validation des manipulations expérimentales, le recrutement en ligne des participants sont discutés en détail dans ce deuxième essai. Cet essai se conclut par une discussion des similitudes et dissimilitudes entre les expériences dites classiques et celles conduites dans Internet.

Finalement, le troisième essai présente les résultats de l'expérience en ligne. Ainsi, les résultats portant sur l'influence du type de site Web, du type de recommandation, du type de source de recommandation et du type de produit sur la propension des consommateurs à utiliser et à suivre les recommandations en ligne sont présentés. Ce dernier essai se conclut avec une discussion des implications théoriques et pratiques des résultats obtenus.

Importance du sujet

L'émergence d'Internet en tant que canal de communication et de distribution a suscité l'intérêt de plusieurs chercheurs en marketing au cours des dernières années (Barwise, Hammond et Elbrese, 2000). Certains ont même suggéré qu'Internet causerait un changement de paradigme en marketing (Hoffman et Novak, 1997).

Internet est aussi devenu une source d'information importante pour les consommateurs, surtout en raison du fait qu'ils peuvent facilement accéder à une vaste quantité d'informations provenant d'une multitude de sources (ex. : communautés virtuelles, sites Web personnels, sites Web commerciaux, courrier électronique). Ainsi, toutes les sources d'information proposées par Andreasen (1968) sont accessibles en ligne : 1) *Impersonal advocate* (ex. : bannières); 2) *Impersonal independent* (ex. : www.consumersreports.org); 3) *Personal advocate* (ex. : clavardage avec un représentant des ventes); 4) *Personal independent* (ex. : courrier électronique d'un ami). Les sources d'information personnelles peuvent, soit fournir de l'information personnalisée (ex. : " Le vendeur m'a dit que le produit A répondrait davantage à mes besoins que le produit B ") ou non personnalisée (ex. : " Le vendeur mentionne que le produit A est le meilleur sur le marché ") aux consommateurs. De plus, traditionnellement, on a présumé que les sources d'information impersonnelles pouvaient seulement fournir de l'information non personnalisée aux consommateurs (Andreasen, 1968; Lutz et Reilly, 1974; Mitra, Reiss et Capella, 1999). Cette présomption est maintenant remise en question grâce aux technologies de l'information. Par exemple, dans Internet un consommateur peut maintenant utiliser des sources d'information impersonnelles, telles que des agents intelligents et des systèmes de recommandation, pour obtenir des recommandations personnalisées de produits (Alba *et al*., 1997; Ansari, Essegaier et Kohli, 2000; Häubl et Trifts, 2000; Maes, 1999; Pereira, 2000; Urban, Sultan et Qualls, 1999). Ce nouveau type de source d'information a contribué à l'émergence d'un nouveau champ de recherche en comportement des consommateurs qui s'intéresse à l'utilisation et à l'influence des sources d'information impersonnelles ayant la

capacité de fournir de l'information personnalisée (Ansari, Essegaier et Kohli, 2000; Barwise, Elbrese et Hammond, 2001; Häubl et Trifts, 2000; Urban, Sultan et Qualls, 1999). La présente recherche a donc pour but de contribuer à ce champ de recherche en analysant l'influence de différentes sources d'information personnelles ou impersonnelles offrant de l'information personnalisée sur les choix de produits des consommateurs.

Cadre théorique

Cette recherche s'inspire de l'approche cognitive du comportement des consommateurs. Ces derniers sont perçus comme étant des personnes orientées vers la résolution de problèmes (Anderson, 1986; Olshavsky, 1985; Payne, Bettman et Johnson, 1993). Selon la nature du problème à résoudre, de la situation et de leurs caractéristiques propres, les consommateurs peuvent opter pour des processus décisionnels requérant l'utilisation de sources d'information personnelles et de sources d'information impersonnelles offrant de l'information personnalisée. Ainsi, afin de résoudre des problèmes de consommation comme celui de choisir un produit dans Internet, les consommateurs peuvent décider ou non de consulter des recommandations de produits provenant d'autrui et de suivre ou non ces recommandations. Ainsi, s'inspirant de l'approche cognitive, cette recherche s'intéresse aux décisions des consommateurs relatives à la consultation des recommandations de produits en ligne ainsi que les décisions des consommateurs de suivre ces recommandations.

Conclusion

Au cours de ce premier chapitre, le sujet de cette recherche a été présenté. L'utilisation et l'influence des sources d'information personnelles en ligne ainsi que des sources d'information impersonnelles offrant de l'information personnalisée en

ligne est un champ de recherche émergent et prometteur. Cette recherche a pour objectif de contribuer à ce champ de recherche en explorant l'influence de différentes sources d'information en ligne sur les choix de produits des consommateurs. Les trois essais brièvement introduits au cours de ce chapitre sont présentés dans les prochains chapitres.

CHAPITRE 2

"Online Influence of Relevant Others: A Framework"

Abstract

Relevant others (e.g., friends) are often used by consumers, and indubitably influence their decision-making processes. As a communication medium, the Internet is a fertile ground for information exchanges between consumers and relevant others. In addition, the Internet gives consumers access to new information sources that can also act as relevant others (e.g., recommender system) and thus influence consumers. The objective of this essay is to provide a framework for relevant others as online information sources for consumers. To this effect, we first review the literature on information sources and their influence on consumers' decisions. Second, we present a framework that encompasses all online relevant others acting as information sources. Third, we propose a set of propositions related to the framework. The paper concludes with managerial implications and research avenues related to the influence of online relevant others on consumers.

Introduction

If it is to be used as a distribution channel by a significant portion of consumers, the Internet must overcome numerous barriers (Ernst & Young, 2000), many of which are related to consumers' perceived risks of using this relatively new distribution channel. A number of risk reduction devices are available to consumers and sellers (Roselius, 1971). To reduce their risk, consumers often turn to others for information and advice about products, brands, stores, etc. (Ardnt, 1967; Hawes and Lumpkin, 1986; Lutz and Reilly, 1974; Perry and Hamm, 1969; Roselius, 1971; Rosen and

Olshavsky, 1987a; Sheth and Venkatesen, 1968; Zidmund and Scott, 1974). They can consult a variety of "others" such as other persons close to them (e.g., friends), other persons having established expertise or reputation (e.g., salesperson), or even other groups (e.g., *Consumers Reports*) in order to decrease their perceived risk. The Internet is particularly well suited to help consumers communicate with others since it is a powerful and efficient communication tool for the exchange of commercial information (Barwise, Elbrese, and Hammond, 2001). For instance, Asimba (www.asimba.com), a sports and fitness lifestyle website, increased its membership base from 30,000 members to more than 500,000 members with an effective "Tell-a-friend" promotion that cost $3 per new member compared with an estimated acquisition cost of $300 per member for TV ads (Bannan, 2000). Furthermore, new information sources, such as intelligent agents and recommender systems, can also act as "others," to help consumers make online consumption decisions (Alba et al., 1997; Häubl and Trifts, 2000; Maes, 1999; Urban, Sultan and Qualls, 1999). Thus, in addition to being a fertile ground for exchanges between consumers and others, the Internet also offers consumers a relatively new type of information source that provides personalized information. We contend that a better understanding and usage of online others as information and influence sources will contribute to reduce consumers' perceived risk and will help eradicate some barriers that impede the growth of e-commerce.

The main objective of this essay is to provide a comprehensive framework for online influence of others on consumers' decision-making processes. The remainder of this essay begins with a review of consumer research on relevant others as information sources for consumers and their role in consumers' decision-making processes. It is followed by the presentation of a framework that encompasses all online relevant others acting as information sources. We then discuss a set of propositions related to the framework. The paper concludes with managerial implications and research avenues on the influence of online relevant others on consumers.

Literature Review

Information Sources

Research on the influence of others on consumers' decision–making processes has typically been labeled as reference group, word-of-mouth (hereafter WOM) or interpersonal influence research (Rosen and Olshavsky, 1987b). These research areas present both similarities and contrasts. First, all of the studies have investigated the influence of information sources on consumers. Andreasen (1968) proposes the following typology of information sources: 1) Impersonal Advocate (e.g., Mass media), 2) Impersonal Independent (e.g., *Consumer Reports*), 3) Personal Advocate (e.g., Sales clerks), and 4) Personal Independent (e.g., friends). WOM can be defined as "*interpersonal communications in which none of the participants are marketing sources*" (Bone, 1995, p. 213). Thus, WOM research focuses exclusively on personal independent information sources (Ardnt, 1967; Bone, 1995; Brown and Reingen, 1987; Gilly *et al.*, 1998; Herr, Kardes, and Kim, 1991; McGrath and Otnes, 1995; Still, Barnes, and Kooyman, 1984). Interpersonal influence, which includes WOM, focuses either on advocate or independent personal information sources (Duhan *et al.*, 1997). According to Bearden and Etzel (1982, p. 184), a reference group is "*a person or group of people that significantly influence an individual's behavior*". Thus, reference group research, which encompasses interpersonal influence, investigates the influence of personal or impersonal groups of one or more individuals on consumers (Burnkrant and Cousineau, 1975; Cohen and Golden, 1972; Childers and Rao, 1992; Deutsch and Gerard, 1955; Park and Lessig, 1977; Pincus and Waters, 1977; Price and Feick, 1984; Rosen and Olshavsky, 1987a).

Relevant others may exert two types of influence on consumers: informational and normative (Bearden, Netemeyer, and Teel, 1989, 1990; Price and Feick, 1984; Deutsch and Gerard, 1955; Pincus and Waters, 1977). Informational influence refers to an *"influence to accept information from another as evidence about reality*" and normative influence refers to an "*influence to conform with the positive expectations of another*" (Deutsch and Gerard, 1955, p. 629). Deutsch and Gerard (1955) point out

that the term "another" may refer to another person, to a group or to oneself. When obtaining information from others, consumers must select the desired information. According to Rosen and Olshavsky (1987a), consumers can request two types of information: attribute-value information and recommendations. In their decision-making process, consumers can turn to others in order to acquire information on brands and on their attributes or subcontract their decision and ask others to recommend the best option. Furthermore, Price and Feick (1984) empirically found that personal information sources can play one or more of the following roles in the decision-making process: structure the decision-making problem (nature of the product, product usefulness, salient attributes), provide information to the consumer (retail outlets, information sources, price), help in the evaluation and elimination of options, provide a recommendation in order to choose an option, and comfort the consumers in their decision-making process (confirm the consideration of all suitable options and the reasonableness of the decision-making process). Thus, others can influence consumers for informational or normative reasons and others can exert influence in one or more steps of their decision-making process.

Personal information sources either provide personalized (e.g., "The salesperson told me that Product A would better meet my needs than Product B") or non-personalized (e.g., The salesperson said that product A is the best on the market) information to consumers. In addition, it is has been traditionally assumed that impersonal information sources can only provide non-personalized information to consumers (Andreasen, 1968; Lutz and Reilly, 1974; Mitra, Reiss and Capella, 1999). This assumption is now challenged by information technologies. For instance, on the Internet consumers can use impersonal information sources such as intelligent agents and recommender systems in order to obtain personalized information (Alba *et al*., 1997; Ansari, Essegaier, and Kohli, 2000; Häubl and Trifts, 2000; Maes, 1999; Pereira, 2000; Urban, Sultan, and Qualls, 1999). The emergence of this new type of information source has generated a new research area in consumer research (Ansari, Essegaier, and Kohli, 2000; Barwise, Elbrese, and Hammond, 2001; Häubl and Trifts, 2000; Urban, Sultan, and Qualls, 1999).

A revised typology of information sources is needed in order to reflect this new reality. To this effect, information sources can be classified in four groups: 1) Personal source providing personalized information (e.g., "My sister says that Product A is best for me"); 2) Personal source providing non-personalized information (e.g., "A renowned expert says that Product A is the best"); 3) Impersonal source providing personalized information (e.g., "Based on my profile, the recommender system suggests Product A"); 4) Impersonal source providing non-personalized information (e.g., "*Consumer Reports* mentions that Product A is the best product on the market"). As Andreasen (1968) asserts, these sources can either be independent or advocate. Note that the same source could be perceived as an advocate source (e.g., Michael Jordan promoting a specific brand) or as an independent source (e.g., Michael Jordan giving advice on sports products). The remainder of the paper focuses on the influence of online relevant others, i.e., personal or impersonal online information sources providing personalized or non-personalized information to consumers. Online relevant others can represent a person, a group, or an information system. We subsequently review the circumstances in which these information sources are used by consumers in their decision-making processes.

Relevant Others in Consumers' Decision-Making Processes

Olshavsky (1985) introduced the following classification of decision-making processes: affect referral, own-based, and other-based processes. The affect referral decision-making process is generally favored by consumers that already possess a strong attitude toward one option (Wright, 1975). In these cases, consumers do not base their decisions on an exhaustive evaluation of attributes and/or alternatives, but rather on their past experience. In fact, this is a heuristic that consists simply in accessing one's attitude in memory in order to make a decision. Thus, since the search effort is solely internal, others' influence cannot have an effect on these types of decision-making processes. Nonetheless, relevant others may have contributed in the past to the formation of an individual's attitude.

Own-based decision-making processes occur when consumers do not have a preferred option, but have the capacity and the motivation to process information and complete a complex decision-making process. In these cases, consumers rely on themselves to search for relevant information, evaluate alternatives, and make a purchase decision. For this type of decision-making process, Payne, Bettman and Johnson (1993) suggest that consumers can use a variety of heuristics (lexicographic, disjunctive, etc.) that may vary according to the desired decision's accuracy and the effort that consumers are willing to invest in the particular decision. Consumers that adopt own-based decision-making processes can be influenced by others but do not rely on them exclusively to make decisions. For example, a consumer may ask a close friend which product attributes are important to consider for a given product (Price and Feick, 1984), but may also gather complementary information from other information sources such as advertising, store visits, and salespeople in order to determine the pertinent product attributes to consider. In own-based decision-making processes, relevant others are only one of many external information sources that consumers can consult.

When consumers do not have a preferred option nor the capacity or the motivation to process information, they may turn to other-based decision-making processes. Here, consumers subcontract either part or all of their decision-making process. Solomon (1986) predicates that consumers may use surrogates to act on their behalf for information search, evaluation of options and/or even to carry out transactions. In a study of life insurance purchases, Formisamo, Olshavsky, and Tapp (1982) found that 71% of consumers that followed an other-based decision-making process made their purchase decision in keeping with the salesperson's recommendation. Olshavsky (1985) asserts that other-based decision-making processes are underpinned by four motivations: following a recommendation, conforming to group norms, imitating others, and complying with a specific request.

In order for others' influence to occur within own-based and other-based decision-making processes, consumers must perform an external search. When consumers

decide to engage in external search activities, they may either conduct search activities that "*will facilitate their decision-making regarding some goal object in the marketplace*" (Kelly, 1968, p. 273), e.g., prepurchase search activities, or activities that will enhance their knowledge of particular brands and/or product classes without any purchase intent at the time of their search, e.g., ongoing search activities (Bloch, Sherrell, and Ridgway, 1986). The majority of studies concerning consumers' external search efforts have focused on prepurchase search activities (Beatty and Smith, 1987; Brucks, 1985; Furse, Punj, and Stewart, 1984; Moorthy, Ratchford, and Talukdar, 1997; Newman, 1977). Results show that external search efforts vary across product categories (Beatty and Smith, 1987) and across consumers within a specific product category (Furse, Punj, and Stewart, 1984; Moorthy, Ratchford, and Talukdar, 1997). Beatty and Smith (1987) propose that the total search effort should comprise the following four factors: Retailer search factor (phone calls to retailers, trips to retailers, number of retailers visited, and time spent visiting), Media search factor (number of ads recalled, number of items of written information used, other makes seriously considered, and other dealers seriously considered), Time factor (introspection time and search time) and Interpersonal search factor (Number of owners known and number of opinion leaders used). Hence, others as a source of information are only one of many information sources available to consumers that perform an external search.

Table I – Relationships Between Decision-Making Process External Search and Influence of Others

Decision-Making Process	External Search	Potential for consumers to be influenced by others
Affect Referral	None	None
Own-based	High	Moderate
Other-based	Low	High

Thus, relevant others may be used as a source of information only when consumers decide to perform own-or other-based decision-making processes because an external search effort only occurs in these processes. More specifically, consumers need to

expose themselves or be exposed to others, which are only one of many information sources available to them. Since consumers subcontract at least a portion of their process in other-based decision-making processes, their external search effort is lesser than in own-based decision-making processes, in which they perform the entire process themselves. As Table I (page 12) illustrates, when consumers perform an external search effort, there is a negative relationship between their search level and the potential for others' influence to occur. In the next section, the ways in which consumers can perform their external search on the Internet are discussed.

Online External Search and Relevant Others

Online external search activities have been the subject of interesting theoretical papers (Alba *et al.,* 1997; Rowley, 2000; Salomon and Koppleman, 1992), but only a few empirical studies have been conducted to date (Lynch and Ariely, 2000; Vijayasarathy, 2001; Ward and Lee, 1999). As in general external search activities, consumers can use the Internet as a tool to conduct either ongoing or prepurchase search activities (Alba *et al.,* 1997; Rowley, 2000; Salomon and Koppleman, 1992; Peterson, Balasurbramanian, and Bronnebberg, 1997). In a comparison of traditional distribution channels and the Internet, Alba *et al.,* (1997) suggest that with regard to consumers' external search, interactive home shopping can provide a greater number of alternatives for consideration and can be used to efficiently screen the options so as to enhance the consumer's ability to make purchase decisions. Ward and Lee (1999) assert that consumers' Internet usage experience influences the way they use these search tools. They found that more experienced users are more proficient at seeking product information and purchasing products on the Internet (Ward and Lee, 1999). In addition, in a study of consumers' online prepurchase search activities for wine products, Lynch and Ariely (2000) found that when consumers can easily sort, organize and compare information about product prices, product quality and store offerings, they tend to be more satisfied with their purchase decisions and become more loyal to websites that offer such search tools.

A myriad of search tools are available to consumers using the Internet. Rowley (2000) developed the following classification: general search tools including browsers and search engines (directories, subject gateway, meta search and all-in-one tools, search bots, search engines for specific sites) and shopping bots. The former category offers consumers the possibility of searching through a wide array of subjects including products and services offered on the Internet, while the latter tools are designed exclusively to locate products and services. For example, the shopping bot MySimon (www.mysimon.com) helps consumers find various products such as books, tea and credit cards based on specific product attributes specified by consumers (Vijayasarathy, 2001). Hence, the Internet grants consumers many opportunities, namely communication tools, to perform their external search effort and interact with relevant others. Consumers can use the World Wide Web to browse on various types of websites (e.g., retailers, manufacturers, search engines, shopping bots) and search for information. In addition, they can also use email and other communication devices (video, chat, etc.) to communicate with various information sources (e.g., friends, salespersons).

Specifically with regard to the online influence of relevant others, consumers can engage in two types of Internet communication: proactive, i.e., initiated by consumers or reactive, i.e., initiated by others. Examples of the former could be a consumer browsing on a website or a consumer sending an email to a friend. Emails sent to the consumer and pop-up screens are examples of reactive communication. Both communication types may involve others' influence. Furthermore, relevant others' influence can originate from either a seller (e.g., a retailer) or a third party (e.g., a shopping bot), which may or may not have commercial links with sellers. As in traditional retail settings, online consumers, by interacting with other consumers or with product class experts such as salespeople, can be influenced in their decision-making processes. Moreover, online consumers can also be influenced by information provided by electronic decision aids (EDA) that act like human experts in specific fields. Two types of EDA can act as impersonal sources of personalized information: Consumer decision support systems (CDSS) and Recommender systems

(RS). CDSS serve to structure decisions and/or evaluate options and RS are designed to obtain a solution from an expert advisor (King and Hill, 1994). Since CDSS and RS can influence consumers' decisions (Häubl and Trifts 2000), in addition to other consumers and human experts, CDSS and RS presumably exert an influence on consumers by acting as impersonal sources of personalized information. Thus, as illustrated in Table II (page 16), relevant others' influence can be presented within a framework comprising three dimensions: 1) Online promoter of relevant other (seller, commercially linked third party, or independent third party); 2) Relevant other (consumer, expert, or CDSS/RS); and 3) Communication (proactive or reactive).

As shown in Table II (page 16), consumers can initiate a communication with relevant others that are promoted by a seller. First, the seller can provide consumers with communication opportunities that enable them to exchange relevant information about the firm and/or its products and services. For example, Amazon (www.amazon.com) enables consumers to write book reviews that can be viewed by other consumers, and thus facilitate or influence purchase decisions. Second, consumers can communicate with experts working for the seller. On line, consumers can initiate communication by email or by other communication means. For instance, companies such as LivePerson (www.liveperson.com) and HelloOperator (www.hellooperator.com) offer firms software products that can generate live customer service via chat and video interaction with consumers.

Third, consumers can interact with CDSS and RS that act as information sources (Pereira, 2000). RS largely rely on three underlying technologies: content-based, constraint-based and collaborative-based filtering methods (Guttman, Moukas, and Maes, 1998). Content-based filtering generates product recommendations based on a consumer's specified product attributes or past product ratings (Guttman, Moukas, and Maes, 1998; Balabanovic and Soham, 1997). An example of content-based RS is the now classic Andersen Consulting's BargainFinder (Maes, 1999).

Table II – A Framework for Online Influence of Relevant Others

Communi-cation/ Promoter	Proactive (i.e., Initiated by the consumer)	Reactive (i.e., Initiated by others)
Seller	Other consumers: Consumer initiated information exchange with other consumers promoted by a seller (e.g., amazon.com's customers' book reviews). Expert: Consumer initiated communication with an intra-firm product class expert who is knowledgeable about the consumer(s) and who is promoted by a seller (e.g., online customer service via chat, email sent to a salesperson). Consumer Decision Support and Recommender Systems: Consumer initiated communication with an intra-firm information system that is knowledgeable about the consumer(s) and/or the products and which is promoted by a seller (e.g., bn.com's and amazon.com's recommender systems).	Other consumers*: Seller initiated information exchange between other customers and the consumer (e.g., email of other consumers' testimonies sent by the seller to consumers). Expert: Seller initiated communication between an intra-firm product class expert, who is knowledgeable about the consumer(s), and the consumer (e.g., email of sales representatives, websites' pop-up help screens). Consumer Decision Support and Recommender Systems: Seller initiated communication between an intra-firm information system, which is knowledgeable about the consumer(s) and/or the products, and the consumer (e.g., Amazon's alerts).
Commer-cially linked 3rd party	Other consumers: Consumer initiated information exchange with other consumer(s) who have a commercial link with the seller. (e.g., consumers' personal websites participating in affiliate programs). Expert: Consumer initiated communication an inter-firm product class expert who is knowledgeable about the consumer(s) and who is promoted by a commercially linked third party (e.g., sponsored chat moderator). Consumer Decision Support and Recommender Systems: Consumer initiated communication with an inter-firm information system that is knowledgeable about the consumer(s) and/or the products and which is promoted by a commercially linked third party (e.g., personalogic.com, mysimon.com).	Other consumers (Viral Marketing): Information exchange between the consumer and other consumer(s) who initiated the communication and who have a commercial link with the seller (e.g., Tell-a-friend email promotions). Expert *: Commercially linked third party initiated communication between an inter-firm product class expert, who is knowledgeable about the consumer(s), and the consumer. Consumer Decision Support and Recommender Systems: Commercially linked third party initiated communication between an inter-firm information system, which is knowledgeable about the consumer(s) and/or the products, and the consumer (e.g., yesmail.com, mypoints.com, lifeminders.com).
Indepen-dent 3rd party	Other consumers: Consumer initiated information exchange with other consumer(s) who have no commercial links with the seller. (e.g., virtual communities such as epinions.com and untied.com, personal websites, email sent to a friend). Expert: Consumer initiated communication with an inter-firm product class expert who is knowledgeable about the consumer(s) and who is promoted by an independent third party (e.g., gomez.com, about.com, consumerreports.org). Consumer Decision Support and Recommender Systems: Consumer initiated communication with an inter-firm information system that is knowledgeable about the consumer(s) and/or the products and which is promoted by an independent third party (e.g., moviecritic.com).	Other consumers (Viral Marketing): Information exchange between the consumer and other consumer(s) who initiated the communication and who have no commercial links with the seller. (e.g., email received from a friend). Expert *: Independent third party initiated communication between an inter-firm product class expert, who is knowledgeable about the consumer(s), and the consumer (e.g., online personal shopper). Consumer Decision Support and Recommender Systems *: Commercially linked third party initiated communication between an inter-firm information system, which is knowledgeable about the consumer(s) and/or the products, and the consumer (e.g., online personal recommender system).

Note: *Not currently used on the Internet to our knowledge.

Constraint-based filtering centers on product attributes or product ratings; it uses constraint satisfaction problem techniques to filter and sort the recommended products by the consumer's utility. Constraint-based filtering applies both hard (must be satisfied) and soft (need not be completely satisfied) constraints to generate recommendations directed at users (Guttman, Moukas, and Maes, 1998; Häubl and Trifts, 2000). Personalogic's RS (www.personalogic.com) is one example of constraint-based filtering (Maes, 1999). Moreover, collaborative-based filtering identifies users whose preferences are similar to those of the customer and recommends products that these users have liked (Guttman, Moukas, and Maes, 1998; Balabanovic and Soham, 1997). Many well-known retail websites such as Barnes&Nobles (www.bn.com) and Zdnet (www.zdnet.com) use collaborative filtering in order to recommend products to consumers (Maes, 1999). In addition, in order to minimize weaknesses related to a particular filtering technique (e.g., under the collaborative filtering process, a new product will have little chance of being recommended to one user until it is rated by other users), RS can combine filtering techniques. For instance, Balabanovic and Shoham's (1997) hybrid RS recommends an item to a user when the item scores highly against the user's profile (content-based filtering) and when it is highly rated by users with similar profiles (collaborative filtering). Thus, it is possible for consumers to proactively interact with seller-promoted relevant others such as other consumers, human experts, and CDSS/RS.

Furthermore, sellers can use relevant others to proactively communicate with consumers. In these cases, sellers may or may not have the consumers' permission to contact them. Sellers that obtain consumers' permission to send commercial information are considered to engage in permission marketing, while a lack of permission is described as spamming (Krishnamurthy, 2000). To our knowledge, in this context only two information sources are currently used: experts and CDSS/RS. However, other consumers could also be used in this context, as illustrated in Table II (page 16). Experts can proactively communicate with consumers and exert an influence on consumers. For example, consumers could receive an unsolicited email from a sales representative working for the seller. CDSS/RS can also be used in this

context. For instance, Amazon (www.amazon.com) proposes an alert service that notifies registered consumers by email when a new product corresponding to their pre-defined product attributes (author, title, subject, etc.) is available.

Like sellers, commercially linked third parties can be consulted by consumers for online information. Furthermore, they can use relevant others to convey commercial information and influence consumers. Similar to the case of sellers, consumers could receive information originating from other consumers but promoted by the third party. For instance, a commercially linked third party could include testimonies of satisfied consumers on its website. In addition, consumers could also exchange product and service information with other consumers by browsing on their personal websites. If these websites feature commercial links such as affiliate programs with specific sellers, they may steer consumers toward products and services that are available at these commercial partners. In this case, the promoter and the source of influence are the same: other consumers. In addition, human experts can be drawn on to exert an influence in this context. For instance, an expert working for a seller could be used as a moderator during a chat session on a third party website. Lastly, commercially linked third parties can also use CDSS/RS. The MySimon website (www.mysimon.com) is an example of a CDSS/RS that recommends products and services of its business partners based on consumers' needs or desired product attributes.

Commercially linked third parties can also initiate communication with consumers and exert an influence. As illustrated in the introduction, viral marketing strategies that recruit other consumers as personal information sources are an effective means of exerting influence. Many sellers' websites are now using "Tell-a-friend" promotions in order to get consumers who visit their website to refer it to other consumers via email in order to increase their website traffic and, they hope, their sales. CDSS/RS are also found in this context. Internet companies such as Yesmail (www.yesmail.com), Mypoints (www.mypoints.com) and Lifeminders (www.lifeminders.com) all fall within the category of impersonal sources providing

personalized information. These third parties, which are commercially linked to various sellers, harness their information systems to personalize promotional messages and exert an influence based on their knowledge of specific consumers' interests and tastes.

Although information from commercially linked third parties and sellers is widely available online, consumers may prefer to obtain commercial information from third parties that have no commercial ties with sellers. First, consumers can exchange information about specific firms or products and services and exert influence on other consumers via personal and virtual community websites (Ladik and Locander, 2001; Krishnamurthy, 2001). Virtual communities designed to be information forums where consumers can submit their opinions on an array of products (www.epinions.com) or a specific service (www.untied.com) are examples of relevant others' influence. Second, third parties can enlist experts to exert interpersonal influence. For instance, users of the About website (www.about.com) can directly contact experts in various domains to obtain personalized advice and recommendations. CDSS/RS also exert an influence in this context. The website Moviecritic (www.moviecritic.com) exemplifies this type of system. After entering their profile, consumers visiting the website can receive recommendations of movies that they would be expected to enjoy based on their profile and the movies that similar consumers have liked. In an interesting study of an independent third party recommender system for pickup trucks, Urban, Sultan and Qualls (1999) found that 88% of consumers using the system agreed that the recommendations provided met their needs.

Moreover, independent third parties can use proactive communication devices to inform and influence consumers. Up to now, other consumers are the primary online information sources that have been used to proactively communicate with consumers in this context. Again, note that in these cases, the information sources are the same as the promoter, i.e., other consumers. The popularity of sites such as eBay (www.ebay.com) exemplifies how consumers use online communication, i.e., email

and newsgroups, to share information and convince other consumers to at least visit a specific website (Cheng, 1999). Although this method is not currently used online, human experts could act as online personal shoppers for consumers and contact them regarding transmission of pertinent commercial information. This situation parallels that of traditional offline commerce (Solomon, 1986), whereby surrogate consumers act as agents that guide, direct and/or transact on behalf of consumers that have delegated a portion of their decision-making processes. Furthermore, CDSS/RS acting as personal shopping advisors represent interpersonal information sources that use obtrusive communication devices. Although no such system is currently in use, personal intelligent agents' descriptions provided by Alba *et al.* (1997) and Maes (1999) indicate what can be expected.

To summarize, the framework described above suggests that the influence exerted by online relevant others can be classified according to the type of information source (other consumers, human expert, or CDSS/RS), the type of promoter of the information source (seller, commercially linked third party, or independent third party) and the type of communication (proactive or reactive). Next, we present a series of propositions outlining how the influence of relevant others may vary based on these characteristics.

Research Propositions for the Online Influence of Relevant Others

Propositions related to the above framework are discussed in this section. Each proposition focuses on one particular dimension of the framework. In combination, they represent the potential main effects of the dimensions.

We postulate that relevant others promoted by an independent third party website are more influential than those promoted by a commercially linked third party or seller website. According to the discounting principle of the attribution theory (Kelley, 1973), which predicates that a communicator will be perceived as biased if the

recipient can infer that the message can be attributed to personal or situational causes, consumers will attribute more non-product related motivations (e.g., commissions on sales) to relevant others that are promoted by commercially linked third parties or sellers.

Proposition 1 – Information provided to consumers by an online information source will be more influential if it is promoted by an independent third party website than if it is promoted by a commercially linked third party website. In turn, information received from an online information source promoted by such a third party website will be more influential than if it is promoted by a seller website.

As Hoffman and Novak (1996) reported, in addition to providing firms with additional communication means, the Internet is differentiated from other media because it provides consumers with opportunities to proactively interact with the medium (e.g., browse on a webpage) or with people through the medium (e.g., email). We suggest that online proactive communication (i.e., initiated by the consumer) will be more influential than online reactive communication (i.e., initiated by relevant others). Again based on the discounting principle of the attribution theory (Kelley, 1973), we posit that consumers will attribute more non-product related motivations to relevant others when the others initiate the communication than in situations where consumers initiate the communication.

Proposition 2 – The information contained in communication exchanges between consumers and online relevant others that are initiated by consumers (Proactive) will be more influential than the information contained in exchanges initiated by others (Reactive).

Furthermore, we hypothesize that the type of online information source will have an impact on the information credibility, and consequently on its influence on consumers. Kelman (1961) suggests that credibility is composed of two dimensions: trust and expertise. Expertise can be viewed as the perceived ability of an information

source to know the right answer and trustworthiness as the information source's motivation to communicate this expertise without bias (McGuire, 1969). First, we predict that, as in offline settings, consumers will perceive differences between the trustworthiness and expertise of other consumers and human experts. Experts should be perceived as more expert than other consumers. In addition, human experts will presumably be perceived as less trustworthy than other consumers since consumers may attribute more non-product related motivations to human experts (e.g., commission on sales) than to other consumers.

Proposition 3a – As an online information source, other consumers will be perceived by consumers as possessing less expertise than human experts.

Proposition 3a – As an online information source, other consumers will be perceived by consumers as being more trustworthy than human experts.

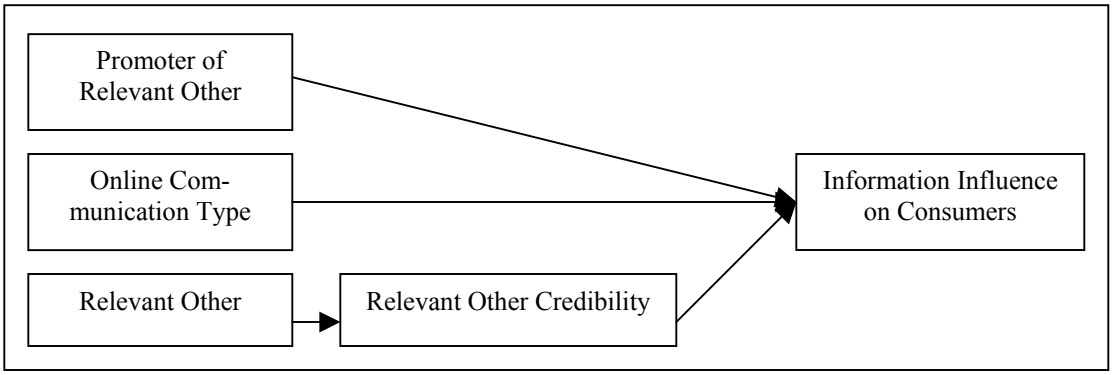
Regarding online environments more specifically, we anticipate that consumers will perceive credibility differences between other consumers and CDSS/RS, which will be perceived as possessing more expertise than other consumers. In addition, we predict that CDSS/RS will be perceived as less trustworthy than other consumers since, as with human experts, consumers can attribute their behaviors to non-product related motivations (e.g., programmed to recommended a certain product). In addition, based on Urban, Sultan, and Qualls' (1999) finding that CDSS/RS can be perceived by consumers as credible information sources, we propose that CDSS/RS will be perceived to be as trustworthy and expert as human experts.

Proposition 4a – CDSS/RS will be perceived as possessing more expertise than the online information source "other consumers".
Proposition 4b – CDSS/RS will be perceived as less trustworthy than the online information source "other consumers".

Proposition 4c – CDSS/RS will be perceived as being as trustworthy and expert as online human experts.

Based on the above propositions, the following conceptual framework is proposed (Figure 1, page 23). Promoters of relevant others (e.g., Type of Website), relevant others, and the type of communication are all suggested to directly or indirectly influence the information influence on consumers.

Figure 1 - Conceptual Framework



Note that interaction among promoters of relevant others, relevant others, and the type of communication is possible. For instance, it is worth questioning whether a reactive information exchange promoted by an independent third party is less influential than a proactive exchange initiated by a commercially linked third party. These propositions and their related interactions should be empirically investigated in order to determine which combinations of promoter, relevant other, and communication type are the most effective for both marketers and consumers.

Conclusion

As mentioned, the use of relevant others potentially helps consumers reduce the perceived risk of shopping online. Thus, the main objective of this paper was to provide a much-needed framework for analyzing the influence of online relevant

others on consumers. The rapid growth of online marketing has provided a fertile environment for the emergence of new marketing concepts and tools. Concepts such as viral marketing, permission marketing and tools such as CDSS/RS are now frequently used in online environments to exert influence. However, in order to optimize the use of these tools, marketers require a comprehensive framework and more importantly, must gain insight into the potential effectiveness of these online tools through empirical findings in research areas such as WOM, interpersonal influence, and reference group. Hence, for marketers, the proposed framework should contribute to an understanding of the methods of exerting influence using relevant others in online environments.

To our knowledge, this paper proposes the first general framework that sheds light on the online influence of relevant others on consumers. Given that the work on online relevant others is largely in its infancy; several research avenues can be identified. First, each proposition posited and the potential interactions related to the dimensions of the framework must be empirically tested in order to assess their relevance. Second, pertinent moderators related to the online influence of relevant others should be investigated. For instance, variables pertaining to consumers (e.g., familiarity, knowledge) that have been found to moderate the use and influence of others on consumers' decisions in offline settings (Beattie, 1982; Brucks, 1985; Furse, Punj, and Stewart, 1984; Gilly, Wolfingarber, and Yale, 1998; King and Balasubramanian, 1994; Lascu, Bearden, and Rose, 1995; Sheth and Vankatesan, 1968) may also moderate the influence of relevant others in an online setting. Third, email marketing techniques such as permission marketing and viral marketing deserve investigation particularly since email volume is expected to increase dramatically in the coming years (Jackson, 2001). This increase in volume may affect the way in which consumers manage their incoming email and will consequently have an impact on the effectiveness of email marketing techniques. Furthermore, since it is difficult if not impossible to forecast the evolution of the Internet, this framework will surely need to be updated in the near future to ensure that it encompasses new ways that

consumers perform online searches and consequently permits relevant others to exert influence on consumers in new ways.

CHAPITRE 3

"Online Experimental Design: An Empirical Illustration"

Abstract

The objective of this essay is to empirically illustrate methodological specifications of experimental designs on the Internet. We have conducted an online experiment that evaluates the influence of online product recommendations on consumers' online choices. Specifically, a 3 (types of websites) X 5 (types of recommendations and recommendation sources) X 2 (types of products) online experimental design is developed and validated. Methodological issues such as online randomization, online manipulation checks, online test of measurement scales, and online subject recruitment are presented in detail, followed by a discussion of the use of online experimental design and its similarities and dissimilarities with offline experiments.

Introduction

In recent years, marketing scholars and practitioners have brought to light the potential of conducting online experiments to investigate marketing problems (Barwise, Elberse, and Hammond, 2001; Wyner, 2000). To date, only a limited number of studies using online experimental designs have emerged in the marketing literature. Online experiments have been performed in the area of online advertising (e.g., Bruner and Kumar, 2000; Cho, Lee, and Tharp, 2001; Stevenson, Bruner, and Kumar, 2000) and in the consumer behavior area (e.g., Coyle and Thorson, 2001; Häubl and Thrifts, 2000; Lynch and Ariely, 2000; Murphy, 1999; Pedersen, 2000). This relative scarcity of studies using the Internet to conduct experiments suggests that this type of methodology is still emergent. The main objective of this paper is to empirically illustrate how experiments can be designed and conducted on the Internet. In order to achieve this objective, a topical example involving the influence of online product recommendations on consumers' online choices is presented.

The remainder of the paper is organized as follows. First, the conceptual framework of the study is briefly presented. Second, the online randomization procedure is discussed, followed by a presentation of the manipulation checks and measurement scale tests performed online. Fourth, the online subject recruitment procedure is presented. The paper concludes with a discussion of the use of online experimental design and its similarities and dissimilarities with offline experiments.

Conceptual Framework

This section presents the conceptual framework of the study. The dependent and independent variables are introduced, along with the hypotheses that were tested during the online experiment. First, the conceptual framework is elucidated by a brief discussion of the rationale of the study.

Online Product Recommendations

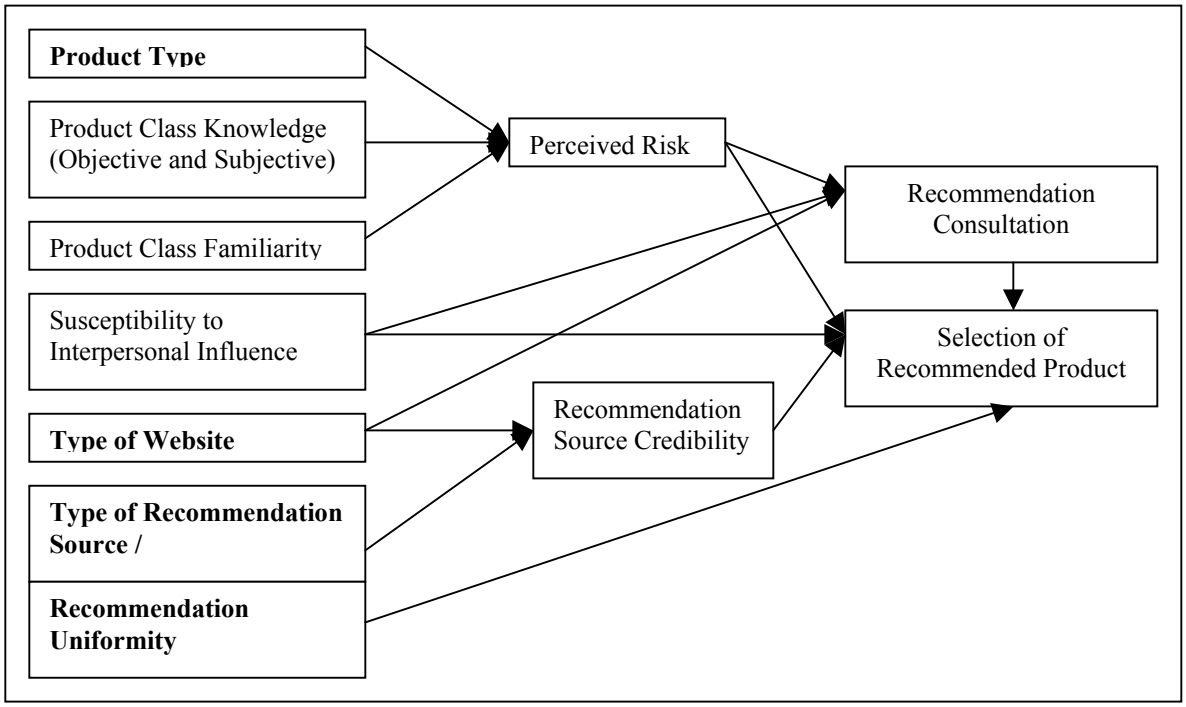
Influence exerted by information sources such as peers, experts, and salespeople has long been an important topic in consumer research. Research results provide strong evidence that consumers use and are influenced by these information sources (Ardnt, 1967; Brown and Reingen, 1987; Duhan et al., 1997; Gilly et al., 1998; Olshavsky and Granbois, 1979; Price and Feick, 1984; Rosen and Olshavsky, 1987a; Still, Barnes, and Kooyman, 1984). The emergence of the Internet and electronic commerce has also given consumers seeking and buying products online an opportunity to consult recommendation sources prior to making consumption decisions. For example, a consumer can consult websites such as Epinions (www.epinions.com) to seek opinions and testimonies of other consumers about specific products. Although many examples of websites using various recommendation sources can be cited, few studies have explored the use and effect of online recommendation sources on consumers' decision-making processes (Häubl

and Thrifts, 2000; Urban, Sultan, and Qualls, 1999). Therefore, considerable research is required to gain a better understanding of the use and influence on consumers' choices of recommendation sources in computer-mediated environments such as the Internet and the World Wide Web.

Conceptual Framework

As illustrated in Figure 1 (page 29), three variables are believed to directly moderate consumers' propensity to consult a recommendation source: Perceived risk (Ardnt, 1967; Hawes and Lumpkin, 1986; Lutz and Reilly, 1974; Perry and Hamm, 1969; Roselius, 1971; Rosen and Olshavsky, 1987a; Sheth and Venkatesen, 1968; Zidmund and Scott, 1974), susceptibility to interpersonal influence (Bearden, Netemeyer, and Teel, 1989; Burnkrant and Cousineau, 1975; Deutsch and Gerard, 1955; Park and Lessig, 1977), and type of website (Senecal and Nantel, 2001). In addition, five variables may directly affect the recommendation influence on consumers' online product choices: Perceived risk (Ardnt, 1967; Hawes and Lumpkin, 1986; Lutz and Reilly, 1974; Perry and Hamm, 1969; Roselius, 1971; Rosen and Olshavsky, 1987a; Sheth and Venkatesen, 1968; Zidmund and Scott, 1974), susceptibility to interpersonal influence (Bearden, Netemeyer, and Teel, 1989; Burnkrant and Cousineau, 1975; Deutsch and Gerard, 1955; Park and Lessig, 1977), recommendation source credibility (Gilly *et al*., 1998; Lascu, Bearden, and Rose, 1998; Price and Fieck, 1984), recommendation uniformity (Cialdini and Trost, 1998; Pincus and Waters, 1977), and recommendation consultation.

Figure 1 – Conceptual Framework



Note: Experimentally manipulated variables represented by bold fonts.

Furthermore, four variables are considered antecedents of perceived risk: Product type (King and Balasubramanian, 1994), objective and subjective product class knowledge (Beattie, 1982; Brucks, 1985; Furse, Punj, and Stewart, 1984; Gilly, Wolfinbarger, and Yale, 1998; King and Balasubramanian, 1994; Lascu, Bearden, and Rose, 1995), and product class familiarity (Sheth and Venkatesan, 1968). In addition, two variables are considered antecedents of online recommendation source credibility: Type of website and type of recommendation source (Senecal and Nantel, 2001).

Dependent Variables

As illustrated in Figure 1 (page 29), two dependent variables are measured. The first dependent variable is consultation or non-consultation of the product recommendation. This dichotomous variable is measured by the clickstream data collected during subjects' shopping tasks. The second dependent variable is the

influence of the recommendation source on consumers' online product selections. To measure this variable, product selection of subjects exposed or not exposed to product recommendations were compared in order to assess the influence of the product recommendation.

Independent Variables

Four of the independent variables were manipulated during the online experiment: type of website, type of recommendation source, degree of recommendation uniformity, and product type. The type of website was manipulated on three treatment levels: seller, third party commercially linked to sellers, non-commercially linked third party. In the "seller" condition the website was described as an etailer (e.g., Amazon.com). The "third party commercially linked to sellers" treatment level was described to subjects as an online buying group linked to a limited number of specific etailers (e.g., Shopping.yahoo.com). Lastly, in the "non-commercially linked third party" condition, the website was presented as an independent organization, similar to *Consumer Reports*, that was not related to any online etailers.

The second factor represents a combination of the recommendation source treatment levels and, in one instance, the recommendation's degree of uniformity (other consumers – uniform recommendation, other consumers – non-uniform recommendation, human expert, recommender system, and no recommendation source). The "no recommendation source" condition, where no product recommendation was proposed to subjects, served as our control group. In the "human experts" condition, the recommendation source was presented as a group of expert advisors specialized in the product class. The treatment level "recommender system" was described as a software application that provides personalized recommendations based on the subject profile. In the "other consumers – uniform recommendation," subjects were told that the product recommendation came from the product choices of all of the other consumers and that they had chosen the particular product most frequently (e.g., Calculator A was selected by 71% of

consumers). In the "other consumers – non-uniform recommendation" condition, subjects were recommended two products that were most frequently selected by others (e.g., Calculator A was selected by 40% of consumers and Calculator B by 39% of consumers).

The product type (search or experience) is the only within-subject experimental factor. Nelson (1970) advanced that search qualities are those that *"the consumer can determine by inspection prior to purchase,*" whereas experience qualities "*are not determined prior to purchase*" (Nelson, 1970, p. 730). In the "search" condition, the products presented to subjects were calculators and in the "experience" condition, the products were bottles of wine. These products were selected on the basis of pretest results. Table I (page 31) summarizes the treatment levels that were used in the experiment.

Table I – Experimental Treatment Levels

Type of Website	**Type of recommendation source - Recommendation uniformity**	**Product type**
Seller	No recommendation source	Search
Third party commercially linked to sellers	Human experts	Experience
Third party not commercially linked to sellers	Other consumers – uniform recommendation	
	Other consumers – non-uniform recommendation	
	Recommender system	

All of the other independent variables (susceptibility to interpersonal influence, objective product class knowledge, subjective product class knowledge product class familiarity recommendation source credibility, perceived risk) present in the conceptual framework were measured during the experiment. These variables were assessed with existing measurement scales and were pretested before the experiment.

Online Randomization

The experiment was performed in two sessions. In order to motivate subjects to participate without mentioning the precise goal of the experiment (i.e., the influence of product recommendation on product choice), a cover story was used. Subjects were told that a two session experiment was being conducted to assess the commercial potential of various products that a foreign group (Maximo) was interested in introducing on local markets via their website. Participants were also informed that in the second session of the experiment, they would be asked to select three products (computer mouse, calculator, and wine bottle) and that they had a one in three chance of winning one of the products selected. They were told that the average product value was $45.

In the first session, subjects were asked to visit the experiment website and complete an online questionnaire. The questionnaire measured their product class knowledge (objective and subjective), product class familiarity, and perceived risk for computer mouse, calculator and wine product classes. Concurrently, their susceptibility to interpersonal influence, Internet usage and some demographic information were evaluated. After completing the online questionnaire, they were asked to provide their email address and were advised that they would be contacted in the following days for the second session.

Five days after the first session, subjects were sent an email with a hyperlink to the second session website. Once on the website, they were asked to logon to the second session by entering their email address. Following a brief introduction to the experiment website reminding them of the goal of the study (i.e., cover story), they were randomly assigned to one of three Maximo websites (seller, third party commercially linked to sellers, non-commercially linked third party). Once on the website, subjects were instructed to read a description of the company in order to clearly understand which of the three types of Website they were visiting. Subjects

were then advised that within the next few minutes they would be asked to shop on Maximo's website and select three products from three different product classes.

The first shopping task was used as a warm-up task. The goal of this first shopping task was to familiarize subjects with the structure and functionalities of Maximo's website. Subjects were shown four computer mice and were asked to choose one. They had the opportunity to evaluate mice based on their attributes and they were also randomly assigned to one of the five recommendation source treatment levels (other consumers – uniform recommendation, other consumers – non-uniform recommendation, human expert, recommender system, or no recommendation source). Hence, in addition to product attributes the majority of subjects could consult the product recommendation generated by one of the four recommendation sources. The remaining subjects were assigned to the control group condition (i.e., no recommendation source). Next, the recommendation source to which they had been assigned was described to subjects. Note that the same product was recommended by all recommendation sources (e.g., Logitech's Wheel Mouse Optical). For subjects assigned to the recommendation source treatment level "other consumers – non-uniform recommendation" a second product was also recommended (e.g., 44% of consumers chose Logitech's Wheel Mouse Optical and 43% the Microsoft's Intellimouse Optical). After this initial product evaluation, subjects were asked to choose one of the four mice presented.

The warm-up task was followed by a second online shopping task. Subjects were randomly assigned to a product class (i.e., calculator or wine) and shown four products from this product class. The product class was randomized in order to control for any order effect. The second shopping task essentially followed the same procedure as the first shopping task. They were exposed to the same recommendation source treatment level as in the warm-up shopping task. The product recommended by all recommendation sources was again the same. Following the second product choice, subjects were asked to complete a short questionnaire. Subjects who had

consulted a recommendation source were asked to complete a recommendation source credibility measurement scale.

Following this second shopping task, subjects were asked to perform the third and final shopping task on the same type of website. In this task subjects were exposed to four products of the remaining product class (i.e., calculator or wine). The third shopping task essentially followed the same procedure as the second shopping task. Subjects were exposed to the same recommendation source as that of previous shopping tasks. The only exception was that in order to heighten credibility, subjects exposed to the recommendation sources "other consumers" were exposed once to the uniform recommendation treatment level and once to the non-uniform recommendation treatment level in the second and third shopping tasks. Following their final product selection, subjects who consulted a product recommendation were again asked to evaluate the source's credibility according to a perceived credibility measurement scale. After having completed all three shopping tasks, subjects were asked to complete a final questionnaire in which they were prompted to guess the main objective of the experiment. They then accessed a debriefing page explaining the actual goal of the experiment and were logged out of the second session. The debriefing page explained the real goal of the experiment (i.e., influence of recommendation on product choices), reassured subjects about their chance to win one of the product they selected, indicated that the collected data would remain confidential, and that all researchers performing the study had signed a confidentiality agreement. Finally, subjects were provided the University Ethics Comity phone number in order for them to call if they had any questions or comments on the study.

To summarize, the experiment website automatically and randomly assigned subjects to one type of website and one recommendation source treatment level. In addition, after the warm-up task, if subjects were randomly assigned to one of the two product classes. For subjects assigned to the "other consumers" recommendation source treatment levels, the experiment website also automatically counterbalanced subjects'

exposure to uniform and non-uniform product recommendations between their last two shopping tasks. Once these various online randomizations were programmed and functional, manipulation checks were necessary to ensure that subjects perceived the differences between the various treatment levels. These online manipulation checks are discussed in the following section.

Online Manipulation Checks

A series of four pretests were necessary to achieve effective online manipulations. Each pretest was followed by iterations on manipulations (e.g., website descriptions), if necessary, to ensure their effectiveness. All manipulation checks were performed online.

The objective of the first pretest was to select three product classes for the experiment and to test the reliability and validity of measurement scales that would be used to measure non-manipulated independent variables. A convenience sample of 39 undergraduate and graduate students was used to perform this first pretest. In a laboratory setting subjects were asked to complete an online questionnaire. The objective of the second pretest was to perform qualitative manipulation checks for the three remaining independent variables to be manipulated during the experiment, namely the type of website, the type of recommendation source, and the information uniformity. For these manipulation checks, a convenience sample of 6 undergraduate students who had not participated in the first pretest were recruited. Again, the pretest was conducted in a laboratory setting. Subjects had to complete three tasks online: 1) Comment three different website descriptions, 2) Comment four different recommendation source / recommendation uniformity descriptions and 3) Complete an online questionnaire. For each task, a concurrent verbal protocol method was used. The objective of the third pretest was to perform quantitative manipulation checks for three independent variables manipulated during the experiment (type of website, recommendation source, and information uniformity) and to test the experiment

website functionalities. For this pretest, a convenience sample of 37 undergraduate and graduate students who did no participate in preceding pretests were recruited. In this pretest, subjects were asked to complete an online questionnaire and complete two online shopping tasks (wine and calculator) in a laboratory setting. The objective of the fourth pretest was to perform quantitative manipulation checks for all four independent variables manipulated during the experiment (type of website, recommendation source and information uniformity, and product type) and to test the experiment website functionalities. For this pretest, 33 consumers were recruited. Subjects were asked to complete an online questionnaire and to complete three online shopping tasks (computer mouse, wine, and calculator).

Product Manipulation

As mentioned, the objective of the first pretest was to select three product classes for the experiment. For each product class, subjects were asked whether products in the product class could either be evaluated: 1) Before purchase; 2) Mostly before purchase; 3) Mostly after purchase; 4) Only after purchase. The set of product classes to evaluate was composed of products with an average value of $45 (i.e., calculator, camping cooler, computer mouse, water filter system, wine bottle, 35mm camera). As Table II (page 38) reveals, the results of Pretest 1 indicate that the wine product class was perceived as the most "experience" product of the set (mean = 2.6) and that the calculator product class was perceived as the most "search" product (mean = 1.6). The computer mouse was found to be the most balanced product class (mean = 2.1). Consequently, the mouse product class was selected for the warm-up task.

Website Manipulation

The website treatment levels (seller, third party commercially linked to sellers, third party not commercially linked to sellers) were tested in Pretests 2, 3, and 4. In the

second pretest, subjects were sequentially exposed to the three website treatment levels (i.e., within-subject design) and in the third and fourth pretests, they were only exposed to one website treatment level (i.e., between-subject design). Qualitative results of Pretest 2 confirmed that subjects perceived differences between the three treatment levels. In Pretests 3 and 4, subjects were asked to identify on which type of website there were shopping after their initial online shopping task. They were told to select one of the following three descriptions: 1) "A retailer offering products on its website and competing with other retailers on the Internet" (seller description), 2) "An Internet buying group offering a comparison service for products offered by a limited number of Internet retailer partners" (third party commercially linked to sellers description), 3) "An independent organization offering a comparison service for products offered by all Internet retailers" (third party not commercially linked to sellers description). Although significant, results of Pretest 3 revealed that many subjects did not clearly perceive on which type of website they were shopping. For instance, when asked on which type of website they were while performing their shopping task, only 54% of subjects assigned to the "seller" type of website mentioned that they were on a "seller" website.

Table II – Manipulation Check Results

	Pretest 1	Pretest 2	Pretest 3	Pretest 4
Nature	Quantitative (Online questionnaire)	Qualitative (Concurrent Verbal Protocols)	Quantitative (Online questionnaire and two online shopping tasks on Maximo)	Quantitative (Online questionnaire and three online shopping tasks on Maximo)
N	39 students	6 students	37 students	33 consumers
Setting	Laboratory	Laboratory	Laboratory	Usual Internet Usage Location
Compensation	$15	$15	$15	One in three chance of winning one of their product selections ($45)
Manipulations checked	Product	Website Recommendation Source and Uniformity	Website Recommendation Source and Uniformity Website Functionality	Website Recommendation Source and Uniformity Website Functionality
Iteration	No	No	No	Website: Use of graphics, and additional webpage for the "seller" condition Recommendation Uniformity: Manipulation check question rephrased.
Results	Experience: Wine (M = 2.6) Search: Calculator (M = 1.6) Warm-up: Mouse (M = 2.1)	All three Websites and all four recommendation source treatment levels were perceived as different.	Website: Statistically effective but non-satisfactory Recommendation Source: Effective Recommendation Uniformity: Non-effective Website Functionality: No differences perceived by subjects between the different environments	Website: Effective Recommendation Source: Effective Recommendation Uniformity: Effective Website Functionality: No differences perceived by subjects between the different environments
Test Statistic	Wine vs. Calculator: $t(38) = -4.89^a$ Wine vs. Mouse: $t(38) = 1.99^b$ Calculator vs. Mouse : $t(38) = -3.13^a$	NA	Website: Seller vs . others: $X^2 (1) = 15.938^a$ 3rd party linked vs. others: $X^2 (1) = 16.968^a$ 3rd party independent vs. others: $X^2 (1) = 10.428^a$ Recommendation Source: Other consumers vs. others: $X^2 (1) = 13.537^a$ Human expert vs. others: $X^2 (1) = 33.481^a$ Recommender System vs. others: $X^2 (1) = 12.806^a$ Recommendation Uniformity: $X^2 (1) = 0.486$ Website Functionality: Different Websites (3): $F (2,35) = 1.191, p = 0.334$ Different Recommendation Source Treatment Levels (5): $F (4,35) = 1.286, p = 0.291$	Website: Seller vs . others: $X^2 (1) = 4.54^b$ 3rd party linked vs. others: $X^2 (1) = 8.42^a$ 3rd party independent vs. others: $X^2 (1) = 12.44^a$ Recommendation Source: Other consumers vs. others: $X^2 (1) = 16.62^a$ Human expert vs. others: $X^2 (1) = 15.50^a$ Recommender System vs. others: $X^2 (1) = 12.05^a$ Recommendation Uniformity: $X^2 (1) = 7.89^a$ Website Functionality: Different Websites (3): $F (2,31) = 0.68, p = 0.62$ Different Recommendation Source Treatment Levels (5): $F (4,31) = 0.36, p = 0.70$

Note: ^{a}: $p \leq 0.005$ b: $p \leq 0.05$

For the fourth pretest, two iterations were performed to better differentiate treatment levels: 1) In addition to the text description, graphics were used on the website description page (e.g., Maximo's logo) and 2) for the "seller" condition, an additional page illustrating the various store departments was added following the website description page. It is important to point out that a major difficulty in online experiments is to manipulate only the desired variables while keeping everything else constant. As shown in Figure 2 (page 39), the three Maximo websites are identical (i.e., colors, design) except for their descriptions (i.e., text). Again significant, the results of Pretest 4 indicated a more balanced situation between all three types of website manipulation. The majority of subjects exposed to each type of website matched the type of website they were shopping on with its description (64% for the "seller" website, 63% for the "third party commercially linked to sellers" website, and 69% for the "third party not commercially linked to sellers" type of website).

Figure 2 – Website Treatment Levels

Recommendation Source Manipulation

The four recommendation source treatment levels (other consumers, human experts, recommender system, no recommendation source) were tested in Pretests 2, 3, and 4. A within-subject approach was used for the second pretest, subjects were sequentially exposed to three recommendation source treatment levels (other consumers, human experts, recommender system). In the third and fourth pretests, they were only exposed to one of the four recommendation source treatment levels (i.e., between-subject design). The results of the second pretest confirmed that subjects perceived differences between the three recommendation sources. During Pretests 3 and 4, subjects who consulted a product recommendation were asked to identify, after each online shopping task, the type of recommendation source they consulted during their shopping task. They were instructed to select one of the following three descriptions: 1) "The recommendation proposed to me on Maximo's website originated from the information received from other consumers." (other consumers description); 2) "The recommendation proposed to me on Maximo's website originated from the advisers working for Maximo." (human experts description); 3) "The recommendation proposed to me on Maximos' website originated from information that I recently supplied while answering a questionnaire, that Maximo's computer system then used to formulate a personalized recommendation." (recommender system description). Most subjects clearly realized the recommendation source they were exposed to by correctly answering the manipulation check question. As illustrated in Table II (page 38), subjects exposed to a specific recommendation source (e.g., other consumers) mentioned that they were exposed to that specific recommendation source more often than to the other recommendation sources (e.g., human experts and recommender system).

Recommendation Uniformity Manipulation

The recommendation uniformity (other consumers – uniform recommendation and other consumers – non-uniform recommendation) manipulation was also tested in Pretests 2, 3, and 4. Again a within-subject approach was used in the second pretest and a between-subject design was used in the third and fourth pretests. The results of the second pretest confirmed that subjects perceived differences between the two recommendation uniformity conditions. In Pretests 3 and 4, subjects who consulted the recommendation source "other consumers" were also asked if the recommendation they received was uniform. The results of Pretest 3 clearly indicated a problem either with the manipulation of the uniformity or the clarity of the manipulation check question. Given the positive results obtained in the second pretest, we suspected a problem with the manipulation check question, which was thus rephrased for Pretest 4. The initial manipulation check question ("Among the products offered on the Maximo website, was there a product recommended by a clear majority of consumers?") was rephrased in order to more closely associate the question with the information format (i.e., percentages) seen during the online shopping experience ("Among the products offered on the Maximo website, was there a product recommended by more than 50% of consumers?"). The fourth pretest revealed that the recommendation uniformity manipulation was effective. Subjects exposed to a uniform recommendation mentioned significantly more often that the product recommendation was uniform than did subjects exposed to the non-uniform condition.

Website Functionality

In order to assess whether subjects perceived differences in the functionality of the three different types of websites or in the functionality of websites using different recommendation source treatment levels, subjects were asked to complete a website functionality measurement scale in Pretests 3 and 4. The 7-item measurement scale

was inspired by Abels, White, and Hahn (1997, 1999). As illustrated in Table II (page 38), no significant differences were found between the three types of websites or the five recommendation source treatment levels.

During the four pretests manipulation checks for all independent variables to be manipulated during the experiment (product type, type of websites, types of recommendation sources, and recommendation uniformity) were performed, and results showed that manipulations were all successful. In addition, website functionalities for all types of websites and recommendation source treatments levels did not indicate any significant differences.

Online Measurement Scales

Measurement scales of independent variables not manipulated during the experiment were also tested online. The main objective of these pretests was to ensure that all measurement scales had satisfactory psychometric properties despite the online environment. The results of these tests are reported in Table III (page 43).

In general, the pretest results show that measurement scales developed in an offline environment (i.e., paper-pencil questionnaire) have similar psychometric properties when used in an online environment. Moreover, subjects did not perceive any major difficulties in understanding or completing measurement scales in an online environment. However, it should be noted that a particular effort was made to ensure that the online measurement scales were well presented (e.g., titles, alignment, multiple pages instead of long scroll down pages) and easy to complete (scroll-down menus, radio buttons, etc.).

Table III – Independent Variables Measurement Scales Properties [c,d]

Variable	Scale Origin	Type	Items / Dimensions	Original psychometric characteristics		Pretests		Experiment	
				Reliability coefficients	Validity	Reliability coefficients	Exploratory Factor Analysis	Reliability coefficients	Exploratory Factor Analysis
Subjective Knowledge	Flynn and Goldsmith (1999)	Likert	5 items / 1 dimension	0.87 – 0.94	Convergent Discriminant	0.85	1 factor (63% of the variance explained)	0.88 – 0.92	1 factor (67% -75% of the variance explained)
Product Class Familiarity	Park, Mothersbaugh ,and Feick (1994)	Likert	3 items / 1 dimension	0.87	NA	0.65	1 factor (59% of the variance explained)	0.79 – 0.85[a]	1 factor (72% -78% of the variance explained)
Susceptibility to Interpersonal Influence	Bearden, Netemeyer, and Teel (1989)	Likert	8 items for normative 4 items for informational	Normative: 0.87 – 0.88 Informational: 0.82 – 0.83	Construct	Normative: 0.86 Informa-tional: 0.63	2 factors (56% of the variance explained)	Normative: 0.87 Informa-tional: 0.84[b]	2 factors (57% of the variance explained)
Information Source Credibility	Ohanian (1990)	Semantic differential	5 items for expertise 5 items for trustworthiness	Expertise: 0.89 Trustworthi-ness: 0.90	Convergent Discriminant Nomological	Expertise: 0.91 Trustworthi-ness: 0.84	2 factors (74% - 76% of the variance explained)	Expertise: 0.88 – 0.89 Trustworthi-ness: 0.84 – 0.88	2 factors (70% - 73% of the variance explained)

Notes: [a] In the pretests, two items were added to increase the reliability of the scale. This addition generated a two-factor structure. Only the most important factor (3 items) was retained for the experiment.
[b] In the pretests, two items were added to increase the informational dimension reliability. In addition, one original informational item was deleted because it loaded on both dimensions in the exploratory factor analysis.
[c] Objective Product Class measurement scales were specifically developed for this study, thus no comparisons with existing scales could be illustrated in the above figure.
[d] No psychometric data are available for the perceived risk measures since only one item was used to measure each dimension.

Sampling

The study participants were all Internet users and recruited by email from three different sampling frames. First, 25,742 emails were sent to a panel of consumers by a specialized firm. Because of the low response rate obtained from this sampling frame, two additional sampling frames were used to attain a minimum of 450 subjects. Thus, 490 emails were sent to an e-commerce research center panel of consumers and 2,625 emails were sent to a list of business undergraduates. All contacted subjects received an email stating that two researchers from a large business school were conducting a study on electronic commerce and that participants had a one in three chance of wining the product selected. Table IV (page 44) presents the various response rates of these sampling frames.

Table IV – Experiment Participation Statistics by Sampling Frame

	Consumer Panel	E-commerce Panel	Undergraduates
Emails sent	25 742	490	2625
Emails opened	6952	NA	NA
Hyperlink clicked (Click Through Rate)	536 (2.1%)		
Completed Session 1 (Response Rate)	220 (0.9%)	79 (16.1%)	252 (9.6%)
Completed Sessions 1 and 2 (Response Rate)	174 (0.6%)	59 (12.0%)	203 (7.7%)
Response time (From reception of Session 1 invitation email to completion of Session 2)	8 days	6 days	6 days

Note: 1) 52 subjects who participated in both sessions could not be retraced to their sampling frame since they used an email address that differed from the original email lists.
2) All sampling frames were subjected to a 5-day delay between the transmission of the first and second sessions invitation emails.

Overall, 630 subjects participated in the first session and 488 subjects participated in both sessions. Subjects took an average of 6 to 8 days to complete both sessions of the experiment, which includes a 5-day delay between Sessions 1 and 2 email invitations. This quick response time is similar to online email survey response time, which varies from 4 to 10 days (for reviews, see Bachmann, Elfrink, and Vazzana, 2000; Cobanoglu, Warde, and Moreo, 2001; Dommeyer and Moriarty, 2000; Sheehan and McMillan, 1999). Participants from the three sampling frames were similar when it came to their gender, age group, and education level (Table V, page 45). The consumer panel was mainly composed of full-time workers. The E-commerce and undergraduate sampling frames were mainly composed of students.

Table V – Demographic Differences Among Sampling Frames

	Consumer Panel	E-commerce Panel	Undergraduates
Central tendency statistic	Mode	Mode	Mode
Gender	Male (54%)	Male (54%)	Female (54%)
Age	18-29 (64%)	18-29 (95%)	18-29 (97%)
Highest Education Level	University without degree (33%)	University degree (49%)	University without degree (70%)
Situation	Full-time worker (72%)	Full-time student (51%)	Full-time student and part-time worker (33%)
Income	$25 000 – $34 999 (28%)	< $15 000 (53%)	< $15 000 (56%)

The mortality rate between experiment sessions ranged from 19% to 25% depending on the email list. As illustrated in Table IV (page 44), the participation rates ranged from 0.6% to 12% depending on the email list used to recruit subjects. The average click-through rate for the permission marketing industry was 4.8% in 2000 (Opt-in News, 2001). However, based on the foreseen surge in permission email volume (from 64 billion emails to 159 billion) between 2000 and 2002 (Jackson, 2001), a click-through rate of 2.1% seems acceptable. Participation rates obtained from the two other email lists are in the low end of the response rates continuum obtained in various academic email surveys (for reviews, see Cobanoglu, Warde, and Moreo, 2001; Cook, Heath and Thompson, 2000; Sheehan and McMillan, 1999). High response rates observed in various studies have been attributed to the nature of the samples (e.g., Internet users vs. employees), along with the salience of the survey topic to potential participants, and the nature and amount of contact with participants (Cook, Heath, and Thompson, 2000; Sheehan and McMillan, 1999). In accordance with results obtained by Sheeman and McMillan (1999), in the present study response rates appear to vary based on the salience of the experiment topic to participants. The experiment was presented to potential participants as a study of electronic commerce. Thus, it seems logical that the highest response rate originated from members of an ecommerce panel and business undergraduates and the lowest from typical consumers.

Some differences between samples were also observed regarding the dependent variables, namely frequency of consulting or following product recommendations (Table VI, page 46). For the calculator product class, subjects from the consumer panel consulted the product recommendation less frequently than undergraduates (X^2 (1) = 4.967, $p < 0.05$) and subjects from the e-commerce panel (X^2 (1) = 7.246, $p < 0.05$). In addition, undergraduates followed the calculator recommendation less frequently than subjects for the consumer panel (X^2 (1) = 8.382, $p < 0.05$). For the wine product class, undergraduates consulted the product recommendation significantly more frequently than did subjects from the consumer (X^2 (1) = 4.038, $p < 0.05$) and e-commerce (X^2 (1) = 3.979, $p < 0.05$) panels.

Table VI – Comparison of Results Among Sampling Frames

Dependent Variable	Product	Consumer Panel	E-commerce Panel	Undergraduates
Subjects who consulted the product recommendation (data from all subjects except control group)	Mouse	69%	83%	75%
	Calculator	**60%**	**83%**	**72%**
	Wine	**66%**	**61%**	**76%**
Subjects who followed the product recommendation (data from all subjects who consulted the recommendation)	Mouse	62%	68%	55%
	Calculator	**41%**	38%	**22%**
	Wine	45%	52%	57%

To summarize, the study participants originated from three different sampling frames. One sampling frame consisted of consumers, one of people interested in electronic commerce, and one of business undergraduates. These sampling frames exhibited similar response times but markedly different response rates. These differences are believed to be mainly due to participants' varying interest in the study topic and the relative fit between the email lists and the study topic. In addition, subjects within the various sampling frames exhibited different online behaviors with respect to the dependent variables.

Discussion and Conclusion

To summarize, this paper illustrated the way in which experiments can be developed and validated online. A 3 (three different website treatment levels) X 5 (five recommendation source treatment levels) X 2 (two product type treatment levels) factorial design was used as an example of an online experiment. This experiment was conducted in two online sessions. The first session consisted in an online questionnaire. The second session entailed randomly exposing subjects to one type of website, one recommendation source treatment level and two product types. In order to test the experiment website, to ensure successful manipulation of these experimental factors, and to test measurement scales, four online pretests were conducted prior to the experiment.

The setup and management of online experiments differ from that of offline experiments. Online experiments do not necessarily require a longer setup time, but they require specialized computer programming skills. Even if some work can be performed with little training (e.g., online questionnaire), most of the work related to the online experiment necessitates specialized programming skills (e.g., random assignment). Such skills are also needed to develop, in an iterative fashion (i.e., pretests), an experimental website where online environments are identical in every respect apart from the different experiment factor treatment levels. As seen, many iterations may be necessary to achieve effective manipulations while keeping everything else constant.

The data collection process is another major difference between offline and online experimentation. First, conducting the online experiment outside of a laboratory setting may increase subject participation levels since subjects need not go to a laboratory at a specific time. They can thus decide when and where they will participate (e.g., from home at 11pm). Moreover, the fact that a large number of subjects can participate in the experiment simultaneously increases the data collection speed or the sample size. Furthermore, when the experiment is performed

online and outside a laboratory, the number of participants is not limited by physical constraints (e.g., laboratory space and availability). It should also be noted that in online experiments, human error related to the collection of quantitative data is minimized since the data are automatically transferred to a database without any human intervention.

Furthermore, having subjects perform the experiment in their usual Internet usage location may generate additional advantages. For instance, studies similar to that illustrated in this essay benefit from the fact that subjects performed the experiment in their natural setting; a typical online shopping environment was thus reproduced. As Kerlinger and Lee (2000) argue, difference between experiments and field experiments thus becomes a matter of degree. In the present study, we tried to maximize the external validity of the experiment (e.g., subjects performed the experiment in their usual online shopping environment) without jeopardizing the level of control proper to laboratory experiments (e.g., random assignment of subjects, variable manipulation). In addition, Nosek, Banaji, and Greenwald (2002) assert that having subjects participate from any location may also be a useful methodology for studies whose sample population cannot be easily brought to a laboratory (e.g., managers).

The fact that subjects may perform the online experiment outside a laboratory setting implies one additional important characteristic: the absence of an experimenter; which has a number of positive and negative implications. On the positive side, this approach minimizes the experimenter bias by eliminating a major source of coercion and by providing exactly the same instructions to all subjects (Nosek, Banaji, and Greenwald, 2002). On the negative side, the absence of an experimenter may hinder the debriefing of subjects. For instance, a subject that does not complete the online experiment may not reach the debriefing page. Thus, as in the present study and as suggested by Nosek, Banaji, and Greenwald (2002), it is important for subjects or experimenters to have other means of communication to ensure a proper debriefing (e.g., phone number, email address of the experimenter, leave-the-study button, etc.).

The absence of an experimenter during the online experiment increases the possibility of subjects' misunderstanding parts of the experiment such as the cover story and task instructions (Nosek, Banaji, and Greenwald, 2002). Thus, qualitative pretests and laboratory pretests become very important to ensure that subjects comprehend the context and the objective of the experiment and what they are asked to do.

The internal validity of online experiments conducted outside a laboratory setting may be jeopardized by uncontrollable factors. Since subjects are not in a controlled environment, they may be disturbed by a number of extraneous factors (e.g., other people, music, etc.) which will introduce greater variability between the participants' states than a laboratory experiment. Nosek, Banaji, and Greenwald (2002) suggest a number of means of minimizing this risk: 1) submit a list of requirements to subjects before they start performing the experiment (e.g., quiet environment); 2) at the end of the experiment, ask subjects to list the various distractions they were exposed to during the experiment; 3) and/or as in the present study, have subjects complete a warm-up task in order to stimulate their involvement in and focus on the task. Additional characteristics may also contribute to the variability of states between subjects. For instance, subjects' Internet connection speed or the way they use their browser buttons (e.g., Back button) to navigate through the experiment website may affect their states. McGraw, Tew, and Williams (2000) advocate the use of a preloading strategy to eliminate the connection speed issue. By having the entire online experiment loaded on subjects' computers before being able to participate resolves this problem. In order to address the browser button issue, in the present study, when subjects hit the "Back" button of their browser during a shopping task, an error message appeared on the screen and automatically redirected them to the page they were on before hitting the "Back" button. Thus, they were "forced" to use buttons available on the various webpages instead of their browser's navigation buttons. McGraw, Tew, and Williams (2000) have devised alternative solutions to this problem such as having subjects perform the experiment in a separate window where no browser navigational buttons are available. Hence, in order to maximize the

internal validity of online experiments not conducted in a laboratory setting, many issues must be addressed, some of which pose a challenge for researchers. However, it has to be noted that results obtained in various online environments match laboratory setting results in most of the online psychology studies performed to date (McGraw, Tew, and Williams, 2000; Krantz and Dalal, 2000; Musch and Reips, 2000).

In online experiments, as in any study, it is crucial to meticulously choose appropriate sampling frames for at least two reasons. First, as illustrated, the selection of the sampling frame has a large impact on the response rate. Thus, it is important to assess the level of fit between the recruitment email lists and the study topic (i.e., quality of the list) in order to predict the response rate and thus the number of invitation emails to send. Second, sample frame selection is important for external validity purposes. For instance, in the present study, differences between the three sampling frames were observed in their use and propensity to follow online product recommendations. In certain cases, researchers must choose between sampling frames ensuring high external validity (i.e., consumer panel) and those providing a high response rate (i.e., undergraduates). Alternately, they may opt for a compromise solution (i.e., e-commerce panel) that ensures a high response rate without undermining the external validity of the study.

In conclusion, this paper attempted to illustrate the way in which an experiment could be developed in an online environment to investigate specific marketing research problems. Although only a limited number of studies have used online experiments to date to investigate marketing related research topics and despite the fact that a number of issues arise when online experiments are performed in non-laboratory settings, online experiments appear to be promising and effective means of conducting research.

CHAPITRE 4

"The Influence of Online Product Recommendations on Consumers' Online Choices"

Abstract

This study investigates consumers' usage of online recommendation sources and their influence on online product choices. A 3 (websites) X 5 (recommendation sources and recommendation types) X 2 (products) online experiment was conducted with 488 subjects. Results indicate that subjects who consulted product recommendations selected recommended products twice as often as subjects who did not consult recommendations. Although perceived as possessing less expertise than human experts and as being significantly less trustworthy than other consumers, the online recommendation source "recommender system" was more influential than the recommendation sources "other consumers" and "human experts". The type of product (search or experience) had no influence on subjects' propensity to consult product recommendations but it had a significant influence on their propensity to follow product recommendations. Finally, the type of website had no influence on subjects' propensity to consult or follow a product recommendation and did not affect the perceived credibility of recommendation sources. Theoretical and managerial implications of these findings are provided.

Introduction

In recent years, the Internet has become a major source of information for consumers. To influence consumers' online external search efforts, many websites use recommendation sources to suggest specific products to consumers.

Recommendation sources range from traditional sources such as other consumers (e.g., testimonies of readers on retail websites such as Amazon.com) to personalized recommendations provided by recommender systems (Ansari, Essegaier, and Kohli, 2000; Häubl and Trifts, 2000; Maes, 1999; Urban, Sultan, and Qualls, 1999). To date, no study has specifically investigated and compared the relative influence of these online recommendation sources on consumers' product choices. Therefore, the main objective of this study is to investigate the influence of online product recommendations on consumers' online product choices. In addition, we explore the moderating influence of variables related to recommendation sources and the purchase decision.

Literature Review

Influence of Recommendation Consultation on Product Selection

Research on the use and influence of recommendations on consumers has typically been subsumed under personal influence or word-of-mouth (WOM) research. However, as noted by Rosen and Olshavsky (1987b), research on opinion leadership and reference groups is also related to the study of recommendations and to influence in general. Recommendation sources are considered primarily as information sources. Andreasen (1968) proposes the following typology of information sources: 1) Impersonal Advocate (e.g., mass media), 2) Impersonal Independent (e.g., *Consumer Reports*), 3) Personal Advocate (e.g., sales clerks), and 4) Personal Independent (e.g., friends). Although research on personal influence and WOM focuses on the latter two information sources, it is noteworthy that impersonal independent information sources such as *Consumer Reports* can also serve as recommendation sources. Moreover, the Internet can provide consumers with an additional type of impersonal information source. For instance, electronic decision-making aids such as recommender systems are impersonal information sources that provide personalized information to consumers (Alba *et al*., 1997; Ansari, Essegaier,

and Kohli, 2000; Häubl and Trifts, 2000; Maes, 1999, Urban, Sultan, and Qualls, 1999). In an effort to extend Andreasen's (1968) typology to computer-mediated environments, we assert that information sources can be sorted into one of four groups: 1) Personal source providing personalized information (e.g., "My sister says that this product is best for me."); 2) Personal source providing non-personalized information (e.g., "A renowned expert says that this product is the best."); 3) Impersonal source providing personalized information (e.g., "Based on my profile, the recommender system suggests this product."); 4) Impersonal source providing non-personalized information (e.g., "According to *Consumer Reports,* this is the best product on the market."). In consumer research, studies on personal influence, social influence, or WOM, can be categorized as studies investigating personal sources providing personalized or non-personalized information. Furthermore, studies dealing with reference groups encompass such sources as well as impersonal sources that provide non-personalized information. Thus, a new area has emerged in consumer research, arising mainly from information technologies such as the Internet: that of impersonal sources that provide personalized information.

Research on personal influence suggests that personal information sources influence consumers' decision-making (Ardnt, 1967; Brown and Reingen, 1987; Duhan et al., 1997; Gilly et al., 1998; Olshavsky and Granbois, 1979; Price and Feick, 1984; Rosen and Olshavsky, 1987a; Still, Barnes, and Kooyman, 1984). For instance, Still, Barnes, and Kooyman (1984) suggest that WOM has a greater positive effect than mass media on movie attendance. We postulate that personal information sources as well as impersonal information sources that provide personalized information will influence consumers in computer-mediated environments such as the Internet and the World Wide Web. We thus formulate the following general hypothesis.

Hypothesis 1

The propensity of choosing a given product is greater for consumers exposed to an online information source recommending that product than for consumers not exposed to that recommendation.

Determinants of Recommendation Consultation

Prior research has shown that the type of product affects consumers' use of personal information sources and their influence on consumers' choices (Bearden and Etzel, 1982; Childers and Rao, 1992; King and Balasubramanian, 1994). Nelson (1970) suggests that goods can be classified as possessing either search or experience qualities. Search qualities are those that "the consumer can determine by inspection prior to purchase" and experience qualities are those that "are not determined prior to purchase" (Nelson, 1974, p. 730). King and Balasubramanian (1994) found that consumers assessing a search product (e.g., a 35mm camera) were more likely to use own-based decision-making processes than consumers assessing an experience product, and that consumers evaluating an experience product (e.g., a film-processing service) relied more on other-based and hybrid decision-making processes than consumers assessing a search product. Thus, the following hypothesis is posited.

Hypothesis 2

The consultation of product recommendations is more frequent for experience products than for search products.

Based on the website classifications proposed by Hoffman, Novak, and Chatterjee (1995) and Spiller and Lohse (1998), Senecal and Nantel (2001) suggest that recommendation sources can be used and promoted by three different types of websites: sellers (e.g., retailer or manufacturer websites such as Amazon.com), commercially linked third parties (e.g., comparison shopping websites such as MySimon.com), and non-commercially linked third parties (e.g., product or merchant

assessment websites such as Consumerreports.org). More independent Websites such as non-commercially linked third parties that facilitate consumers' external search effort by decreasing search costs should be preferred by consumers (Alba *et al., 199*7; Bakos, 1997; Lynch and Ariely, 2000). For instance, Lynch and Ariely (2000) found that consumer' satisfaction, retention, and enjoyment increased when shopping on websites with low search cost functionalities (e.g., comparison across online stores). By providing more alternatives to choose from and more objective information, independent websites should be perceived as more useful by consumers. Consequently consumers should consult product recommendations in a greater proportion when shopping on more independent than on less independent websites.

Hypothesis 3

Consumers are more likely to consult online recommendations on "non-commercially linked third party" websites than on "commercially linked third party" websites, and more likely to consult online recommendations on the latter websites than on "seller" types of websites.

Determinants of Recommendation Influence

In addition to influencing consumers' propensity to consult an online product recommendation, the type of product and the type of website should also impact on consumers' propensity to follow an online product recommendation. Based on prior research on the relationship between product type and personal information source influence (Bearden and Etzel, 1982; Childers and Rao, 1992; King and Balasubramanian, 1994), we put forward the following hypothesis.

Hypothesis 4

Once consulted, online product recommendations of experience products are more likely to be followed by consumers than online product recommendations for search products.

Based on Alba *et al.* (1997), Bakos (1997) and Lynch and Ariely (2000), we propose that online product recommendations from an independent third party website are more influential than those from a commercially linked third party website. In turn, we propose that online product recommendations from a commercially linked third party website are more influential than those from a seller website. In addition, prior research on attribution theory suggests that consumers discredit recommendations from endorsers if they suspect that the latter have incentives to recommend a product (for reviews, refer to Folkes, 1988; Mizerski, Golden, and Kernan, 1979). According to the discounting principle of attribution theory (Kelley, 1973), which predicates that a communicator will be perceived as biased if the recipient can infer that the message can be attributed to personal or situational causes, consumers should attribute more non-product related motivations (e.g., commissions on sales) to recommendation sources that are promoted by commercially linked third parties and sellers than independent third party websites. We therefore put forth the following hypothesis.

Hypothesis 5

Once consulted, online product recommendations consulted on "non-commercially linked third party" websites have a greater impact on consumers than if consulted on "commercially linked third party" websites, and online product recommendation consulted on the latter type of websites have a greater impact on consumers than if consulted on "seller" websites.

In light of research on consumers' use of relevant others in their pre-purchase external search efforts (Olshavsky and Granbois, 1979; Price and Fieck, 1984; Rosen and Olshavsky, 1987b) and in consideration of the emergence of online information

sources providing personalized recommendations (Ansari, Essegaier, and Kohli, 2000; Häubl and Trifts, 2000; Maes, 1999; Urban, Sultan, and Qualls, 1999), Senecal and Nantel (2001) assert that online recommendation sources can be sorted into three broad categories: 1) other consumers (e.g., relatives, friends, and acquaintances), 2) human experts (e.g., salespersons, independent experts), and 3) expert systems such as recommender systems. We posit that these online recommendation sources will have different levels of influence on consumers' online product selection. Brown and Reingen (1987) suggest that information received from sources that have some personal knowledge about the consumer (i.e., strong-tie source) have more influence on the latter than sources that have no personal knowledge about the consumer (i.e., weak-tie source). Thus, a recommendation source providing personalized information to consumers (e.g., a recommender system) should be more influential than a recommendation source providing non-personalized information (e.g., other consumers).

Hypothesis 6

Once consulted, product recommendations from information sources offering personalized recommendations (e.g., recommender system) have a greater influence on consumers than recommendations from information sources providing non-personalized recommendations.

In their review of social influence, Cialdini and Trost (1998) argue that descriptive norms influence what people do in novel, ambiguous, or uncertain situations. In these situations, people observe what others do and act accordingly to reach decisions effectively (Cialdini and Trost, 1998). Furthermore, the authors conclude that in a given situation, others may provide consensus information that will be perceived as correct (Cialdini and Trost, 1998). Miller and Prentice (1996) suggest that uniformity is a necessary condition for a group to establish a behavior its norm. Again, attribution theory provides an interesting explanation for this phenomenon. Kelley's (1967) attribution model specifies that in high-consensus situations (e.g., most

consumers chose product A), people tend to attribute the causation to entities (e.g., product A), whereas in low-consensus situations (e.g., a minority of consumers chose product A), people tend to attribute the causation to persons (e.g., specific preferences of this small group of consumers). In support of this view, d'Astous and Touil (1999) found that consumers' evaluations of a new movie are more likely to follow a critic's judgment (favorable or unfavorable) when it is in agreement with other critics' judgments. Thus, we postulate that if a product is recommended by a clear majority of group members (e.g., a group of consumers), consumers will follow the recommendation in a greater proportion than if the product is not recommended by a majority of group members.

Hypothesis 7

There is a positive relationship between the uniformity of an online reference group's (i.e., other consumers) recommendation and its influence on consumers' product choice.

Kelman (1961) affirms that credibility is a product of expertise and trustworthiness. Expertise can be viewed as the perceived ability of an information source to know the right answer and trustworthiness as the perceived information source's motivation to communicate this expertise without bias (McGuire, 1969). Although moderated by contextual factors (for a review, refer to Sternthal, Phillips, and Dholakia, 1978), source expertise and trustworthiness have been found to be positively correlated with consumers' attitude toward the brand, behavioral intentions, and behaviors (Gilly *et al*., 1998; Harmon and Coney, 1982; Hovland and Weiss, 1951; Johnson, Torcivia, and Poprick, 1968; Lafferty and Goldsmith, 1999; Lascu, Bearden, and Rose, 1995; Moore, Hausknecht, and Thamodaran, 1986; Price and Feick, 1984; Schulman and Worrall, 1970; Tybout, 1978; Wiener and Mowen, 1986). Consequently, we anticipate that both dimensions of a source credibility will have a positive influence on consumers' propensity to follow a product recommendation.

Hypothesis 8

H8a: There is a positive relationship between consumers' perceived trust in an online recommendation source and their likelihood of choosing a recommended product.

H8b: There is a positive relationship between consumers' perceived expertise of an online recommendation source and their likelihood of choosing a recommended product.

In addition, we predict that in addition to acting as a determinant of recommendation influence, source credibility will be influenced by the type of recommendation source as well as the type of website consumers visit. First, we predicate that the recommendation source "other consumers" will be perceived as less expert than "human experts" and "recommender systems" recommendation sources. However, again based on the discounting principle of attribution theory (Kelley, 1967), the recommendation source "other consumers" should be perceived as more trustworthy than human experts and recommender systems. The latter two recommendation sources are more susceptible to non-product related attributions. Second, since consumers may also attribute non-product related motivations more easily to recommendation sources promoted by websites that are not clearly independent, we predict that the type of website will have an impact on the perception of the recommendation source's trustworthiness. For instance, a human expert who recommends a product on a seller Website may be perceived by consumers as less trustworthy than if he recommended the same product on an independent third party website. Thus, the following hypotheses are posited.

Hypothesis 9

H9a: The online recommendation sources "human experts" and "recommender system" will be perceived as possessing more expertise than the online recommendation source "other consumers."

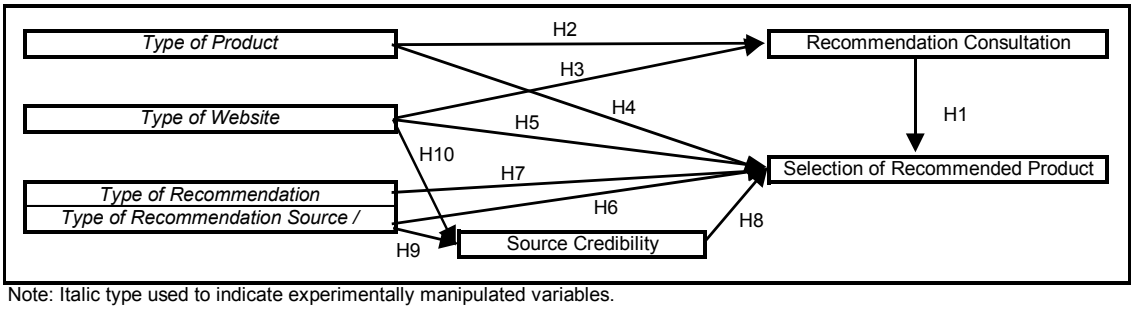
H9b: The online recommendation sources "human experts" and "recommender system" will be perceived as less trustworthy than the online recommendation source "other consumers."

Hypothesis 10

Consumers' trust in the recommendation source will be greater when shopping on a "non-commercially linked third party" type of website than on a "commercially linked third party" type of website, which in turn will be perceived as more trustworthy than the "seller" type of website.

In summary and as depicted in Figure 1 (page 61), we suggest that two variables will moderate consumers' propensity to consult and follow online product recommendations: type of product (i.e., evaluation possible mainly before or after purchase) and the type of website (e.g., retailer vs. *Consumer Reports* website). Three additional variables are believed to moderate the influence of an online product recommendation: consultation of the recommendation, type of recommendation (i.e., uniform vs. non-uniform), and type of recommendation source (e.g., other consumers vs. experts). Moreover, we contend that the credibility of the recommendation source will act as a mediator between the online recommendation influence and the type of website as well as between the online recommendation influence and the type of recommendation source.

Figure 1 – Conceptual Framework



Note: Italic type used to indicate experimentally manipulated variables.

Method

Sample

All study participants were Internet users and recruited by email from three different sampling frames. First, a specialized firm sent 25,742 emails to a panel of consumers. Because this initial recruitment yielded a low response rate, two additional samples were used. Accordingly, 490 emails were sent to an e-commerce research center panel of consumers and 2,625 emails were sent to a list of business undergraduates. The email stated that two researchers from a large business school were conducting a study on electronic commerce and that participants had a one in three chance of wining a product of their choice. They were told that they would be asked to participate in two sessions in order to complete the experiment. Overall, 630 subjects participated in the first session and 488 subjects participated in both sessions. Subjects took an average of 6 to 8 days to complete both sessions of the online experiment, which included a 5-day delay between email invitations of sessions 1 and 2. Of the 488 participants, 174 were from the specialized firm list (response rate: 0.6%), 59 originated from the e-commerce research center list (response rate: 12.0%), 203 were from the undergraduate list (response rate: 7.7%), and 52 could not be traced since they used a different email address than the ones on the lists. Subjects

participated in both sessions of the study from the location where they usually use the Internet.

The majority of subjects were between the ages of 18 and 29 years (84%). Fifty percent were female, one third were working full time (31%), 26% of subjects were full-time students, and another 31% were part-time workers and students. On average, subjects had been using the Internet for 4.5 years and currently used it about 18 hours per week. They usually accessed the Internet from home (65%), from school (21%), and from the office (13%). The most frequently cited primary reasons for using the Internet were to communicate with others (44%) and to search for work- or school-related information (34%).

Procedure

Experiment Overview

In the first session of the experiment subjects were simply asked to complete an online questionnaire. In the second session, subjects were asked to perform online shopping tasks on a specific website. During that second session a 3 x 5 x 2 online experiment was conducted. The first between-subject factor was the website manipulation. Subjects were assigned to one of three following types of websites: seller, third party commercially linked to sellers or non-commercially linked third party. The second between-subject factor manipulated the type and source of recommendations. Subjects were assigned to one of the five following conditions: other consumers – uniform recommendation, other consumers – non-uniform recommendation, human experts, recommender system or no recommendation source. Finally, the last factor, a within-subject factor, was the product manipulation. During their first online shopping task, subjects were assigned to either a search or experience product and they were assigned to the remaining product type for their second shopping task.

Experiment Description

To motivate subjects to participate without mentioning the precise goal of the experiment (i.e., the influence of recommendation on product choice), a cover story was used. Subjects were told that a two-session experiment was being conducted to assess the commercial potential of various products that a foreign company (Maximo) was interested in introducing to local markets via their website. In addition, participants were informed that they would be asked in the second session of the experiment to select three products and that they had a one in three chance of winning one of the products selected. Subjects were informed that the average product value was $45. The first session questionnaire measured their knowledge and familiarity with the computer mouse, calculator and wine product classes, their Internet usage, and some demographics. At the end of the questionnaire, subjects were asked to provide their email address and were advised that they would be contacted in the following days for the second session. Two sessions were used in order to minimize the number of measures in the second session. It increased the realism of shopping tasks of the second session.

Five days after the first session, subjects were sent an email providing a hyperlink to the second session website. Once on the website, they were asked to logon to the second session by entering their email address. Following a brief introduction to the experimental website to remind them of the goal of the study (i.e., cover story), they were randomly assigned to one of three Maximo websites (seller, third party commercially linked to sellers, or non-commercially linked third party). Once on the website, subjects were instructed to read a description of the company to clearly understand which of the three types of websites they were visiting. Note that all three Maximo websites used in the experiment were graphically identical except for their description page (See Figure 2, page 64). Subjects were then advised that within the next few minutes they would be asked to shop on Maximo's Website and select three products from three different product classes.

Figure 2 – Website Treatment Levels

As recommended by Nosek, Banaji, and Greenwald (2002), the first online shopping task was a warm-up task. The goal of this first shopping task was to familiarize subjects with the structure and functionalities of Maximo's website. Subjects were shown four computer mice and asked to choose one. They were able to evaluate mice based on their attributes and they were also randomly assigned to one of the five recommendation source and type treatment levels (other consumers – uniform recommendation, other consumers – non-uniform recommendation, human experts, recommender system, or no recommendation source). Hence, in addition to product attributes, most subjects had the opportunity to consult a recommendation page.

Subjects were free to consult or not the recommendation page (i.e., Click or not on the "Our recommendation" button). Remaining subjects were assigned to the control group condition (i.e., no recommendation source). On the recommendation page, the recommendation source (e.g., human experts) was described to the subject and it recommended one of four products within the product class. Note that the same product was recommended by all recommendation sources (e.g., Logitech's Wheel Mouse Optical). For subjects assigned to the recommendation source treatment level "other consumers – non-uniform recommendation," a second product was also recommended (e.g., 40% of consumers chose Logitech's Wheel Mouse Optical and 39% the Microsoft Intellimouse Optical). After this initial product assessment, subjects were asked to choose one of the four mice presented.

The warm-up task was followed by a second online shopping task. Subjects were randomly assigned to a product class (i.e., calculator or wine). Product classes were randomized to control for any order effect. The second shopping task essentially followed the same procedure as the first shopping task. Subjects were asked to select one product out of four within the product class. If they elected to consult the recommendation page, they were exposed to the same recommendation source treatment level as in the warm-up shopping task (e.g., human experts). The product recommended by all recommendation sources was again the same. Again, under the recommendation source treatment level "other consumers – non-uniform recommendation," a second product was almost equally recommended. Following the second product choice, subjects were asked to complete a short questionnaire that measured their product choice confidence and the reasons for their choice (e.g., quality, price, brand, recommendation). In addition, subjects who had consulted the recommendation page (i.e., subjects who clicked on the "Our recommendation" button) were asked to complete a recommendation source credibility measurement scale.

Following this second shopping task, subjects were asked to perform the third and final shopping task. As part of this task, subjects were exposed to four products of the

remaining product class (i.e., calculator or wine). The third shopping task essentially followed the same procedure as the second shopping task. Subjects were exposed to the same recommendation source as that of previous shopping tasks. The only exception was that in order to heighten credibility, subjects exposed to the recommendation sources "other consumers" were exposed once to the uniform recommendation treatment level and once to the non-uniform recommendation treatment level in the second and third shopping tasks. Following their final product selection, subjects who consulted the recommendation page were again asked to evaluate the recommendation source's credibility. Again, all subjects were asked to assess their choice confidence and the reasons for selecting a specific product. After having completed all three shopping tasks, subjects were asked to complete a short final questionnaire in which they were prompted to guess the main objective of the experiment. They then accessed a debriefing page explaining the actual goal of the experiment and were logged out of the second session. The debriefing page explained the real goal of the experiment (i.e., influence of recommendations on product choices), reassured subjects about their chance to win one of the product they selected, indicated that the collected data would remain confidential, and that all researchers performing the study had signed a confidentiality agreement. Finally, subjects were provided the University Ethics Comity phone number in order for them to call if they had any questions or comments on the study.

The Website Treatment

Subjects were assigned to one of the three following website treatment levels. The seller treatment level was operationalized by exposing subjects to an e-tailer's description:

> "Maximo is a large European store selling products on the Internet. It is currently assessing the feasibility of offering new products on its website to consumers in your area. Therefore, it is very interested in learning your product preferences. In the region, Maximo competes with The Bay, Staples and Wal-Mart, which also offer their products on the Internet."

The third party commercially linked to sellers website was described as a website acting as a buying group linked to specific e-tailers:

> "Maximo is a large European buying group. It is currently assessing the feasibility of offering new products on its website to consumers in your area. Therefore, it is very interested in learning your product preferences. Being an intermediary between consumers and a limited number of partner-retailers offering their products on the Internet, Maximo offers the best products available at its partner-retailers. In the region, Maximo has the following partners: The Bay, Staples and Wal-Mart."

The non-commercially linked third party was presented as an independent organization with no links to online e-tailers:

> "Maximo is a large European independent organization offering a product comparison service on the Internet. It is currently assessing the feasibility of offering new products on its website to consumers in your area. Therefore, it is very interested in learning your product preferences. Being independent, Maximo selects for you the best products available on all sites offering products on the Internet. Hence, Maximo offers a service similar to that of Consumer Reports."

The Recommendation Source and Recommendation Type Treatments

This experimental factor represents a combination of the recommendation source treatment levels and the recommendation type treatment levels. Of the three recommendation sources, only one was presented as a large group (other consumers), thus the information uniformity manipulation (uniform or non-uniform) was used only for this recommendation source. During the experiment if subjects were assigned to a recommendation source and if they elected to see the product recommendation (i.e., clicked on the "Our recommendation" button), they were exposed to a recommended product and a description of the recommendation source. For the "other consumers – uniform recommendation" treatment level, the recommendation source for the mouse product class was described as follows.

> "This recommendation is based on other consumer selections. In fact, based on the choices of consumers in your area, we have determined the following preferences:

Product	Consumers who have selected the product
Kensington's Mouse In A Box Optical Pro	9 %
Targus' Optical Scroller Mini Mouse	2 %
Microsoft's Intellimouse Optical	18 %
Logitech's Wheel Mouse Optical	71 %

An almost identical description was used for the "other consumers – non-uniform recommendation." The only exception being that the percentages used were not clearly in favor of one product (e.g., Logitech's Wheel Mouse Optical [40%]; Microsoft's Intellimouse Optical [39%]; Kensington's Mouse In A Box Optical Pro [15%]; Targus' Optical Scroller Mini Mouse [6%]). Based on pretest results of consumers' preferences, the second best preferred product was always proposed by recommendation sources. When subjects were assigned to the "human experts" condition, the recommendation source was presented as follows: "This recommendation is based on an evaluation by our team of experts. Our advisors, experts in this product class, highly recommend this product over the others." The "recommender system" treatment level was described as follows: "This recommendation results from the analysis of the answers to the questionnaire that you completed a few days ago during the first phase of the study. Our computer system analyzed your answers and, based on your personalized profile, the system highly recommends this product over the others."[1]

Product Type Treatment

The product type was manipulated by two different product classes. Based on pretest results, the search product class used for the experiment is the calculator, and wine is used for the experience product class. Since it is the only within factor of the experiment, after their warm-up task, subjects were randomly assigned to either the calculator or the wine product class on their first shopping task and assigned to the other product class for their second shopping task.

Measures

Dependent Variables

Two main dependent variables were measured. The first dependent variable was the consultation (i.e., clicked on the "Our recommendation" button) or the non-

[1] In the first session, subjects were asked to complete a subjective knowledge measurement scale (Flynn and Goldsmith, 1999) and a familiarity measurement scale (Park, Mothersbaugh, and Feick, 1994) for each product category.

consultation (i.e., did not clicked on the "Our recommendation" button) of the product recommendation. This dichotomous variable was measured with clickstream data collected during subjects' shopping tasks. The second dependent variable was the influence of the recommendation source on consumers' online product choices. Thus, product selections of subjects exposed and not exposed to product recommendations were compared. Additionally, two secondary dependent variables were measured. After each product choice, subjects were asked to fill out a short questionnaire measuring their product choice confidence and reasons for their choice. The latter dependent variables were measured for exploratory purposes.

Mediating Variable

In this study, the credibility measurement scale developed by Ohanian (1990) was used to assess recommendation sources' expertise and trustworthiness. This semantic differential measurement scale uses the following items to measure expertise: Expert/Not expert, Experience / Inexperienced, Knowledgeable / Unknowledgeable, Qualified / Unqualified, and Skilled / Unskilled. The trust dimension is assessed by the following items: Dependable / Undependable, Honest / Dishonest, Reliable / Unreliable, Sincere / Insincere, and Trustworthy / Untrustwothy. As illustrated in Table I (page 70), this scale is reliable. Furthermore, it has been extensively tested and shows evidence of construct and nomological validity (Ohanian, 1990). The scale was pre-tested before the experiment. One "trust" item (i.e., Dependable / Undependable) loaded almost equally on both dimensions (loadings of 0.479 vs. 0.427 on the trust and expertise dimensions, respectively). Since similar results were again obtained in an additional pretest, the problematic item was deleted. Results of the experiment's first session supported the two-dimensional structure of the modified credibility measurement scale (See Table I, page 70).

Table 1 – Psychometric Characteristics of the Credibility Measurement Scale

Scale	Type	Original Reliability	Pretest (n=39)		Experiment (n=488)	
			Reliability	Structure (EFA, ML extraction, Oblimin rotation)	Reliability	Structure (EFA, ML extraction, Oblimin rotation)
Credibility (Ohanian, 1990)	7-point Semantic Differen-tial	Expertise (5 items): 0.89 Trustwor-thiness (5 items): 0.90	Expertise (5 items): 0.91 Trustwor-thiness (5 items): 0.84	1st factor eigenvalue: 4.19 - 5.12 (49% - 51% variance explained) 2nd factor eigenvalue: 2.23 - 2.71 (23% - 27% variance explained)	Expertise (5 items): 0.88 –0.89 Trustwor-thiness (4 items): 0.84 – 0.88	1st factor eigenvalue: 4.11 – 4.85 (51% - 54% variance explained) 2nd factor eigenvalue: 1.49 – 1.74 (19% variance explained)

Manipulation Checks

Following Perdue and Summers (1986), manipulation checks were performed during pretests. A series of four pretests were necessary to achieve effective online manipulations. After each pretest, necessary iterations were made on manipulations (e.g., Website descriptions) to ensure their effectiveness. Results from the last pretest are presented below. For this pretest, 33 consumers were recruited. Subjects were asked to complete an online questionnaire and to perform three online shopping tasks for three different products (computer mouse, wine, and calculator). Subjects were randomly assigned to treatment levels, and the wine and calculator product selections were counterbalanced. Subjects performed the pretest from the location where they usually use the Internet and they had a one in three chance of winning one of their product selections ($45 value). Pretest subjects were not included in the final sample.

Product Manipulation

For each product class, subjects were asked whether products in the product class could either be evaluated: 1) Before purchase; 2) Mostly before purchase; 3) Mostly after purchase; 4) Only after purchase. Results of the pretest indicated that the wine product class was perceived as the most "experience" product (mean = 3.2) of a set comprised of the following product classes: calculator, camping cooler, computer mouse, water filter system, bottle of wine, 35mm camera. The calculator product

class was perceived as the most "search" product (mean = 1.4). Furthermore, the difference between the evaluations of the two product classes was significant ($t(27) = -7.48$, $p < 0.001$). The computer mouse was the most balanced product category (mean = 2.1) and differed from the wine ($t(27) = 4.46$, $p < 0.001$) and calculator ($t(29) = -3.07$, $p < 0.01$) product classes. This is why it was selected for the warm-up task.

Website Manipulation

Following their first shopping task, subjects were asked to identify the type of Website on which they were shopping. They had to select one of three descriptions: 1) "A retailer offering products on its website and competing with other retailers on the Internet" (i.e., seller description); 2) "An Internet buying group offering a comparison service for products offered by a limited number of partners which are Internet retailers" (i.e., third party commercially linked to sellers description); 3) "An independent organization offering a comparison service for products offered by all Internet retailers" (i.e., third party not commercially linked to sellers description). Results suggested that the majority of consumers exposed to each type of website matched the type of website they were visiting with its description (Subjects who matched the seller website with its description: 66.7%; Subjects who matched the third party commercially linked to sellers website with its description: 62.5%; Subjects who matched the third party not commercially linked to sellers website with its description: 69.2%; $X^2(2) = 18.13$, $p < 0.05$).

Recommendation Source Manipulation

After their second and third shopping tasks, subjects who consulted a product recommendation were asked to identify which type of recommendation source they consulted. They had to select one of three descriptions: 1) "The recommendation proposed to me on Maximo's website was generated using the information received from other consumers" (i.e., other consumers description); 2) "The recommendation proposed to me on Maximo's website was generated by advisers working for Maximo" (i.e., human experts description); 3) "The recommendation proposed to me

on Maximo's website was generated using information that I recently supplied while answering a questionnaire and with which Maximo's computer system generated a personalized recommendation" (i.e., recommender system description). Results indicated that the majority of subjects exposed to one of the three types of recommendation sources matched the type of recommendation source they were exposed to and its description (Subjects who matched the recommendation source "other consumers" with its description: 100.0%; Subjects who matched the recommendation source "human experts" with its description: 60.0%; Subjects who matched the recommendation source "recommender system" with its description: 66.7%; X^2 (2) = 8.35, $p < 0.05$).

Recommendation Uniformity Manipulation

Subjects who consulted the recommendation source "other consumers" were also asked the following yes/no question: "Among the products offered on the Maximo website, was there a product recommended by more than 50% of consumers?" Results indicated that the recommendation uniformity manipulation for the recommendation sources "other consumers" was effective. Subjects exposed to a uniform recommendation mentioned significantly more often that the product recommendation was uniform than those exposed to a non-uniform recommendation (Subjects who matched the uniform recommendation with its description: 100.0%; Subjects who matched the non uniform recommendation with its description: 69.2%; X^2 (1) = 7.89, $p = 0.005$).

Results

Hypothesis Guessing

Of the 488 participants, 20.3% correctly guessed the goal of the experiment. However, the frequency of choosing a recommended product did not differ between subjects who correctly guessed the goal of the experiment and subjects who did not

correctly guess the main goal of the experiment (Wine: X^2 (1) = 3.640, $p > 0.05$[2]; Calculator: X^2 (1) = 2.703, $p > 0.05$). Note that subjects who consulted a product recommendation had a better chance of guessing the experiment's goal since they were asked to complete a source credibility measurement scale after their shopping tasks. No significant relationship was found to exist between subjects who did or did not correctly guess the goal of the experiment and the type of recommendation sources they were exposed to (X^2 (3) = 2.061, $p > 0.1$) or the type of website they used (X^2 (2) = 3.782, $p > 0.1$). Thus, subjects' product choices were not biased by their intuitions regarding the goal of the experiment, and neither the type of website nor the type of recommendation source influenced subjects' propensity to correctly guess the main goal of the experiment.

Test of Hypotheses

Generalized Estimations Equations (GEE) were used to test most hypotheses (H1 to H8)[3]. These hypotheses all suggest relationships between either categorical independent variables (e.g., product type) or continuous independent variables (e.g., recommendation source credibility) and dichotomous dependent variables (i.e., consultation or non consultation of the recommendation page and selection or non selection of a recommended product). Furthermore, since subjects had to perform multiple shopping tasks their responses were likely to be correlated (e.g., correlation between the decision to consult the product recommendation on the second and on third shopping tasks). The GEE technique is well suited for the analysis of categorical repeated measurements and correlated data (Liang and Zeger, 1986; Stockes, Davis, and Koch, 2001). Finally, analysis of variance for repeated measures was used to test H9 and H10.

The two online shopping tasks performed by 488 subjects generated 976 observations. Of the 976 observations, 202 (20.7%) observations were collected from the control group and 774 (79.3%) observations were gathered from subjects

[2] Unless mentioned, all p values are one-tailed tests.
[3] GEE were also used to analyze the recommendation source manipulation check (pretest).

exposed to experimental manipulations. Of this latter number of observations, 539 (69.6%) observations reflect decisions to consult a product recommendation and 235 (30.4%) observations represent decisions not to consult a product recommendation. Of the 539 decisions to consult a product recommendation, 231 (42.9%) represent decisions to follow a product recommendation and 308 (57.1%) reflect decisions not to follow a product recommendation.

Influence of Recommendation Consultation on Product Selection

Our first hypothesis stipulates that consumers exposed to a product recommendation will be more likely to select the recommended product than consumers not exposed to a product recommendation. Our results strongly support H1. The recommended products (e.g., Logitech's Wheel Mouse Optical) were selected in a greater proportion by subjects who consulted the product recommendation (42.9%) than by control group subjects (27.0%) or by subjects who decided not to click on the recommendation button to consult the recommendation page during their shopping task (15.7%). Thus, overall only 20.9% of product choices made by subjects who did not see a product recommendation, either because they were assigned to the control group or because they did not click on the recommendation button during their shopping task, favored the recommended product compared with a proportion of 42.9% of product choices made by subjects who consulted the product recommendation (X^2 (1) = 44.4, $p < 0.001$). Thus, online product recommendations significantly influenced subjects' online product choices.

Determinants of Recommendation Consultation

In order to test H2 and H3, only observations from subjects who had been given the possibility to consult a product recommendation were used in the analysis (n = 774 observations). H2 stipulates that recommendation consultation will be greater for experience products than for search products. Of the 539 decisions to consult a product recommendation, 49.7% of decisions were to consult the calculator recommendation and 50.3% reflected decisions to consult the wine recommendation. Hence, no significant differences in consumers' propensity to consult the product

recommendation were found between the calculator and wine products ($X^2(1) = 0.01$, $p > 0.1$). H3 suggests that recommendation consultation is more likely on more independent websites. Results show that subjects' propensity to consult product recommendations was not influenced by the type of website they were visiting ($X^2(2) = 0.430$, $p > 0.1$). Of the 539 decisions to consult a product recommendation, 33.6% were made on the seller website (i.e., etailer), 32.5% were made on the commercially linked third party website (i.e., buying group), and 34.0% were made on the independent third party website (i.e., independent organization). Consequently, neither the type of product (H2) nor the type of website (H3) influenced consumers' decision to consult an online product recommendation.

Determinants of Recommendation Influence

In order to test H4 to H6, only observations from subjects who had consulted a product recommendation were used in the analysis (n = 539 observations). H4 stipulates that consumers will be more influenced by recommendations for experience products than for search products. In support of H4 results indicated that, of the 327 decisions to consult a wine recommendation, 44.3% of decisions were to follow the recommendation and of the 212 decisions to consult a calculator recommendation, 40.6% of decisions were to follow the recommendation (X^2 (1) = 6.20, $p < 0.01$). H5 suggests that product recommendation influence is greater on more independent websites. Results did not support H5, no relationship was found between the type of website and subjects' propensity to follow product recommendations ($X^2(2) = 0.80$, $p > 0.1$). On the seller website, 43.6% of decisions were to follow a product recommendation, 44.6% of decisions were to follow a product recommendation on the buying group website, and 40.4% of decisions made on the independent organization website were to follow a product recommendation. Furthermore, no contrast tests between websites yielded significant results. H6 stipulates that recommender systems are more influential than other consumers and human experts. In support of H6, contrast tests showed that recommender systems are more influential than other consumers ($X^2(1) = 8.30$, $p < 0.005$) and than human experts ($X^2(1) = 3.10$, $p < 0.05$). When the product recommendation came from the

recommender system, 56.1% of decisions made by subjects were to follow the recommendation. That proportion dropped to 33.3% for human experts and 27.9% for other consumers providing uniform recommendations. No significant difference was found between human experts and other consumers relatively to their influence on subjects' choices (X^2 (1) = 1.56, $p > 0.1$). H7 suggests that uniform recommendations have greater influence on consumers than non-uniform recommendation. To test H7, only observations from subjects assigned to the recommendation source "other consumers" and who consulted a product recommendation were used (n = 254 observations). Of the 254 decisions to consult a product recommendation from subjects assigned to "other consumers", 90 observations indicated decisions that followed the product recommendation and 164 observations indicated decisions that did not. Of these 90 decisions, 47.8% were made after being exposed to a non-uniform recommendation and 52.2% were made following the exposition to a uniform product recommendation. Hence, results suggest that the type of recommendation (i.e., uniform vs. non-uniform) does not affect the recommendation influence (X^2 (1) = 0.270, $p > 0.1$).

Recommendation Source Credibility

To test H8 to H10, only observations from subjects who consulted a product recommendation were used in the analysis (n = 539 observations). Results supported H8. A positive relationship was found between consumers' perceived trust in the recommendation source (H8a) and their propensity of choosing a recommended product (X^2 (1) = 4.03, $p < 0.05$). A positive relationship was also found between consumers' perceived expertise of the recommendation source (H8b) and their propensity of selecting a recommended product (X^2 (1) = 10.21, $p < 0.001$). As predicted by H9a, differences were observed between perceived expertise of recommendation sources ($F(2, 211) = 16.30$, $p < 0.001$, two-tailed test). Contrast analysis revealed that other consumers were perceived as less expert than human experts (M = 4.4 and 5.2 respectively; Contrast Estimate (C.E.) = 0.823, $p < 0.001$) and recommender systems (M = 4.7; C.E. = 0.381, p = 0.005). It is noteworthy that

human experts were perceived as more expert than recommender systems (C.E. = 0.442, $p < 0.05$, two-tailed test). As stated in H9b, differences in recommendation sources' trustworthiness were also observed ($F(2, 211) = 3.916$, $p < 0.05$, two-tailed test). Contrasts analysis showed that the recommendation source "other consumers" was perceived as significantly more trustworthy than the recommendation source "recommender system" (M = 5.1 and 4.6 respectively; C.E. = -0.438, $p < 0.005$) but as trustworthy as human experts (M = 4.9; C.E. = -0.138, $p > 0.05$), thus providing partial support to H9b. Interestingly, human experts were perceived as marginally more trustworthy than recommender systems (C.E. = 0.299, $p < 0.1$, two-tailed test). Finally, H10 was not supported. No significant differences were found between the trustworthiness of recommendation sources among the different types of websites (M = 5.0 (etailer), 4.9 (buying group), 4.9 (independent organization); $F(2,211) = 0.640$, $p > 0.1$, two-tailed test).

Additional Findings

Subjects' confidence in their product choices was measured after each online shopping task. It was assessed by a two-item 7-point Likert-type measurement scale ranging from "Strongly Disagree" to "Strongly Agree." The two items were "I believe that I have selected the right product" and "I am certain that I have made the best possible choice." This product choice confidence scale had a satisfactory internal consistency (Cronbach's alpha = 0.76) for exploratory purposes. Post hoc analysis indicated that subjects who consulted and followed a product recommendation showed less confidence (M = 5.4) in their product choice than subjects who did not consult the product recommendation (M = 5.8) and subjects who did consult the recommendation but did not follow it (M = 5.7; $F(2, 772) = 11.969$, $p \leq 0.001$, two-tailed test). Cognitive dissonance theory provides one plausible explanation for these results. Festinger (1957, 1964) maintains that the evaluation of alternatives will be more divergent after the decision than before or during the decision-making process because the decision-maker is committed to the alternative once it is chosen. This confirmatory process, called *spreading apart of choice alternatives,* has been observed not only after an alternative is chosen (Chernev 2001; Eagly and Chaiken,

1993, p. 477 for a review) but also during consumers decision-making process (Russo, Medvec, and Meloy, 1998). The present study posits that subjects who consulted and followed the product recommendation felt less cognitive dissonance than other subjects because they used the recommendation as a consonant element. Therefore, subjects who did not consult or follow the product recommendation claimed that they were more confident in their product choice in an attempt to reduce their cognitive dissonance by spreading apart the chosen alternative from the others. An alternative explanation of these results is that people who are susceptible to interpersonal influence such as product recommendations from relevant others are in general less confident in their ability to select the best product available (Bearden, Netemeyer, and Teel, 1990). Additional research controlling for subjects' general confidence in their judgments would provide a more definitive explanation of this phenomenon.

Subjects were also asked the reasons for their choice after each product selection. They were instructed to indicate their level of agreement with each of the following reasons for their choices on a 7-point Likert-type scale ranging from "Strongly Disagree" to "Strongly Agree": product quality, price, product recommendation, visual aspect of the product, and brand. Post hoc analysis revealed significant differences between subjects. Subjects who followed a product recommendation indicated that the "recommendation" reason was a less important reason in explaining their choice than those who did not follow the recommendation ($F(1, 536) = 494.953$, $p < 0.001$, two-tailed test). Furthermore, subjects who did follow the recommendation indicated that reasons such as the brand, the quality, and the visual aspect of the product were more important in explaining their choice than subjects who did not follow the recommendation (Brand: $F(1, 534) = 24.422$, $p < 0.001$; Quality: $F(1, 536) = 20.669$, $p < 0.001$; Visual aspect: $F(1, 534) = 5.187$, $p < 0.05$; two-tailed tests). Consequently, subjects who were influenced by product recommendations tended to lessen the recommendation influence by attributing their choice to various product attributes. Again, cognitive dissonance theory provides a plausible explanation for this phenomenon (Festinger, 1957, 1964). Subjects who consulted and followed the

recommendation may have felt a certain level of cognitive dissonance because they were influenced in their product choice. In an attempt to reduce their cognitive dissonance, they may have explained their choice by focusing on consonant reasons such as the brand and less on dissonant reasons such as the recommendation. This bias could have been motivated for reasons such as maintaining self-image and effective control over the environment (Azjen, 1996).

In addition, subjects' professional situation (full-time worker vs. full-time student) was assessed to determine whether it had an impact on their propensity to consult and follow online product recommendations. Full-time students consulted product recommendations significantly more often than full-time workers (55.2% vs. 46.7%; $X^2(1) = 4.156$, $p < 0.05$, two-tailed test). However, the two groups did not significantly differ in their tendency to follow product recommendations (43.1% vs. 45.8%; $X^2(1) = 0.221$, $p > 0.1$, two-tailed test).

Discussion and Conclusion

Results strongly support our contention that consumers are influenced in their online product choices by online recommendations. However, all online recommendation sources are not equally influential. Recommender systems were found to be the most influential recommendation source even if they were perceived as possessing less expertise than human experts and as being less trustworthy than other consumers. The type of product did not influence subjects' propensity to consult a product recommendation but for subjects who did consult a product recommendation the product type had an influence on their propensity to follow a product recommendation. Recommendations for experience products were significantly more influential than for search products. The type of website on which recommendation sources were used did not affect their perceived trustworthiness and did not influence consumers' propensity to consult or follow the product recommendation.

This essay's main theoretical implication is related to the influence of recommender systems on consumers' online choices. With the emergence of the Internet, consumers now have access to new impersonal sources of influence that can provide personalized product information and recommendations. Results show that this type of information source indeed influences consumers' online product choices, and that it is more influential than conventional recommendation sources. Thus, this study contributes to an emergent consumer research area, namely the use and influence of impersonal information sources providing personalized information (e.g., recommender systems and intelligent agents) on consumers' decision-making processes (Alba *et al*. 1997; Ansari, Essegaier, and Kohli 2000; Häubl and Trifts 2000; Maes 1999; Urban, Sultan, and Qualls 1999).

This essay also has implications for marketers. Results show that online recommendation sources influence consumers' online choices. Products were

selected twice as often if they were recommended. As mentioned, this influence is moderated by the type of recommendation source and the type of product but it is not moderated by the type of website. Thus, results suggest that a specific recommendation source will be as effective on a retailer website (e.g., Amazon) as it will be on an independent third party Website such as Consumer Reports. It seems that consumers focus much more on the recommendation source itself than on the type of website on which the recommendation source is used. Finally, the influence of online recommendations should not be assessed by directly asking consumers. As shown, consumers tend to deny recommendation influence by focusing on other attributes of the offering.

Since research on online recommendation sources is emergent, many research avenues are of interest. First, since impersonal information sources are used by and influence consumers, an effort should be made to develop and/or adapt existing tools related to information source influence. For instance, it would be interesting to develop a susceptibility to relevant others influence measurement scale that would both include personal information sources (Bearden, Netemeyer, and Teel 1989, 1990) and these new information sources. Second, results of the present study suggest that recommender systems are perceived as less trustworthy than more traditional information sources. As suggested by Urban, Sultan, and Qualls (1999), trust is not instantaneous and increases over multiple successful interactions. Since our purpose was not to perform a longitudinal study, our results must be interpreted with caution. It is plausible that a customer's trust in a specific recommender system would increase over time if he/she was satisfied with products previously recommended by that system. Similarly, it would be of interest to explore if customer loyalty to a specific website (Srinivasan, Anderson, and Ponnavolu 2002) acts as a moderator of the use and influence of online recommendation sources. Third, in the present study only a limited product assortment was used (i.e., four products) in each product class. It would be very interesting to study how product assortment (See Simonson 1999 for a review) affects the influence of online recommendation sources. For instance, an increase in the number of alternatives presented or the presence of a

clearly dominant alternative not recommended may affect the credibility and influence of online recommendation sources. Fourth, as mentioned, the decisions to consult (or not to consult) and to follow (or not to follow) an online product recommendation affect consumers' confidence in their product choices and also their choice justifications. In order to better comprehend implications of these results, it would be interesting to examine if these decisions also affect consumers' satisfaction with their online shopping experience (Szymanski and Hise 2000). Finally, additional variables need to be investigated to better understand why consumers consult and follow online product recommendations. Variables such as online shopping familiarity and experience, past experience with online recommendations, age, and time starvation (Lohse, Bellman, and Johnson 2000; Wood 2000) may help explain why consumers use recommendations in their online decision-making process.

This study has some limitations that should be kept in mind before applying the results to real market situations. First, only one search and one experience product were used. As suggested by Alba *et al.* (1997), the retail format may influence the proportion of experience and search attributes of a product. For instance, a software application may be perceived as mainly an experience product when evaluated offline but as possessing more search attributes when evaluated online if consumers can test it online before purchase. Thus, to ensure that the findings related to the product classes used in this study are not idiosyncratic, additional studies using different search and experience products should be conducted. Second, this study only investigated consumers' online product choices; it did not investigate online purchases. Thus, additional variables such as product price, product availability or delivery time could also affect how consumers are influenced by online product recommendations.

CHAPITRE 5
Conclusion

L'objectif principal de cette recherche était de vérifier si les consommateurs utilisent et sont influencés par les recommandations de produits qui leurs sont faites dans Internet.

Afin d'atteindre cet objectif un cadre conceptuel répertoriant les différentes formes d'influence personnelle ou personnalisée que l'on retrouve dans Internet a été proposé (Chapitre 2). En se basant sur ce cadre conceptuel ainsi que sur les propositions de recherche découlant d'une portion de ce cadre conceptuel, une expérience en ligne a été développée et validée (Chapitre 3). Finalement, les résultats de cette expérience ont permis de vérifier si les consommateurs, lorsqu'ils magasinent dans un site Web, utilisent et sont influencés par les recommandations de produits qui leurs sont soumises (Chapitre 4).

Les principaux résultats de cette recherche sont les suivants. Les consommateurs utilisent et sont influencés par les recommandations de produits lorsqu'ils naviguent dans un site Web. Cette influence est modérée par le type de produit qu'ils recherchent et par la source de recommandation suggérant le produit. Ainsi, les consommateurs sont plus influencés par les recommandations en ligne lorsqu'ils ont à choisir un produit ne pouvant pas être évalué avant achat comparativement à un produit pouvant être évalué avant achat. De plus, parmi les trois sources de recommandation utilisées lors de l'expérience (autres consommateurs, experts humains et système de recommandation), les recommandations de produits provenant du système de recommandation ont davantage d'influence sur les choix des consommateurs. Le type de site Web n'affecte pas la propension des consommateurs à consulter ou à suivre une recommandation de produit.

Les contributions de cette recherche sont multiples. Premièrement, le cadre conceptuel proposé permet de clairement catégoriser les diverses sources d'information, personnelles et impersonnelles offrant de l'information personnalisée, pouvant influencer les consommateurs lorsqu'ils utilisent Internet pour magasiner. Étant donné que le type d'expérience effectuée est encore peu utilisé en recherche marketing cette recherche a aussi une contribution importante sur le plan méthodologique (ex. : recrutement par courrier électronique, assignation aléatoire des participants à différentes versions d'un site Web, etc.). Finalement, les résultats de cette recherche contribuent à l'avancement des connaissances pour ce qui est du comportement des consommateurs dans Internet. Cette recherche, en comparant des sources de recommandation dites traditionnelles (ex. : experts) avec de nouvelles sources de recommandation (ex. : système de recommandation), contribue à un champ de recherche émergeant en comportement des consommateurs qui étudie l'utilisation et l'influence sur les décisions des consommateurs des sources d'information impersonnelles offrant de l'information personnalisée (Alba *et al*., 1997; Ansari, Essegaier et Kohli 2000; Häubl et Trifts 2000; Maes, 1999; Pereira 2000; Urban, Sultan et Qualls, 1999).

En plus des avenues de recherche mentionnées à la fin de chacun des essais (ex. : identification de variables influençant la consultation des sources de recommandation), une dernière avenue de recherche se doit d'être soulignée. La présente recherche ne s'est intéressée qu'aux recommandations effectuées par des sources de recommandation utilisées dans un site Web (i.e., Maximo). Tel qu'il est illustré dans le premier essai, ceci ne représente qu'une partie du cadre conceptuel proposé. Ainsi, les recherches portant sur l'utilisation et l'influence des sources d'information personnelles ou offrant de l'information personnalisée lors de situations où les consommateurs ne sont pas proactifs (ex. : visite d'un site Web) mais plutôt réactifs (ex. : courrier électronique) est un domaine de recherche prometteur.

RÉFÉRENCES BIBLIOGRAPHIQUES

ABELS, E.G., WHITE, M.D. et HAHN, K. (1997), « Identifying User-Based Criteria for Web Pages », *Internet Research: Electronic Networking Applications and Policy*, Vol. 7, N° 4, p. 252-262.

ABELS, E.G., WHITE, M.D. et HAHN, K. (1999), « A User-Based Design Process for Websites », *Internet Research: Electronic Networking Applications and Policy*, Vol. 15, N° 1, p. 35-44.

ALBA, J., LYNCH, J., WEITZ, B., JANISZEWSKI, C., LUTZ, R., SAWYER, A. et WOOD, S.(1997), « Interactive Home Shopping: Consumer, Retailer, and Manufacturer Incentives to Participate in Electronic Marketplaces », *Journal of Marketing,* Vol. 61, N° 3, p. 38–53.

ANDERSON, P.F. (1986), « On Method in Consumer Research: A Critical Relativist Perspective », *Journal of Consumer Research*, Vol. 13, N° 2, p. 155-174.

ANDREASEN, A.R. (1968), « Attitudes and Customer Behavior: A Decision Model », *Perspectives in Consumer Behavior,* H.H. Kassarjian and T.S. Robertson (Eds.), Glenview, IL: Scott, Foresman and Company, p. 498-510.

ANSARI, A., ESSEGAIER, S. et KOHLI, R. (2000), « Internet Recommendation Systems », *Journal of Marketing Research*, Vol. 37, N° 3, p. 363-375.

ARDNT, J. (1967), « Role of Product-Related Conversations in the Diffusion of a New Product », *Journal of Marketing Research*, Vol. 4, N° 3, p. 291-295.

AZJEN, I. (1996), « The Social Psychology of Decision Making », *Social Psychology : Handbook of Basic Principles*, T.T. Higgins et A.W. Kruglansky (Eds.), New-York, NY: Guilford Press, p. 297-325.

BACHMANN, D.P., ELFRINK, J. et VAZZANA, G.(2000), « Email and Snail Mail Face Off in Rematch », *Marketing Research*, Vol. 11, N° 4, p. 11-15.

BAKOS, Y.J. (1997), « Reducing Buyer Search Costs: Implications for Electronic Marketplaces », *Management Science*, Vol. 43, N° 2, p. 1676-1692.

BALABANOVIC, M. et SOHAM, Y.(1997), « Fab: Content-based, Collaborative Recommendation », *Communications of the ACM*, Vol. 40, N° 3, p. 66-73.

BANNAN, Karen J. (2000), « Spreading the Word », *Adweek*, 5 juin, p. 24-26.

BARWISE, P., HAMMOND, K. et ELBERSE, A. (2001), « Marketing and the Internet: A Research Review », eCommerce Research Forum, MIT (http://ecommerce.mit.edu/forum/).

BEARDEN, W.O. et ETZEL, M.J. (1982), « Reference Group Influence on Product and Brand Purchase Decisions », *Journal of Consumer Research*, Vol. 9, N° 2, p. 183-194.

BEARDEN, W.O., NETEMEYER, R.G. et TEEL, J.E. (1989), « Measurement of Consumer Susceptibility to Interpersonal Influence », *Journal of Consumer Research*, Vol. 15, N° 4, p. 473-481.

BEARDEN, W.O., NETEMEYER, R.G. et TEEL, J.E. (1990), « Further Validation of the Consumer Susceptibility to Interpersonal Influence Scale », *Advances in Consumer Research*, Vol. 17, R.W. Pollay et G. J. Gorn (Eds.), Provo, UT: Association for Consumer Research, p. 770-776.

BEATTIE, A.E. (1982), « Effects of Product Knowledge on Comparison, Memory, Evaluation, and Choice: A Model of Expertise in Consumer Decision-Making », *Advances in Consumer Research*, Vol. 9, A. Mitchell (Ed.), Ann Arbor, MI: Association for Consumer Research, p. 336-341.

BEATTY, S.E. et SMITH, S.M. (1987), « External Search Effort: An Investigation Across Several Product Categories », *Journal of Consumer Research*, Vol. 14, N° 1, p. 83-95.

BLOCH, P.H., SHERRELL, D.L. et RIDGWAY, N.M. (1986), « Consumer Search: An Extended Framework », *Journal of Consumer Research*, Vol. 13, N° 1, p. 119-126.

BONE, P.F. (1995), « Word-of-Mouth Effects on Short-term and Long-term Product Judgments », *Journal of Business Research*, Vol. 32, N° 3, p. 213-223.

BROWN, J.J. et REINGEN, P.H. (1987), « Social Ties and Word-of-Mouth Referral Behavior », *Journal of Consumer Research*, Vol. 14, N° 3, p. 350-362.

BRUCKS, M. (1985), « The Effects of Product Class Knowledge on Information Search Behavior », *Journal of Consumer Research*, Vol. 12, N° 1, p. 1-16.

BRUNER, G.C. et KUMAR, A. (2000), « Web Commercials and Advertising Hierarchy-of-Effects », *Journal of Advertising Research*, Vol. 40, N°s 1-2, p. 35-42.

BURNKRANT, R.E. et COUSINEAU, A. (1975), « Informational and Normative Social Influence on Buying Behavior », *Journal of Consumer Research,* Vol. 2, N° 3, p. 206–215.

CHENG, K. (1999), « eBay Best Viral Marketing », *Adweek*, June 28, p. 42.

CHERNEV, A. (2001), « The Impact of Common Features on Consumer Preferences: A Case of Confirmatory Reasoning », *Journal of Consumer Research,* Vol. 27, N° 4, p. 475–488.

CHILDERS, T.L. et RAO, R. (1992), « The Influence of Familial and Peer-Based Reference Groups », *Journal of Consumer Research,* Vol. 19, N° 2, p. 198–212.

CHO, C., LEE, J. et THARP, M. (2001), « Different Forced-Exposure Levels to Banners Advertisements », *Journal of Advertising Research*, Vol. 41, N° 4, p. 45-56.

CIALDINI, R.B. et TROST, M.R. (1998), « Social Influence: Social Norms, Conformity and Compliance », *The Handbook of Social Psychology,* D.T. Gilbert, S.T. Fiske et G. Lindsey (Eds.), Boston, MA: McGraw-Hill, p. 151-192.

COBANOGLU, C., WARDE, B. et MOREO, P.J. (2001), « A Comparison of Mail, Fax, and Web-Based Survey Methods », *International Journal of Market Research*, Vol. 43, N° 4, p. 441-452.

COHEN, J.B. et GOLDEN, E. (1972), « Informational Social Influence and Product Evaluation », *Journal of Applied Psychology*, N° 56, p. 54-59.

COOK, C., HEATH, F. et THOMPSON, R.L. (2000), « A Meta-Analysis of Response Rates in Web- or Internet-Based Surveys », *Educational and Psychological Measurement*, Vol. 60, N° 6, p. 821-836.

COYLE, J.R. et THORSON, E. (2001), « The Effects of Progressive Levels of Interactivity and Vividness in Web Marketing Sites », *Journal of Advertising*, Vol. 30, N° 3, p. 65-77.

d'ASTOUS, A. et TOUIL, N. (1999), « Consumer Evaluations of Movies on the Basis of Critics' Judgments », *Psychology and Marketing,* Vol. 16, N° 8, p. 677–694.

DEUTSCH, M. et GERARD, H.B. (1955), « A Study of Normative and Informational Social Influence Upon Individual Judgment », *Journal of Abnormal and Social Psychology*, Vol. 51, p. 629-636.

DOMMEYER, C.J. et MORIARTY, E. (2000), « Comparing Two Forms of An Email Survey: Embedded Vs. Attached », *International Journal of Marketing Research*, Vol. 42, N° 1, p. 39-50.

DUHAN, D.F., JOHNSON, S.D., WILCOX, J.B. et HARELL, G.D. (1997), « Influences on Consumer Use of Word-of-Mouth Recommendation Sources », *Journal of the Academy of Marketing Science*, Vol. 25, N° 4, p. 283-295.

EAGLY, A.H. et CHAIKEN, S. (1993), *The Psychology of Attitudes,* Orlando, FL: Harcourt Brace Jovanovich, Inc.

ERNST & YOUNG (2000), « *Global Online Retailing* », Ernst & Young Special Report, January.

FESTINGER, L. (1957), *A Theory of Cognitive Dissonance,* Evanston, IL: Row, Peterson.

FESTINGER, L. (1964), *Conflict, Decision, and Dissonance,* Stanford, CA: Stanford University Press.

FLYNN, L.R. et GOLDSMITH, R.E. (1999), « A Short, Reliable Measure of Subjective Knowledge », *Journal of Business Research,* Vol. 46, N° 1, p. 57–66.

FOLKES, V.S. (1988), « Recent Attribution Research in Consumer Behavior: A Review and New Directions », *Journal of Consumer Behavior,* Vol. 14, N° 4, p. 548–565.

FORMISANO, R.A., OLSHAVSKY, R.W. et TAPP, S. (1982), « Choice Strategy in a Difficult Task Environment », *Journal of Consumer Research*, Vol. 8, N° 4, p. 474-479.

FURSE, D., PUNJ, G. et STEWART, D. (1984), « A Typology of Individual Search Strategies Among Purchasers of New Automobiles », *Journal of Consumer Research*, Vol. 10, N° 4, p. 417-431.

GILLY, M.C., GRAHAM, J.L., WOLFINBARGER, M.F. et YALE, L.J. (1998), « A Dyadic Study of Interpersonal Information Search », *Journal of the Academy of Marketing Science*, Vol. 26, N° 2, p. 83-100.

GUTTMAN, R.H., MOUKAS, A.G. et MAES, P. (1998), « Agent-Mediated Electronic Commerce: A Survey », MIT Media Laboratory.

HARMON, R.R. et CONEY, K.A. (1982), « The Persuasive Effects of Source Credibility in Buy and Lease Situations », *Journal of Marketing Research,* Vol. 19, N° 2, p. 255–260.

HÄUBL, G. et TRIFTS, V. (2000), « Consumer Decision-making in Online Shopping Environments: The Effects of Interactive Decision Aids », *Marketing Science,* Vol. 19, N° 1, Winter, p. 4–21.

HAWES, J.M. et LUMPKIN, J.R. (1986), « Perceived Risk and the Selection of a Retail Patronage Mode », *Journal of the Academy of Marketing Science*, Vol. 14, N° 4, p. 37-42.

HERR, P.H., KARDES, F.R. et KIM, J. (1991), « Effects of Word-of-Mouth and Product-Attribute Information on Persuasion: An Accessibility-Diagnosticity Perspective », *Journal of Consumer Research*, Vol. 17, N° 4, p. 454-462.

HOFFMAN, D.L. et NOVAK, T.K. (1996), « Marketing in Hypermedia Computer-Mediated Environments: Conceptual Foundations », *Journal of Marketing*, Vol. 60, N° 3, p. 50-68.

HOFFMAN, D.L., NOVAK, T.(1997), « A New Marketing Paradigm for Electronic Commerce », *Information Society*, Vol. 13, N° 1, p. 43-55.

HOFFMAN, D.L., NOVAK, T.P. et CHATTERJEE, P.(1995), « Commercial Scenarios for the Web: Opportunities and Challenges », *Journal of Computer Mediated Communication,* Vol. 1, N° 3.

HOVLAND, C.I. et WEISS, W. (1951), « The Influence of Source Credibility on Communication Effectiveness », *Public Opinion Quarterly,* Vol. 15, N° 1, p. 635–650.

JACKSON, J. (2001), « With Your Permission », IMT Strategies.

JOHNSON, H.H., TORCIVIA, J.M. et POPRICK, M.A. (1968), « Effects of Source Credibility on the Relationship Between Authoritarianism and Attitude Change », *Journal of Personality and Social Psychology,* Vol. 9, N° 2, p. 179–183.

KATZ, E. et LAZARSFELD, P.F. (1955), *Personal Influence*, Glencoe, IL: Free Press.

KELLEY, H.H. (1967), « Attribution Theory in Social Psychology », *Nebraska Symposium on Motivation,* David Levine (Ed.), Lincoln, NE: University of Nebraska Press, p. 192–241.

KELLEY, H.H. (1973), « The Process of Causal Attribution », *American Psychologist,* N° 28, p. 107–128.

KELLY, R.F. (1968), « The Search Component of the Consumer Decision Process: A Theoretic Examination », *Marketing and the New Science of Planning*, Robert King (Ed.), Chicago, IL: American Marketing Association, p. 271-274.

KELMAN, H.C. (1961), « Processes of Opinion Change », *Public Opinion Quarterly,* Vol. 25, p. 57–78.

KERLINGER, F.N. et LEE, H.B. (2000), *Foundations of Behavioral Research*, Forth Worth: Harcourt College Publishers.

KING, M.F. et BALASUBRAMANIAN, S.K. (1994), « The Effects of Expertise, End Goal, and Product Type on Adoption of Preference Formation Strategy », *Journal of the Academy of Marketing Science,* Vol. 22, N° 2, p. 146–159.

KING, M.F. et HILL, D.J. (1994), « Electronic Decisions Aids: Integration of a Consumer Perspective », *Journal of Consumer Policy*, Vol. 17, N° 2, p. 181-206.

KRANTZ, J.H. et DALAL, R. (2000), « Validity of Web-Based Psychological Research », *Psychological Experiments on the Internet*, M. Birnbaum (Ed.), Orlando, FL: Academic Press, p. 35-60.

KRISHNAMURTHY, S.(2000), « Spam Revisited », *Quarterly Journal of Electronic Commerce*, Vol. 1, N° 4, p. 305-321.

KRISHNAMURTHY, S. (2001), « Person-To-Person Marketing: The Emergence of the New Consumer Web », *Quarterly Journal of Electronic Commerce*, Vol. 2, N° 2, p. 123-138.

LADIK, D. M. et LOCANDER, W.B. (2001), « A Functional Approach to Participation in Online Communities », *Quarterly Journal of Electronic Commerce*, Vol. 2, N° 4, p. 315-324.

LAFFERTY, B.A. et GOLDSMITH, R.E. (1999), « Corporate Credibility's Role in Consumers' Attitudes and Purchase Intentions When a High versus a Low Credibility Endorser Is Used in the Ad », *Journal of Business Research,* Vol. 44, N° 2, p. 109–116.

LASCU, D., BEARDEN, W.O. et ROSE, R.L. (1995), « Norm Extremity and Personal Influences on Consumer Conformity », *Journal of Business Research,* Vol. 32, N° 3, p. 201–213.

LIANG, K. et ZEGER, S.L. (1986), « Longitudinal Data Analysis Using Generalized Linear Models », *Biometrika*, Vol. 73, N° 1, p. 13-22.

LOHSE, L.G., BELLMAN, S. et JOHNSON, E.J. (2000), « Consumer Behavior on the Internet: Findings from Panel Data », *Journal of Interactive Marketing*, Vol. 14, N° 1, p. 15-29.

LUTZ, R.J. et REILLY, P.J. (1974), « An Exploration of the Effects of Perceived Social and Performance Risk on Consumer Information Acquisition », *Advances in Consumer Research*, Vol. 1, S. Ward et P. Wright (Eds.), Urbana, IL: Association for Consumer Research, p. 393-405.

LYNCH, J.G. et ARIELY, D. (2000), « Wine Online: Search Costs Affect Competition on Price, Quality, and Distribution », *Marketing Science*, Vol. 19, N° 1, p. 83-103.

MAES, P. (1999), « Smart Commerce: The Future of Intelligent Agents in Cyberspace », *Journal of Interactive Marketing,* Vol. 13, N° 3, p. 66–76.

McGRATH, M.A. et OTNES, C. (1995), « Unacquainted Influencers: When Strangers Interact in the Retail Setting », *Journal of Business Research*, Vol. 32, N° 3, p. 261-273.

McGRAW, K.O., TEW, M.D. et WILLIAMS, J.E. (2000), « The Integrity of Web-Delivered Experiments: Can You Trust the Data? », *Psychological Science*, Vol. 11, N° 6, p. 502-506.

McGUIRE, W.J. (1969), « The Nature of Attitudes and Attitude Change », *The Handbook of Social Psychology,* G. Lindzey et E. Aronson (Eds.), Reading, MA: Addison-Wesley Publishing Company, p. 137-314.

MILLER, D.T., PRENTICE, D.A. (1996), « The Construction of Social Norms and Standards », *Social Psychology: Handbook of Basic Principles,* T.T. Higgins et W.A Kruglansky,. (Eds.), New-York, NY: Guilford Press, p. 799-829.

MITRA, K., REISS, M.C. et CAPELLA, L.M. (1999), « An Examination of Perceived Risk, Information Search and Behavioral Intentions in Search, Experience and Credence Services », *The Journal of Services Marketing*, Vol. 13, N° 3, p. 208-228.

MIZERSKI, R.W., GOLDEN, L.L. et KERNAN, J.B. (1979), « The Attribution Process in Consumer Decision Making », *Journal of Consumer Research,* Vol. 6, N° 2, p. 123–140.

MOORE, D.L., HAUSKNECHT, D. et THAMODARAN, K. (1986), « Time Compression, Response Opportunity, and Persuasion », *Journal of Consumer Research,* Vol. 13, N° 1, p. 85–99.

MOORTHY, S., RATCHFORD, B.T. et TALUKDAR, D. (1997), « Consumer Information Search Revisited: Theory and Empirical Analysis », *Journal of Consumer Research*, Vol. 23, N° 4, p. 263-277.

MURPHY, J.(1999), « Surfers and Searchers », *Cornell Hotel and Restaurant Administration Quarterly*, Vol. 40, N° 2, p. 84-95.

MUSCH, J. et REIPS, U. (2000), « A Brief History of Web Experimenting », *Psychological Experiments on the Internet*, M. Brinbaum (Ed.), Orlando, FL: Academic Press, p. 61-87.

NELSON, P. (1970), « Information and Consumer Behavior », *Journal of Political Economy,* Vol. 78, N° 2, p. 311–329.

NELSON, P. (1974), « Advertising as Information », *Journal of Political Economy,* Vol. 83, N° 4, p. 729–754.

NEWMAN, J.W. (1977), « Consumer External Search: Amount and Determinants », *Consumer and Industrial Buying Behavior*, A.G. Woodside, J.N. Sheth et P.D Bennett (Eds.), New-York, NY:North-Holland, p. 79-94.

NOSEK, B. A., BANAJI, M.R., GREENWALD, A.G. (2002), « E-Research: Ethics, Security, Design, and Control in Psychological Research on the Internet », *Journal of Social Issues,* Vol. 58, N° 1, p. 161–176.

OHANIAN, R. (1990), « Construction and Validation of a Scale to Measure Celebrity Endorsers' Perceived Expertise, Trustworthiness, and Attractiveness », *Journal of Advertising,* Vol. 19, N° 3, p. 39–52.

OLSHAVSKY, R.W. (1985), « Perceived Quality in Consumer Decision-making: An Integrated Theoretical Perspective », *Perceived Quality – How Consumers View Stores and Merchandise*, J. Jacoby et J.C. Olson (Eds.), Lexington, MA: DC Heath & Co., p. 3-29.

OLSHAVSKY, R.W. et GRANBOIS, D.H. (1979), « Consumer Decision-making – Fact or Fiction », *Journal of Consumer Research,* Vol. 6, N° 2, p. 93–100.

OLSON, E.L., WIDING II, R.E. (2002), « Are Interactive Decision Aids Better than Passive Decision Aids? A Comparison with Implications for Information Providers on the Internet », *Journal of Interactive Marketing*, Vol. 16, N° 2, p. 22-34.

OPT-IN NEWS (2001), « 2001 Email Marketing Study: Volume 1 – Email Marketing AdNetworks », http://www.optinnews.com/news/showart.asp?DB=NewsTable&ID=267.

PARK, C.W. et LESSIG, V.P. (1977), « Students and Housewives: Differences in Susceptibility to Reference Group Influence », *Journal of Consumer Research*, September, Vol. 4, N° 2, p. 102-110.

PARK, C.W., MOTHERSBAUGH, D.L. et FEICK, L. (1994), « Consumer Knowledge Assessment », *Journal of Consumer Research,* Vol. 21, N° 1, p. 71–82.

PAYNE, J.W., BETTMAN, J.R. et JOHNSON, E.J. (1993), *The Adaptive Decision Maker*, Cambridge, NY: Cambridge University Press.

PEDERSEN, P.E. (2000), « Behavioral Effects of Using Software Agents for Products and Merchant Brokering », *International Journal of Electronic Commerce*, Vol. 5, N° 1, p. 125-141.

PERDUE, B.C. et SUMMERS, J.O. (1986), « Checking the Success of Manipulations in Marketing Experiments », *Journal of Marketing Research*, Vol. 23, N° 4, p. 317-326.

PEREIRA, R.E. (2000), « A Model of Consumer Evaluations of Decision Support Systems in Electronic Commerce », *Quarterly Journal of Electronic Commerce*, Vol. 1, N° 4, p. 335-362.

PERRY, M.et HAMM, B.C. (1969), « Canonical Analysis of Relations between Socioeconomic Risk and Personal Influence in Purchase Decisions », *Journal of Marketing Research*, Vol. 6, N° 3, p. 351-354.

PETERSON, R.A., BALASUBRAMANIAN, S. et BRONNEBBERG, B.J. (1997), « Exploring the Implications of the Internet for Consumer Marketing », *Journal of the Academy of Marketing Science*, Vol. 25, N° 4, p. 329-346.

PINCUS, S. et WATERS, L. K. (1977), « Information Social Influence and Product Quality Judgments », *Journal of Applied Psychology*, Vol. 62, N° 5, p. 615-620.

PRICE, L.L. et FEICK, L.F. (1984), « The Role of Interpersonal Information Sources in External Search: An Informational Perspective », *Advances in Consumer Research*, Vol. 11, T. Kinnear (Ed.), Provo, UT: Association for Consumer Research, p. 250-255.

ROSELIUS, T. (1971), « Consumer Rankings of Risk Reduction Methods », *Journal of Marketing*, Vol. 35, N° 1, p. 56-61.

ROSEN, D.L. et OLSHAVSKY, R.C. (1987a), « The Dual Role of Informational Social Influence: Implications for Marketing Management », *Journal of Business Research*, Vol.15, N° 2, p. 123-144.

ROSEN, D.L. et OLSHAVSKY, R.C. (1987b), « A Protocol Analysis of Brand Choice Strategies Involving Recommendation », *Journal of Consumer Research*, Vol. 14, N° 3, p. 440-444.

ROWLEY, J. (2000), « Product Search in E-shopping: A Review and Research Propositions », *Journal of Consumer Marketing*, Vol. 17, N° 1, p. 20-35.

RUSSO, E.J., MEDVEC, V.H. et MELOY, M.G. (1998), « Predecisional Distortion of Product Information », *Journal of Marketing Research,* Vol. 35, N° 3, p. 438–452.

SALOMON, I. et KOPPLEMAN, F.S. (1992), « Teleshopping or Going Shopping, An information acquisition perspective », *Behaviour & Information Technology*, Vol. 11, N° 4, p. 189-198.

SCHULMAN, G.I. et WORRALL, C. (1970), « Salience Patterns, Source Credibility, and the Sleeper Effect », *Public Opinion Quarterly,* Vol. 34, N° 3, p. 371–382.

SENECAL, S. et NANTEL, J. (2001), « Online Interpersonal Influence: A Framework », eCommerce Research Forum, N° 117, MIT (http://ecommerce.mit.edu/forum/).

SHEEHAN, K.B. et McMILLAN, S.J. (1999), « Response Variation in Email Surveys: An Exploration », *Journal of Advertising Research*, Vol. 39, N° 4, p. 45-54.

SHETH, J.N. et VENKATESAN, M. (1968), « Risk-Reduction Processes in Repetitive Consumer Behavior », *Journal of Marketing Research*, Vol. 5, N° 3, p. 307-310.

SIMONSON, I.(1999), "The Effect of Product Assortment on Buyer Preferences", *Journal of Retailing*, Vol. 75, N° 3, p. 347-370.

SOLOMON, M.R. (1986), « The Missing Link: Surrogate Consumers in the Marketing Chain », *Journal of Marketing*, Vol. 50, No. 4, p. 208-218.

SPILLER, P. et LOHSE, J. (1998), « A Classification of Internet Retail Stores », *International Journal of Electronic Commerce,* Vol. 2, N° 2, p. 29–56.

SRINIVASAN, S.S., ANDERSON, R. et PONNAVOLU, K. (2002), "Customer Loyalty in E-Commerce: An Exploration of Its Antecedents and Consequences", *Journal of Retailing*, Vol. 78, N° 1, p. 41-50.

STERNTHAL, B., PHILLIPS, L.W. et DHOLAKIA, R. (1978), « The Persuasive Effect of Source Credibility: A Situational Analysis », *Public Opinion Quarterly,* Vol. 42, N° 3, p. 285–314.

STEVENSON, J.S., BRUNER, G.C. et KUMAR, A. (2000), « Webpage Background and Viewer Attitudes », *Journal of Advertising Research*, Vol. 40, N°s 1-2, p. 29-34.

STILL, R.R., BARNES, J.H. Jr. et KOOYMAN, M.E. (1984), « Word-of-Mouth Communication in Low-Risk Product Decisions », *International Journal of Advertising*, Vol. 3, N° 4, p. 335-346.

STOKES, M.E., DAVIS, C.S. et KOCH, G.G. (2001), *Categorical Data Analysis Using The SAS System*, 2e Edition, Cary, NC: SAS Institute Inc.

SZYMANSKI, D.M. et HISE, R.T. (2000), "e-Satisfaction : An Initial Examination", *Journal of Retailing*, Vol. 76, N° 3, p. 309-322.

TYBOUT, A.M. (1978), « Relative Effectiveness of Three Behavioral Influence Strategies as Supplements to Persuasion in a Marketing Context », *Journal of Marketing Research,* Vol. 15, N° 2, p. 229–242.

URBAN, G., SULTAN, F. et QUALLS, W. (1999), « Design and Evaluation of a Trust Based Advisor on the Internet », Working Paper, No. 40, e-Commerce Research Forum, MIT.

VIJAYASARATHY, L.R. (2001), « Beyond Beliefs: The Impact of Shopping Orientations, Product Types, and Shopping Aids on Attitude and Intention to Used Online Shopping », *Quarterly Journal of Electronic Commerce*, Vol. 2, N° 2, p. 99-113.

WARD, M.R. et LEE, M.J. (1999), « Internet Shopping, Consumer Search and Product Branding », Working Paper, N° 14, eCommerce Research Forum, MIT.

WIENER, J.L. et MOWEN, J.C. (1986), « Source Credibility: On the Independent Effects of Trust and Expertise », *Advances in Consumer Research,* Vol. 13, R.J. Lutz (Ed.), Provo, UT: Association for Consumer Research, p. 306–310.

WOOD, S.L. (2002), "Future Fantasies: A Social Change Perspective of Retailing in the 21st Century", *Journal of Retailing*, Vol. 78, N° 1, p. 77-83.

WRIGHT, P. (1975), « Consumer Choice Strategies: Simplifying Vs. Optimizing », *Journal of Marketing Research*, Vol. 12, N° 1, p. 60-67.

WYNER, G.A. (2000), « Learn and Earn Through Testing on the Internet », *Marketing Research*, Vol. 12, N° 3, p. 37-38.

ZIDMUND, W.G. et SCOTT, J.E. (1974), « A Multivariate Analysis of Perceived Risk Self-Confidence and Information Sources », *Advances in Consumer Research*, Vol. 1, S. Ward et P. Wright (Eds.), Urbana, IL: Association for Consumer Research, p. 406-416.

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