WHEN IS OURS BETTER THAN MINE?

A FRAMEWORK FOR UNDERSTANDING AND ALTERING PARTICIPATION IN COMMERCIAL SHARING SYSTEMS

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Sharing systems are increasingly challenging sole ownership as the dominant means of obtaining product benefits, making up a market estimated at over $100 B annually in 2010. Consumer options include cell phone minute sharing plans, frequent flyer mile pools, bike sharing programs, and automobile sharing systems, among many others. However, marketing research has yet to provide a framework for understanding and managing these emergent systems. The present paper conceptualizes commercial sharing systems within a typology of shared goods. Three studies then demonstrate that beyond cost-related benefits of sharing, the perceived risk of scarcity related to sharing is a central determinant of its attractiveness. Results suggest that managers can use perceptions of personal and sharing partners' usage patterns to affect risk perceptions and subsequent propensity to participate in a commercial sharing system.

Keywords: sharing, marketing communications, risk, competition, pooled resources, social similarity

Firms and consumers increasingly view sharing as a sustainable, profitable alternative to ownership (Belk 2007, Botsman and Rogers 2010). Growth in sharing systems has been accelerated by social media's ability to facilitate online music and movie sharing (Galbreth, Ghosh, and Shor 2012; Gansky 2010; Henig-Thurau, Henning and Satler 2007). However, physical product sharing systems are expanding at a rapid rate as well (Benkler 2004; Gansky 2010). For example, Zipcar began as a single shared Volkswagen a decade ago, but has grown to over 400,000 participants, 6500 vehicles, and revenues over $130 million (Bloomberg 2010). According to a 2010 study, the car sharing market in North America alone will top $3B by 2016 (Frost & Sullivan 2010). Bicycle sharing systems have sprung up worldwide, accounting for approximately 2.2 million bike-sharing trips per month. As a whole, the sharing economy's worth is estimated at above $100B, and is expected to rise rapidly as consumers and firms seek to maximize efficiency in volatile economic conditions (Sacks 2011).

Sharing systems present unique challenges and opportunities for traditional ownership-based business. As Umair Haque noted in an interview with the magazine *Fast Company*, "(Sharing) has the potential to be lethally disruptive…Certain industries have to rewire themselves, or prepare to sink into the quicksand of the past" (Sacks 2011). Recognizing this, some ownership-based firms are entering the sharing domain. For example, automobile manufacturer Mercedes recently entered the car sharing business themselves (Botsman and Rogers 2010). Unfortunately, commercial sharing system managers cannot rely on marketing scholarship as a guide, because no theoretical frameworks codify commercial sharing systems as different from traditional ownership modalities or empirically demonstrate how consumers evaluate differently-designed sharing plans. Meanwhile, industry sources remain unsure about the drivers of sharing propensity (Potts 2011) and fundamental questions remain unanswered. For example, consider a manager in the telecommunications industry. Will users choose a

sharing as opposed to sole ownership cell phone plan? With whom should they be able to share? How could sharing options be made more appealing? Similarly, consider an automotive manager forecasting the impact of the sharing economy. How could she predict the appeal of shared as opposed to purchased vehicles, or frame communications such that consumers' tendency to opt for one ownership type or the other could be affected?

To answer these questions, we begin by defining commercial sharing programs as marketer-managed systems that provide customers with the opportunity to enjoy product benefits without ownership. Importantly, these systems are characterized by between-consumer rivalry for a limited supply of the shared product. Consistent with rational utility models, we find that consumers will have more interest in sharing when costs of sharing are minimized and benefits from sharing are maximized (Hennig-Thurau, Henning and Sattler 2007; Sinha and Mandel 2008). However, beyond these effects, because sharing systems involve rivalry, perceived product scarcity risk – the likelihood that a product or product-related resource will be unavailable when a consumer desires access – is an important determinant of sharing propensity. Importantly, product scarcity risk is dependent not only on a given consumer's usage, but also on the usage of potential sharing partners. By isolating factors that alter perceived product scarcity risk, we identify ways in which managers can measure or affect risk perceptions and, with them, predict or change the attractiveness of sharing options. As such, the present findings provide a compass for managers seeking to navigate sharing systems. At the same time, we provide a framework that can be enriched as this ownership modality undergoes future evolution.

Conceptualization and Hypotheses

What are commercial sharing systems?

The public goods literature provides a classification system (Samuelson 1954, Ostrom 2003) to conceptualize different types of shared goods based on their rivalry and exclusivity.

Rivalry refers to the degree to which use of the product by one consumer subtracts from the availability of the product to other consumers. In other words, customers may compete for a limited supply of the shared product. Exclusivity refers to the degree to which access to the product can be controlled and restricted to a group of consumers based on some criteria.

Table 1 provides a classification of a range of sharing contexts sorted by these dimensions. Because little has been written about commercial sharing programs, we provide examples and links to more information in each quadrant. Note that these dimensions are continua, not dichotomous classes. We organize them in discrete clusters for simplicity of explication. The quadrants imply lower rivalry/lower exclusivity, lower rivalry/higher exclusivity, higher rivalry/lower exclusivity, and higher rivalry/higher exclusivity, respectively.

Insert Table 1 about here

We consider quadrant one and two sharing systems similar to those explored in public goods (Hardin 1968, 2007; Hudson and Jones 2005) and club goods (Heath and Fennema 1996; Iyengar et al. 2011; Ostrom 2003) literatures. Lower levels of rivalry characterize these types of shared products – use by one consumer does not generally make the good unusable by others, except at extremely high levels. Because our focus is on commercial sharing systems, we do not elaborate on quadrants one and two in the present paper.

Higher rivalry for the shared good is introduced in quadrants three and four, where most commercial sharing systems reside. Here, use by one consumer can preclude use by another. For example, consider commercial bike sharing systems in quadrant 3 such as Nice Ride in Minneapolis and St. Paul, Minnesota. Such systems are open to anyone who would like to participate at any time and can afford the minimal entry cost ($50 per year for students). However, bikes and bike parking stations cannot be assured whenever a consumer wants to take

a bike or return one. Thus, exclusivity is relatively low but rivalry for access to the shared good can be high. Car sharing systems such as ZipCar and Connect by Hertz, also fit within this quadrant – virtually anyone can gain access to the shared good. However, car availability is not guaranteed because even members with reservations are dependent on the previous user to return the vehicle on time and in serviceable condition. Sharing systems in quadrant 4 exhibit higher levels of both rivalry and exclusivity. For example, in shared cell phone plans or frequent flyer mile pools, every minute used by a group member (an exclusive group) subtracts from the supply of minutes available to other authorized users (suggesting rivalry). Thus, rivalry for access to the shared product exists among a limited number of participants. We will return to a discussion of rivalry later in our conceptual development, as it presents both distinct opportunities and challenges to marketers of commercial sharing options.

Why share? Developing an augmented utility model for commercial sharing

Anecdotal evidence suggests that sharing systems may be preferred because they allow access to a desired product with lower costs (Sacks 2011). This is consistent with rational models, where consumers seek products that provide the greatest amount of benefit at the lowest cost possible. Thus, we take the idea of costs and benefits as a baseline in understanding consumers' propensity to share. Hennig-Thurau, Henning and Sattler's (2007) study of illegal electronic file sharing provides a utility-based framework for understanding the way that consumers negotiate sharing versus ownership. We follow their work in disaggregating shared-product costs and utility into relevant analogs in commercial sharing systems.[i] While it is an empirical question which specific costs and sources of utility will predict commercial sharing propensity, we propose that as costs of sharing are minimized and utility is maximized relative to ownership, propensity to choose a sharing system will rise. We then suggest that a novel

augmentation of this model is necessary to address rivalry inherent in commercial sharing systems and to provide practical insights for managers seeking to market these unique options.

Costs of sharing. Three types of costs are likely to affect customers' perceptions of the overall utility of a sharing option. First, the price of a shared product may include a one-time system membership fee or periodic access fees. We refer to this as the price of sharing. Second, technical costs refer to non-monetary costs associated with coping with and learning how to use unfamiliar products. This cost is usually incurred one time with products that are purchased. However, with shared products this cost may be incurred multiple times. For example, in a car sharing system customers may have to operate unfamiliar vehicles repeatedly as they access different types of vehicles. Third, search costs are created via the money or effort needed to determine which product to purchase or which sharing program to enter. In sharing programs additional search costs may also be incurred after entry as customers have to identify and access the appropriate version of the shared product for them.

Sources of overall sharing utility. To understand the overall value of a sharing proposition it is important to identify various sources of utility. Again, consideration of this context requires particular modifications. First, transaction utility refers to the deal value perceived in a sharing system, similar to the transaction utility provided by ownership (Thaler 1985). Second, sources of utility related to flexibility (analogous to mobility utility in Hennig-Thurau et al's work) refer to the absence of limitations on product use within a sharing system. For example, Zipcars are available in many locations, many types of vehicles are available in the system, and the system's automobiles may be used for a variety of purposes. To the extent that consumers can access the product in many different ways, they will perceive high flexibility utility. Third, storage utility refers to product storage advantages obtained through sharing products. For example, in vehicle sharing systems, storage is the sharing system manager's

responsibility, not the customer's. This frees consumers' storage space for other uses. Fourth, anti-industry utility refers to psychological gains derived from a decision that denies support of the traditional ownership market. For example, sharing tools through a tool library may be a way consumers can "punish" the power tool industry for promoting the wasteful acquisition of products that sit unused most of the time. Fifth, social utility refers to the gains that may accrue to sharing participants in the form of approval by reference groups (e.g., the Sierra Club members may support car sharing because it conserves natural resources). Finally, consumers interested in sustainable or prosocial behavior may feel that sharing offers a way to protect the environment or reduce waste (Minton and Rose 1997; Sacks 2011). Thus, consumers may also derive moral utility from sharing as opposed to owning a product.

Other predictors of sharing propensity. As Hennig-Thurau, Henning and Sattler (2007) suggest, if owning and sharing are perceived as providing equivalent product benefits (i.e., they are seen as substitutes), consumers may be more likely to opt for sharing. For example, a shared car may be seen as a closer substitute for an owned car for consumers who do not view car ownership as important to their identities. We anticipate that such individuals will find sharing more appealing. Finally, we predict that consumers who are more familiar with commercial sharing are more likely to participate, as prior knowledge reduces uncertainty about the ability to successfully access the system's utility (Alba and Hutchinson 1987).

Rivalry and Risk. Taken together, this utility model suggests that sharing systems can be promoted in the same way as virtually any product: maximize benefits relative to costs, highlight substitutability, and increase knowledge. However, following this model will do little to generate marketing campaigns that are uniquely tailored to sharing systems. It is important to recall that commercial sharing systems involve rivalry for the shared product. Without accounting for

rivalry, marketers are not empowered to develop campaigns that effectively address all sources of utility in commercial sharing systems.

Because of rivalry, the overall attractiveness of sharing is dependent not only on a consumer's perceptions of costs and benefits but also on perceptions of other consumers' usage (Coase 1960). That is, consumers may believe that others' usage could preclude their own ability to enjoy the sources of utility offered by sharing. If so, we propose that even after controlling for all costs and benefits, if the possibility that consumers will not be able to access a product is perceived to be high, they will find sharing systems significantly less attractive than if access is assured. The possibility that a consumer will not be able to access a product constitutes a risk, as it captures the perceived likelihood of negative consequences associated with sharing (Rindfleisch and Crockett 1999). Note too that this possibility is best understood as a subjective perception rather than an objective quantity (Loewenstein, Hsee, Weber and Welch 2001). We therefore refer to consumers' beliefs about the extent to which sharing will inhibit access to the shared product as *perceived product scarcity risk*. Thus, we both acknowledge the baseline role of costs and various sources of utility in predicting sharing, but also propose a novel augmentation to this model, specific to commercial sharing contexts:

> H1: Beyond the effects of costs, sources of utility, substitutability, and knowledge, perceived product scarcity risk will have a significant negative influence on consumers' propensity to choose a commercial sharing as opposed to an ownership option.

What drives perceived risk of scarcity?

But how can marketers alter perceived scarcity risk in sharing systems? As no prior research has considered this question, we present our framework in Figure 1. Our model augments considerations of factors such as costs, benefits, knowledge and substitutability with two sources of scarcity risk specific to commercial sharing systems: consumers' personal usage

(predictability and absolute level) and sharing partners' potential demands on the shared product (control over others' usage and partner similarity). As such, it recognizes that sharing propensity is not only dependent on the consumer considering sharing program participation, but also on other sharing partners. To the extent these factors increase (decrease) perceived product scarcity risk, they decrease (increase) likelihood of sharing. Further, to the extent that managers can measure or manipulate factors that alter risk, this mediator will also influence sharing propensity. We now identify a number of factors that past research and intuition suggest may exert only main effects on perceived risk, and with it, explain sharing likelihood. For each, we argue that important moderators must also be recognized for managers to use these factors efficiently.

Insert Figure 1 about here

The effect of personal usage patterns and control. Marketers may have access to consumers' past usage patterns, for example, in the case of cell phone plans. If this information can predict sharing's appeal, marketers should be able to target communications to consumers with the highest likelihood of opting in. We propose that usage patterns may indeed be a key in predicting propensity to share based on prior research. For example, Winterhalder (1986) notes that when foragers see high variance, and thus, low predictability, in their food gathering and needs, they are more likely to share. By doing so, they anticipate future reciprocity (Marlowe 2004). Similarly, a cell phone user may have leftover minutes in some months, while other months see her in a deficit. The variability of her usage makes future needs less predictable and may increase the attractiveness of sharing. Thus, prior work and intuition suggest a main effect of predictability, such that consumers who have low ability to predict their own use will have a higher propensity to share.

However, we propose that targeting sharing programs simply based on usage

predictability may not yield consistent effects on perceived product scarcity risks and thus, on sharing likelihood. Recall that in commercial sharing systems rivalry exists among sharing partners. Thus, usage patterns of others may offset the utility that sharing can provide, even to low predictability consumers. That is, the low predictability user may find that others have high product demands during precisely the months in which she has the greatest need, and thus, sharing may not decrease her risk of product scarcity at all. Perhaps because managers recognize the possibility that in some cases, sharing may fail to reduce risk, many commercial sharing systems include mechanisms that allow one consumer to control the resource use of others. For example, AT&T's "Smart Limits for Wireless" allows the primary account holder (i.e, the sharing system proprietor) to set some limits on the types and amounts of wireless usage available to other plan participants at an additional cost of $4.95 per month. These control mechanisms allow the customer to ensure that the product is available when she needs it (Mause 2008), thus reducing the risk of scarcity and increasing sharing's utility.

We expect that low predictability consumers would be more likely to participate in a sharing system only if their sense of *control* over the product/service usage of others were raised. Such mechanisms are most likely to be available in exclusive (quadrant 4) sharing systems, where consumers can self-manage exposure to overuse by others by simply excluding individuals from the plan whom they believe may increase risk of product scarcity. Thus, we will need to show that a formal control program offered by the marketer has effects on perceived risk of product scarcity and sharing propensity even in such exclusive contexts. Formally:

> H2: Consumers' usage predictability and perception of control over others' usage will interact to predict sharing propensity. Specifically, the tendency of low usage predictability to make sharing systems more attractive relative to high usage predictability holds only when control over potential partners' usage is higher rather than lower.

H3: The interactive effect on sharing likelihood proposed in H2 will be mediated by perceptions of risk of product scarcity associated with participating in the sharing system.

The effect of similarity. Specifying that sharing partners are similar to the focal customer could also offer one intuitively appealing way to reduce concerns about scarcity risk. Not only does similarity offer the possibility of easy targeting and promotion, designing a system that meets the needs of a single demographic segment may be more feasible than designing a system that might meet all participants' needs. For example, T-mobile, Verizon, and AT&T offer "friends and family" plans, whereby individuals specify acquaintances with whom to pool cell phone minutes. Cell phone sharing systems in developing nations allow people in any village, who are likely to share cultural or demographic similarities, to share one cell phone handset (Schwartz 2010). Carpooling systems like Commuter Connections tailor promotions to working professionals who may desire the same benefits from sharing and respond positively to the same persuasive arguments.

Similarity among sharing partners should affect a program's attractiveness because it directly enhances trust, a social factor that prominent sharing advocates propose as a key determinant of participation in collaborative consumption (Botsman and Rogers 2010) and the development of non-rivalrous public goods (Krupp, Debruine and Barclay 2008). When individuals trust one another, they suspend negative expectations that others' actions will harm them (Mayer, Davis and Schoorman 1995; Rousseau et al. 1998). In a commercial sharing context this means that a consumer would expect trusted others to refrain from overuse or abuse of the shared product. Individuals tend to trust those with whom they have attitudes or other characteristics in common (Siegrist, Cvetkovich, and Roth 2000; Turban and Jones 1988). Thus, consumers should be less concerned about overuse by others when those others are similar. In fact, research has shown that abuse of the commons – again, a non-rivalrous resource - is lower

when participants have more in common, due to enhanced levels of trust (Smith, Bell and Fusco 1988). Similarly, when sharing with similar others, fluid communication allows for compromise in usage, such that informal agreements can be worked out regarding proportionate use. Thus, based on trust and communication arguments, similarity of usage partners should exert only a positive main effect on sharing.

However, most of these findings involve contexts in which rivalry is minimal. Thus, these intuitions and prior findings may be less relevant to commercial sharing systems. When rivalry exists as in quadrants 3 and 4, competition for the scarce product exists among sharing partners. Such effects are similar to those seen in the creation of "businesslike environments," which prompt a more competitive rather than cooperative mindset (Kay et al. 2004). In fact, group threat theory suggests that competition for resources can be even greater among similar others rather than dissimilar others (Blalock 1967). In our context, this is because individuals who are demographically similar to the decision maker will be inferred to have similar usage patterns as well (Cunningham 2007; Naylor, Lamberton and Norton 2011). For low-usage consumers, usage similarity should not necessarily alter sharing likelihood: if both I and other users rarely used the shared cell phone, we would be unlikely to deplete the available minutes or text messages. There would be little risk created by similarity, and thus, sharing propensity would not be impacted. However, for consumers with high usage, similar others would be inferred to place high demands on the shared good. Thus, direct competition with similar others would exist, and consumers would be concerned that none of the shared resource would be available when they needed it. Therefore, for high usage consumers, similarity to sharing partners should raise the risk of product scarcity. We anticipate that among higher-usage consumers commercial sharing systems heighten the potential risk of product scarcity, and consequently lower propensity to share. These conjectures are formalized as follows:

H4: Consumers' usage level and perceived similarity of sharing partners interact to predict sharing propensity. Specifically, the tendency for similarity to increase sharing propensity holds only for lower as opposed to higher usage consumers. When a consumer's usage level is higher, similarity decreases sharing propensity.

H5: The interactive relationship between personal usage, similarity of sharing partners and sharing propensity proposed in H4 is mediated by perceived risk associated with the sharing system.

Study 1 surveyed consumers regarding a shared vehicle program similar to Zipcar. This study tests the influence of product scarcity risk when included in an augmented version of the utility model developed by Hennig-Thurau, Henning and Sattler (2007). As expected, aspects of both cost and benefit drive sharing propensity. However, consistent with hypothesis 1, perceived product scarcity risk is important beyond these factors. In study 2, consumers evaluate cell phone plans modeled on marketplace offerings, where cost savings from sharing are explicitly stated. Here, costs of sharing are again important. However, results also depict the interdependence between consumers' usage and that of sharing partners: customers' perceptions of their own control over product usage moderate the effects of usage predictability on likelihood of sharing. Consistent with hypothesis 3, these effects are mediated by consumers' product scarcity risk perceptions. Study 3 presents college students with a bicycle-sharing plan where all participants are likely to save money. In this context we test hypothesis 4, observing interactive effects of personal usage and partner similarity on sharing propensity, again mediated by risk perceptions (hypothesis 5). In this study, ecologically valid scarcity risks are related to the availability of bike return racks, rather than the bicycles themselves, thus showing the same pattern as in study 2 with a different operationalization of risk. Further, we show that while trust is influenced by similarity, scarcity risk provides the more robust explanation of sharing likelihood.

Study 1

Study 1 establishes the role of cost, utility, and risk-related elements in propensity to share in the context of a car-sharing program. Car sharing programs like Zipcar conform well to the definition of a commercial sharing system because rivalry exists: high demand by some consumers can preclude product access for others. As such, this study demonstrates the empirical and theoretical distinctiveness of commercial sharing systems as opposed to systems that do not involve rivalry for the shared product. Further, results suggest that by changing consumers' perceptions of product scarcity risk, marketers can exert a significant influence on consumers' propensity to choose a sharing system – a topic we explore further in studies 2 and 3.

Method

A sample of 369 licensed US drivers (43% male, M_{age} = 34.19 years, 80% white) was recruited using the online panel provided by Amazon's Mechanical Turk and paid $1.00 in return for their participation. Eighty-nine percent of respondents owned their own car, and 13% of participants anticipated being in the market for a car in the next 12 months. Interestingly, though the incidence of car sharing was quite low in our sample, we note that the demographic makeup of car sharing customers also roughly mirrors our sample. Burkhard and Millard-Ball's demographic analysis of car-sharers (2007) lists the mean age of car sharers in their 30's (median age: 35, vs. our sample, where the mean age was about 34 years), notes that approximately 43% of US users are male (while our sample was also composed of 43% males), and car sharers are predominately White (87% in their sample, 80% in ours). Thus, our sample likely captures many consumers who would be in Zipcar's potential market.

Participants were provided with information adapted from the Zipcar.com website. (See Web Appendix.) Then participants were asked to estimate their monthly car ownership cost, including insurance, taxes, maintenance, and monthly car payment. We also asked which of a set of sharing programs would be most appropriate for them based on their usage, also adapted from

the Zipcar.com website. This allowed us to determine the cost of a sharing program that would meet their needs. Then, participants reported their likelihood of choosing this sharing program and responded to all other measures listed in table 2. Note that we augmented this model with measures of perceived risk of product scarcity. Doing so allows us to test its role relative to cost, utility, substitutability, and knowledge-related factors, consistent with hypothesis 1. Measures for each construct were patterned as closely as possible after those used in Hennig-Thurau, Henning and Sattler's model (2007), in order to maximize the validity of the comparison of sharing contexts.

We would like to explain the few single-item measures used in this study. First, gross utility was measured as participants' willingness to pay for ownership, as in Hennig-Thurau, Henning and Sattler's model and consistent with standard measurement practice in economics, where the reservation price for a good is used to capture the total amount of utility individuals perceive in a given alternative. Price of ownership was calculated by summing participants' reported costs of monthly payments, insurance, fuel costs, maintenance, parking, and taxes. Transaction utility was measured using simple "deal value" measures, again consistent with Hennig-Thurau, Henning and Sattler's description of the construct and Thaler's (1985) terminology, such that "the perceived merit of the 'deal'" (p. 5) is captured using straightforward language, but without conflating that construct's measure with other sources of utility. Unless otherwise specified, responses to other measures were captured on a 6-point scale anchored by "strongly disagree" (1) and "strongly agree" (6) such that results are comparable to Hennig-Thurau, Henning and Sattler (2007). Aside from the sharing likelihood measures collected first, other measures were displayed in random order. Demographic information was collected last.

Insert Table 2 about here

Analysis

We first checked the reliability of our measures. As shown in table 2, all reliability coefficients were acceptable (alpha = .69 or higher). Measures with multiple items were averaged. All measures loaded appropriately on their intended constructs, with no cross-loadings greater than .5. Correlations between all latent variables (available from the authors) were also equal to or less than .5, with the exception of the gross utility of sole ownership (measured by maximum willingness to pay to own one's own car) and current cost of ownership, which were correlated at .68. Since most people will anchor on their current cost and adjust upward or downward, this is an unsurprising correlation. No variance inflation factors were greater than 2.5, suggesting that this correlation did not introduce problematic levels of multi-collinearity.

We then conducted a regression analysis using all cost and utility model predictors, augmented by perceived product scarcity risk, to predict the likelihood of participating in a sharing plan. We first note that various control variables (age, gender, marital status, likelihood of being in the market for a car in the next 12 months, etc.) had no significant impact on the dependent measure and were not included in the final model. We also note that the model augmented with product scarcity risk provides an r-squared of .62 as opposed to the model without product scarcity risk, which provides an r-square of .57. Both standardized and unstandardized parameter estimates and t-values are noted in table 2.

Results and discussion

We first note that the likelihood of sharing is relatively low in this data (M = 2.51, SD = 1.43). Still, given this low range, results in table 2 show that some elements of cost, substitutability, knowledge, and utility are relevant to legal commercial sharing systems, as they are to illegal file sharing contexts (Hennig-Thurau, Henning and Sattler 2007). Beyond supporting the external validity of their utility model, our findings emphasize somewhat different

elements of cost and utility and suggest an important augmentation of the model for the commercial sharing context.

Though they could vary in their relative importance across sharing contexts, some elements of cost and utility would likely predict propensity to choose any sharing system. In the car-sharing context, we find that transaction utilities associated with both ownership and sharing are important, as are perceived degree of substitutability between ownership and sharing and sharing knowledge. Further, technical costs (involving the car's actual functions) and mobility utility (which involves the number of locations in which consumers will be able to access the sharing program) are both determinants of sharing propensity. Interestingly, despite Zipcar's attempt to attract users based on environmental concerns, moral benefits of sharing do not appear to drive sharing propensity in our sample. In this context, consumers also do not seem driven by social benefits of sharing, search costs, or anti-industry motivation. Future research should consider the roles of specific elements of cost and sources of utility in other contexts, as they are likely to vary somewhat depending on the product being shared.

More importantly, consistent with our conceptualization of commercial sharing systems and hypothesis 1, consumers' perceived risk of product scarcity plays a significant role in determining sharing propensity even when cost, utility, substitutability, and knowledge are accounted for. Thus, while a utility model predicts commercial sharing propensity in some ways parallel to its ability to predict illegal sharing, the commercial sharing context is theoretically and empirically distinct from the target of Hennig-Thurau, Henning and Sattler (2007) and Sinha and Mandel (2008)'s work. We conclude that explaining behavior in the commercial sharing domain requires a consideration of perceived product scarcity risk, due to rivalry for the shared product.

While supporting our conceptualization of commercial sharing systems, this study presents a number of limitations. First, sharing propensity in this study is low, likely partially due

to the low penetration of and familiarity with car-sharing systems in the US. For the next study, we adopt a context more familiar to most US consumers, cell phone minute sharing plans. Further, in study 1, it is possible that participants did not do the mental calculations to determine cost savings from sharing, meaning that cost-related elements could be underweighted. The intuitively accessible nature of risk, by contrast, may therefore play a larger role in decision-making than it might in the face of intentionally calculated costs savings. While we anticipate that this is an ecologically valid condition, in that many consumers do not carefully calculate cost savings when making purchase decisions, we still need to show that perceived scarcity has an important impact when clear cost savings calculations are made. Thus, in study 2 we make the savings associated with sharing more transparent to participants. Most importantly, though study 1 shows the effect of perceived product scarcity risk, our results do not explain what generates or reduces such perceptions. It is to this question that we turn in studies 2 and 3.

Study 2

Study 2 is set in the context of a cell phone minute sharing plan, the details of which are based on major-provider plans currently available in the marketplace. First, we show that individuals who can obtain a lower cost per unit by sharing are more motivated to do so, but again demonstrate that perceived product scarcity risk explains sharing propensity beyond this effect. Second, similar to Sinha and Mandel (2008)'s approach to an illegal file-sharing context, we adopt experimental methods to test our theory. Specifically, we test whether the predictability of one's own usage based on prior experience (information to which marketers are likely to have access) interacts with expectations about the usage of other sharing partners to predict sharing propensity (information which can be altered via marketing message framing). We manipulate whether cell phone plans have an option to limit the usage of other sharing partners. Thus, our

approach is analogous to a real market offering an add-on option that allows control of others' usage. Thus, this study tests hypotheses 2 and 3, providing insight into ways that marketers could forecast or manipulate perceived risk of product scarcity and consequently affect sharing program participation,.

We propose that individuals who find it difficult to predict their own needs (here called low-predictability consumers) are more interested in sharing than individuals whose needs are highly predictable. However, we also expect perceived control over the product or service usage of sharing partners to interact with personal usage predictability. That is, low-predictability consumers should be motivated to share by the provision of a control factor in the sharing system's design, since the ability to control others' usage would allow them to raise the likelihood that a sharing option would decrease their risk of product scarcity.

Method

One hundred twenty-three US participants completed the survey using Amazon's Mechanical Turk panel (M_{age} = 34.25, M_{income} = $37,540, 36% male) and paid $1.50 for their participation. The study followed a 2 (control, no control) x continuously-measured usage predictability between-subjects design. Participants were asked to review a plan matrix similar to one offered by a leading cell phone provider (Appendix A). This matrix included the actual plan details regarding rollover minutes and sharing options as provided by the cellular service company. Note that each participant could also see the savings each plan offered, framed in language used by the cell provider. In the high control condition, participants were told that they could opt for a plan called CellControl, which would allow them to place limits on the minutes used by other individuals included in the sharing program. This option was a modified version of AT&T's Smart Controls plan (Appendix A, bottom), but the plan provider was not identified. In the no control condition, this option was not provided.

Participants then reported their likelihood of choosing one of the sharing plans, using a scale anchored at 1 (very unlikely) to 7 (very likely.) They also specified their plan choice. Perceived product scarcity risk associated with sharing was assessed by answering the question, "To what extent do you feel that choosing a sharing plan will reduce your risk of paying overage charges?" ranging from 1 (not at all) to 5 (very much). This is a valid measure of scarcity risk in a cell phone minute sharing system because extra minutes are always available, but require payment of a substantial fee. Participants then provided their personal level of usage predictability by answering the question, "How well can you predict your personal cell phone usage?" from 1 (very poorly) to 5 (very accurately). The control manipulation was checked by answering, "How much control could you have over others' cell phone usage, in the plans you read about?" where 1 indicated an answer of none and 5 indicated total control. Finally, participants reported whether they currently owned or had owned a cell phone in the past.

Results

Manipulation checks. One participant who had never owned a cell phone was excluded from the analysis. For other observations, some missing data were present; where data is available, it is included in the analysis. Control condition was contrast coded (-1 = control, 1 = no control) and usage predictability was mean-centered (M = 3.03, SD = .69) in all analyses. These two factors, along with their interaction, were first used to predict participants' responses to the control manipulation check. ANOVA indicated that individuals in the control condition perceived their control over others' usage to be greater ($M_{control} = 3.28$) than did those in the no-control condition ($M_{no\ control} = 2.10$, $F(1,118)=37.42$, $p < .0001$). No cross-manipulations or interactions were seen (all p's > .6).

Propensity to choose sharing option. A model including usage predictability, control condition, and their interaction was used to predict participants' likelihood of choosing a sharing

plan. We also included cost per line in the analysis, to see if effects of risk-related factors persist beyond the effect of cost. To determine the cost of sharing, we divide the price of the plan participants chose by the number of lines they wanted to include in the plan. We first note that in this full model, cost per line did not create any two-way or three-way interactions in the analysis. Thus, it is entered as a covariate. Cost per line was a significant predictor of sharing likelihood (b = -.08, $F(1, 117) = 38.44$, $p < .0001$). However, consistent with hypothesis 2, a two-way interaction also emerged (b = .67, $F(1,117) = 5.82$, $p = .02$), as depicted in figure 2, panel A.

To better understand this interaction, we plotted likelihood of choosing a sharing plan at +1 SD, the mean value, and –1 SD from the mean value of predictability and considered the effect of having control as opposed to having no control at each level (Aiken and West 1991). This analysis shows that when participants did not have control over other sharing partners' usage, personal usage predictability did not have a significant effect on sharing likelihood (b = .36, F(1, 117 = .69, p = .41). However, when the sharing plan allowed control over others' usage, lower usage predictability consumers were significantly more likely than higher usage predictability consumers to share (b = .99, F(1, 117 = 7.18, p = .008), consistent with hypothesis 3. Analysis of the slopes of the regression lines shows that for high and moderate predictability individuals, control made no difference in sharing likelihood (high: b = .14, t(117) = .69, p = .48, average:(b = -.27, t(117) = -.27, p = .14). However, most relevant to hypothesis 2, control over others' usage significantly increased likelihood of choosing a sharing plan among low-predictability participants (b = .74, t(117) = 2.73, p = .008).

Insert figure 2 about here

Risk reduction associated with sharing. We then used the same model to predict participants' beliefs that participating in a sharing plan would reduce their risk of paying overage

fees (i.e., reduce their risk of product scarcity). Here, we find a significant interaction of control condition and individuals' personal usage predictability (b = .46, F(1, 117) = 8.75, p = .004), depicted in figure 2, panel B. When the sharing plan did not include a control option, there was no relationship between usage predictability and sharing (b = .31, F(1, 117) = 1.96, p = .17). However, when the sharing plan allowed control, low usage predictability participants felt that the sharing plan would reduce their risk of product scarcity significantly more than did those who felt their usage was predictable (b = -56, F(1,117) = 8.12, p = .005). Further analyses demonstrate that when individuals feel they can predict their own usage well or at the average level, control over others' usage does not significantly affect perceptions that a sharing plan would reduce their risk (high: b = -.07, t(1, 117) = -1.81, p = .07, moderate: (b = -.30, t(1,117) = -.03, p = .76). However, again consistent with hypothesis 2, when ability to predict one's own usage is low, control over sharing partners' usage creates an increase in perceptions that the sharing program will reduce risk relative to having no control (b = .35, t(117) = 2.22, p = .03).

Mediation analysis. We used Baron and Kenny's (1986) method for testing mediation. As discussed above, an interaction of control and personal usage predicts both sharing likelihood and perception of risk reduction. Risk reduction is also a significant predictor of sharing likelihood (F(1, 120) = 14.25, p < .0001). When the interaction of control and predictability as well as risk reduction and cost per line are used to predict sharing likelihood, the interaction becomes a non-significant predictor (b = .33, F(1, 116) = 1.53, p = .22) and risk perception remains significant (b = .79, F(1, 116) = 24.82, p < .0001). A Sobel test confirms mediation (z = 2.15, p = .03), supporting hypothesis 3[ii]. Note, however, that in this analysis the direct effect of cost per line also remains significant (b = -.05, F(1, 116) = 15.66, p = .0001). Thus, risk-related effects exist above the effect of cost savings and do not mediate the effects of the cost factor.

Discussion

Study 2 replicates the effect of cost seen in study 1, showing that individuals who see a lower cost-per-unit are more likely to choose a sharing as opposed to a sole ownership plan. However, beyond this effect, study 2 also investigated two sources of risk that consumers may perceive in a commercial sharing system: personal usage predictability and control over their sharing partner's usage. By understanding their consumers' sense of usage predictability and structuring plans in ways that allow or do not allow control over other sharing partners' consumption, firms may be able to influence consumers' preference for sharing options. Consumers who have unpredictable usage reduce their perceived risk of product scarcity only when they can be assured via a control mechanism that other sharing partners would not over-consume from the shared pool. That is, only when individuals with unpredictable use have an opportunity to control other sharing partners' usage are they likely to adopt a sharing option. Interestingly, these effects emerged even in an exclusive (quadrant 4) system where individuals could presumably choose sharing partners – it could have been predicted that control would be more important when sharing systems are non-exclusive. That effects emerge in a somewhat closed system further highlights the importance of providing structured control mechanisms in addition to consumers' own gatekeeping activities.

However, there are other potential sources of risk in a marketer-offered sharing program, particularly in contexts where membership is non-exclusive. In study 3 we test hypotheses 4 and 5 regarding sharing partner similarity. We design the study in such a way that all participants are likely to save money by sharing. If costs alone were at issue in sharing propensity, we would see no variance in sharing caused by factors such as similarity and personal usage. However, we propose that beyond cost savings, these factors will interact to predict sharing propensity.

Study 3

In study 3 we manipulate participants' usage levels and similarity to potential sharing partners in an ecologically valid bike sharing system. We test hypothesis 4 in this context. In addition, we capture participants' perceptions of trust among potential sharing partners. This data allows us to explore the role of trust on sharing propensity, particularly relative to usage levels, similarity and perceived risk.

Method

Study 3 follows a 3 (similarity of partners: same, different, unspecified) by 2 (anticipated usage) between-participants design. Participants were 105 undergraduate students, who took part in return for course credit. Participants read about a bike-sharing plan patterned closely after bike sharing systems currently in use in Minneapolis-St. Paul (http://www.niceridemn.org) and Washington, DC (http://capitalbikeshare.com). They were asked to imagine the following:

> Imagine that you start graduate school in a new city. You rent an apartment that is about a 10-minute bike ride from campus. Because your apartment does not have parking and the parking rates around the University have skyrocketed in recent months, you are considering selling your car and taking a bike to school as often as possible.
>
> You go to the bike shop, where you see that you can buy an appropriate bike for about $400.
>
> However, you also want to check out other transportation options. You learn about the following bike sharing system, called "Letsgo."

Note that in this study, all participants could reasonably expect to save money by sharing. It is possible that this near-guarantee of saving money could outweigh any considerations of resource sharing risk, such that effects across all conditions would be eliminated. Anticipated usage was manipulated by telling participants that they would "go to campus every day, since you will also be working there," (high anticipated usage) or "you will go to campus only two or three times a week, since you will be working somewhere within walking distance of your apartment," (low anticipated usage).

Similarity of other users was manipulated by changing the headline on the sharing program description. In the similar others condition, the headline read "A Bike Sharing System for Graduate Students Like You!" In the dissimilar others condition, the headline read, "A Bike Sharing System for the City's Downtown Professionals!" These manipulations were pretested to ensure that they were consistent with our theoretical interpretation of the similarity construct. We anticipated that this manipulation of demographic similarity would create expectations of similar usage (Cunningham 2007, Naylor, Lamberton and Norton 2011). Participants drawn from the same pool as our study participants were given the description of the two groups used in the study and asked to answer the question, "How similar do you think these individuals' usage of the bicycles would be to your own?" where a 1 indicated "Not at all similar – We would rarely overlap in our usage" and 5 indicated "Very similar – We would often need them at the same time." Participants who read that partners would be graduate students felt that their usage would be more similar to other sharing system participants than did participants who read about a sharing system involving working professionals ($M_{graduate} = 3.70$, $M_{professionals} = 3.11$, $F(1, 77) = 6.22$, $p = .01$). Planned contrasts show that individuals reading about the graduate students provided responses significantly above the scale midpoint ($t(38) = 4.00$, $p = .0003$), but individuals reading about working professionals' response was not ($t(39) = .84$, $p = .41$). In the unspecified condition, the headline simply read, "A Bike Sharing System!"

Restrictions and costs were adapted from the sharing system used in Washington, DC (www.washingtonrides.com), as in Appendix B. Note that the last sentence in this information introduces the real, commonly experienced risk of scarcity with regard to bike sharing. While bikes are likely to be available when needed, it is a common experience for users of these sharing systems to run out of rack space at popular return locations (Erlanger and de la Baume 2009). Thus, when we refer to scarcity risk in this experiment, we are referring to the likelihood that

consumers will not have access to a key benefit associated with bike use – the ability to pick up and drop off the bike at their desired location, thus incurring additional time and financial costs.

Measures

Participants first provided their likelihood of participating in the sharing program by answering the question, "How likely would you be to subscribe to the Letsgo Bike Sharing Program?" from 1 (very unlikely) to 7 (very likely). Other measures used a 5-point Likert-type scale anchored by 1 (Strongly Disagree) and 5 (Strongly Agree). These included: "I would trust other members of the Letsgo Sharing Program," and "Participating in the Letsgo Sharing System seems risky to me." Participants were then asked to select the statements that accurately described both their own personal usage level (Which of the following statements best describes the scenario you read: "You will ride the bike to campus every day, since you will also be working there," "You will ride the bike to campus only two or three times a week, since you will be working somewhere within walking distance of your apartment," or "I don't remember".) As a manipulation check on other users' similarity, we collected a continuous measure that asked, "How similar would you be to other users of the bike sharing system?" where a response of 1 indicated "not at all similar" and 5 indicated "very similar." Finally, we asked participants if they had any physical impairment that might prevent them from riding a bicycle. Two participants were removed because they reported a physical impairment that would keep them from riding a bike, leaving a sample of 103 participants. Some participants provided partial data. When available, data from all participants are used in the analysis.

Manipulation checks. We first checked to make sure that participants noted their own use condition and others' similarity condition as manipulated. 88% of participants correctly identified their manipulated usage condition. Because the results are unaffected by the 12% who failed to correctly identify their usage condition, we elected to retain all participants in the

analysis. Also, participants in the similar others condition felt that they were significantly more similar to other potential users than did individuals in the dissimilar others condition ($M_{similar}$ = 3.46, $M_{dissimilar}$ = 2.75, F(1, 97) = 5.22, p = .02), with no cross-manipulations created by usage condition or the interaction of the factors.

Likelihood of participating in the sharing system. We first tested user similarity condition, personal usage condition, and their interaction as predictors of likelihood of participating in the sharing system in an ANOVA model. This analysis showed only a significant interaction of other similarity and personal usage (F(2, 97) = 3.53, p = .03). All cell means are depicted in figure 3, panel A. Planned contrasts show that this interaction is driven by two effects. First, consumers who consider sharing with similar others are more likely to do so when their own usage is lower rather than higher (M_{lower} = 3.22, M_{higher} = 1.80, F(1, 97) = 4.96, p =. 03). Hypothesis 4 is partially supported: we see no difference in sharing likelihood for low-usage users regardless of similarity condition ($M_{dissimilar}$ = 3.22, $M_{similar}$ = 2.71, F(1, 97) = 0.61, p = .44). However, as predicted, higher-usage consumers are significantly more likely to share when their prospective partners are dissimilar rather than similar ($M_{dissimilar}$ = 3.50, $M_{similar}$ = 1.80, F(1, 97) = 7.73, p = .007). No other contrasts are significant (all p > .18).

Insert figure 3 around here

Perceived scarcity risk. Using the same model, we also examined our data for evidence that differences in sharing likelihood were driven by perceptions of scarcity risk involved in the sharing system. This analysis shows a significant main effect of user similarity ($M_{dissimilar}$ = 2.41, $M_{unspecified}$ = 3.67, $M_{similar}$ = 3.45, F(2,97) = 15.85, p < .0001) and a significant main effect of personal usage (M_{lower} = 2.85, M_{higher} = 3.44, F(1, 97) = 12.11, p < .001). An interaction of the

two factors was also detected ($F(2, 97) = 6.01$, $p < .01$). All cell means are depicted in figure 3, panel B. Contrast tests show that overall, perceived risk associated with sharing was greater among similar and unspecified users than among dissimilar users (both $p < .0001$). We also note that perceived risk was significantly increased by higher usage when sharing partners were anticipated to be similar ($M_{similar,\ low\ usage} = 2.66$, $M_{similar,\ high\ usage} = 4.40$, $F(1, 97) = 22.76$, $p < .0001$) but did not differ significantly when usage was dissimilar or unspecified (both $p > .35$). Individuals with lower usage levels did not perceive a significant difference in risk regardless of whether other users were likely to be similar or dissimilar ($M_{similar} = 2.66$, $M_{dissimilar} = 2.21$, $F(1, 97) = 1.49$, $p = .22$). Again, partially supporting hypothesis 4, higher-usage consumers felt that risk was significantly greater when they considered sharing with similar as opposed to dissimilar others ($M_{similar} = 4.40$, $M_{dissimilar} = 2.55$, $F(1, 97) = 28.40$, $p < .0001$.)

What explains this sense of risk? To better understand what was driving participants' sense of inflated risk when they considered sharing with similar others, we analyzed the responses to the question about the likelihood of rack space being completely used at the time the participant wished to use a bike. This measure directly captures the appropriate scarcity risk associated with participating in a sharing system. As such, not surprisingly, this measure was highly correlated with sense of risk ($r = .77$, $p < .0001$), and results followed a similar pattern as seen for perceived risk. Significant main effects of user similarity ($F(1, 97) = 18.34$, $p < .0001$) and personal usage level ($F(1, 97) = 16.26$, $p < .0001$) were again qualified by a significant interaction ($F(1, 97) = 7.78$, $p = .007$), depicted in figure 4, panel A[iii].

Mediation analysis. As described above, sharing likelihood (the DV) and perceived risk are explained by the interaction of personal usage level and the similarity of other users. We used Baron and Kenny's (1986) method for testing mediation. Perceived product scarcity risk is a significant predictor of sharing likelihood ($b = -.49$, $F(1,99) = 11.99$, $p = .008$). In a full model

including both factors, their interaction, and perceived risk, the interaction of the two factors drops to marginal significance ($F(1, 96) = 2.84$, $p = .06$). However, perceived risk remains a significant predictor of sharing propensity ($F(1, 94) = 6.90$, $p = .01$). A significant Sobel test suggests mediation ($z = 2.88$, $p = .003$), supporting hypothesis 5.[iv]

Does trust in sharing partners explain our effects? As discussed previously, it is possible that trust among similar sharing partners could lead to higher sharing with similar others regardless of usage patterns. To test this possibility, we estimated an ANOVA using usage condition, similarity condition, and their interaction to predict trust. Results show only an interaction of the two factors, as depicted in figure 4, panel B ($F(2, 96) = 4.55$, $p = .01$). Overall, individuals show a weak and non-significant tendency to trust similar as opposed to dissimilar partners more ($M_{similar} = 3.06$, $M_{dissimilar} = 2.72$, $F(1, 96) = 3.09$, $p = .08$). Unexpectedly, they also show significantly lower levels of trust toward dissimilar others who use less than toward dissimilar others who use more ($M_{less} = 2.14$, $M_{more} = 3.09$, $F(1, 96) = 7.99$, $p = .006$). And in general, individuals with lower usage levels show a robust tendency to trust similar others more than dissimilar others ($M_{similar} = 3.27$, $M_{dissimilar} = 2.14$, $F(1, 96) = 10.53$, $p = .02$). However, a regression analysis shows that in this context, trust in other users is a non-significant predictor of propensity to participate in the bike sharing system ($b = .30$, $F(1, 100) = 2.65$, $p > .10$).

Discussion

Study 3 builds on the first two studies, using the details of a real bike-sharing program. Here, as in many sharing systems, the price of the sharing option was held constant and was likely to be lower than the initial cost of ownership for all participants. Still, the likelihood of cost savings did not lead to equivalent levels of sharing propensity across all participants. Rather, results suggest that communications related to the identity of potential sharing partners may offer an additional means of altering consumers' perceived risk of participating in a sharing program.

Hypothesis 4 was partially supported: for higher-use consumers, the effect of sharing partner similarity was negative rather than positive. These consumers perceive that sharing with similar others will heighten rivalry, and thus, increase their risk of product scarcity. By contrast, sharing with dissimilar others is more attractive to high-usage consumers, because their non-competing usage patterns decrease perceptions of product scarcity risk. This finding provides an important qualification to prior work that generally shows a positive main effect of similarity, but in contexts where rivalry is low or non-existent. In commercial sharing systems similarity may present a danger rather than a comfort, at least for high-volume users. We note, however, that lower-use consumers were not affected by similarity. We speculate that lower-use consumers are less focused on the likely actions of other program participants because they feel their own needs are small and, therefore, scarcity risk is less a problem in general. In such cases, consumers only stand to lose access to a small amount of utility if the pool is completely depleted. Thus, factors that might alter perceived risk have less impact on low-usage consumers' tendencies.

Further, participants showed a weak tendency to trust similar others more than dissimilar others. For low usage individuals similarity increased trust. However, this change in trust was not associated with significant differences in propensity to share. Thus, trust did not drive sharing likelihood in this context. While we may wish to share some things with similar others, such as experiences or goods where many people can gain access without resource scarcity risks (e.g., Raghunathan and Corfman 2006), in a commercial context product scarcity concerns could trump trust. Future research could also explore the unexpected finding that dissimilar others' product usage affects trust perceptions. Perhaps consumers expect higher volume users of a shared product to adhere to system rules (for fear of upsetting the system from which they benefit), while infrequent users are suspected of being willing to "foul their own nest" due to low reliance on the shared product. Finally, note that in this study similarity did not imply relational

closeness. In many cases, similar individuals also know one another, as in a family-based sharing system. When familiarity is higher, consumers could be more willing to accept overuse of the shared resource in the interest of preserving relationships, or they could be willing to set up informal agreements about usage that offset concerns about competition and the risk of product scarcity. The present study considers similarity independent of relational closeness; future work could explore the ways that individuals who are both similar and have interpersonal relationships navigate the give and take of sharing systems.

General Discussion

As Rachel Botsman has said, "(sharing) could be as big as the Industrial Revolution in the way we think about ownership," (quoted in Sacks 2011). However, academic research has thus far provided no empirically grounded framework for studying marketer-mediated or controlled sharing systems. We first contribute a novel conceptualization of these types of programs as opposed to other sharing contexts. We then test an extended utility model originally developed by Hennig-Thurau, Henning and Sattler (2007). Building on this work allows us to first, show the relevance of costs and benefits of sharing in promoting commercial sharing options, consistent with a rational utility model. However, it also highlights the explanatory power of our focal construct in studies 2 and 3 – perceived product scarcity risk. As rivalry for the shared product is a key aspect of commercial sharing systems, we argue that marketers do not need to compete in these systems on cost alone. Rather, they can consider the interdependence of consumers' own usage and that of other sharing partners. By doing so, they can design aspects of their sharing systems or marketing communications to alter perceived product scarcity risk. As they do so, they can change propensity to participate – even if costs and key sources of utility are accounted for.

Managerial and policy implications

This work identifies a number of managerially observable or readily controllable factors that can be used to predict and alter sharing propensity. First, results suggest that marketers should begin by learning the specific cost and utility factors that may impact propensity to participate in commercial sharing systems. Lowering costs and raising benefits of sharing will, consistent with rational models, be likely to change propensity to share. We also see a strong effect of perceived substitutability on sharing. Thus, for marketers wishing to promote sharing, highlighting parallels between ownership and sharing may be effective. Conversely, for those wishing to promote product ownership, highlighting that "there's no substitute for owning your own car," may reduce consumers' interest in sharing systems. Certainly, lower per-unit prices will draw individuals to participate in sharing programs, as seen in study 2.

Second, we show that perceived risk of product scarcity is a major driver of sharing propensity in commercial sharing systems. As such, this factor offers a non-price-based method of competition for sharing system marketers. We have identified a number of factors that can be designed into sharing programs in ways that reduce perceptions of this risk, noting that prescriptions differ for consumers with low usage predictability or high absolute levels of demand as opposed to those with constant usage or lower levels of demand. While product scarcity risk reduction is important in the aggregate, as in study 1, we also show that these high-volume or high-volatility consumers feel the threat created by other sharing partners' possible usage most acutely. For such individuals marketers should design sharing programs with control mechanisms or allow consumers to share with those whose use they know to be complementary as opposed to competing. Providing information about sharing partners' usage over time may assuage consumers' concerns that sharing may increase product scarcity risk. Alternately, marketers may attack risk-related bias against sharing directly, designing communications that

minimize perceptions of competition among pool participants or provide assurances of product availability. Because the public sector also has an interest in encouraging sustainable consumption, municipalities may adopt such a suggestion by offering a buffer of for-hire vehicles in the event that vehicles are unavailable in marketer-mediated systems, in addition to the usual government and activist exhortations regarding the need for conservation.

Third, our research suggests that managers of sharing systems whose target customers are likely to be similar in usage (i.e., friends, family members, fellow employees, etc.) should keep in mind that sharing with similar others may not always be preferred. Rather, individuals who are likely to be heavy product users intuit that they will face less product scarcity risk when sharing with dissimilar as opposed to similar others. Thus, segmentation based on demographic similarity may not be ideal. However, if demographic targeting is most appropriate given a certain product design or budget, marketers may want to communicate that not all demographic similarity leads to competing demands for a product. For example, a car-sharing program in a particular neighborhood may serve a relatively homogeneous demographic set. However, marketers may be able to point out that parents of school-age children may use vehicles at one time (i.e., school drop-off/pick-up), while childless professionals may be able to receive the car "hand-off" for evening events or to pick up supplies for weekend home improvement projects. Highlighting usage heterogeneity or complementarity within demographic segments may reduce product scarcity concerns and with them, increase sharing.

Fourth, while similarity does appear to be linked to trust, trust does not explain propensity to share in the context we considered. This suggests that marketing in terms of trust may not be optimal for promoting commercial sharing systems. Rather, results suggest that consumers' focus on the likelihood of product availability provides a more direct influence on

propensity to share than emphases on the trustworthiness of others. That is, in a commercial setting it could be practical rather than social concerns that motivate consumers most.

Finally, sharing marketers could remedy a widespread lack of knowledge, since familiarity with sharing is likely to increase sharing propensity. Study 1 shows a main effect of knowledge, while Study 2 and 3's results echo this suggestion, showing lower sharing levels in the less familiar bike sharing as opposed to more familiar cell phone sharing setting. Though introducing sharing could be easier in regions with stronger public-goods histories or collective perspectives, overcoming consumers' discomfort regarding the risks inherent in sharing could be difficult in the US given the strong product ownership norm (Belk 2007). Recent popular press pieces such as "The Sharing Economy" (Sacks 2011), arguments in favor of collaborative consumption (Botsman and Rogers 2011), articles exploring sharing's emergence (Potts 2011), and Gansky's argument that, "the future of business is sharing," (2010) suggest that the mass media may help inform consumers. However, taking an active part in such discussions may help firms present sharing programs in ways appropriate to their strategic goals.

Limitations and Opportunities

No single study could accommodate all possible factors affecting risk that are inherent in a sharing system or the myriad variants of programs in existence. Thus, though our framework offers promise, the external validity of our theoretical model could be further bolstered by consideration of boundary conditions and background factors. First, we categorize sharing arrangements using the broad concepts of rivalry and exclusivity. This approach allows us to report findings that should generalize across most programs that have characteristics of quadrants 3 and 4. However, there are other differences among these programs that warrant future study. For example, programs may vary in contractual flexibility. Can a consumer with unpredictable usage opt into or out of a system as needed, or are they locked into participation through a

contract as in many community supported agriculture programs? Other programs may also heighten consumers' concerns by introducing additional lock-in obligations rather than risks. For example, some food co-ops require not only a monetary fee but also require that members work at the store. Such requirements may also alter sharing's attractiveness.

Second, some of the factors examined may vary in their importance across commercial sharing contexts, and between familiar and unfamiliar consumers. For example, we did not observe moral utility to be a predictor of sharing propensity in study 1's car-sharing context.. Future work should explore situations where moral utility of sharing *does* motivate consumers, as one purported major advantage of sharing is the ability to provide ecological benefits (Sacks 2011). Similarly, in study 1's context, knowledge of car sharing was quite low. It is possible that as consumers become more familiar with car sharing, sharing's risks would be perceived as more manageable. If this occurs, risk would simply be treated as a type of cost, and marketers could change sharing likelihood by presenting pricing schemes that offset consumers' sense of risk.

Third, we followed Hennig-Thurau et al's (2007) utility model closely in study 1 as a means to connect our work to theirs, but also to show important differences between our context and illegal file sharing. Our work highlighted the role played by perceived resource risk in commercial sharing systems, even when controlling for cost factors. However, we do not orthogonally manipulate costs and risk of product scarcity. Future research should delve into this relationship in order to provide guidance to firms regarding how tightly to control perceptions of risk at various cost levels. Fourth, we have not fully explored the role of non-economic factors such as altruism or cooperation in commercial sharing systems (Schlager 2002). Some theorists propose that these factors will play a major role in sharing, focusing largely on cooperative contexts like information sharing or open-source code development (Potts 2011). Though we do not see much evidence of their impact in commercial contexts where rivalry exists, future

research may seek downstream effects of such social factors – it is possible that while they do not explain initial propensity to choose a sharing system, they do impact retention or satisfaction.

Finally, future work could adopt a broader view of sharing systems. An open question is whether or not commercial sharing systems offer an alternative business model that is sustainable over the long term. For example, manufacturers have an incentive for growth in units sold as part of their obligation to stockholders to increase revenue and profits over time. However, much of the utility offered by the sale of automobiles to individual consumers or organizations is underutilized when the car seats five people but is occupied by one, or when the car sits unused most of the time. It is possible that marketers offering sharing options gain intangible benefits in terms of improved corporate image for both internal and external stakeholders and, perhaps, positive effects on brand attitudes and brand loyalty.

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Footnotes

[i.] Hennig-Thurau, Henning and Sattler (2007) also include collection utility related to collecting music or movies via download or illegal copying, a source that does not apply in commercial sharing contexts. Their model also considers legal costs that do not apply to commercial sharing systems. These measures are not relevant in commercial sharing systems and are omitted from our model.

[ii] A bootstrapping analysis following Preacher and Hayes (2008) set at 1000 iterations provides a 95% confidence interval for the indirect effect that does not include zero (lower bound: -1.76, upper bound: -.31), further supporting mediation.

[iii] We also find that anticipated scarcity of rack space mediates the relationship between the interaction of user similarity and usage levels and perceived risk. As described, the interaction of user similarity and usage level; predicts anticipated lack of rack space and perceived risk. Lack of rack space is a significant predictor of perceived risk ($F(1, 101) = 125.69$, $p < .0001$.) When both the main effects and interaction of similarity and usage level as well as anticipated lack of rack space are used to predict perceived risk, the interaction drops from significance ($F(1, 96) = 2.50$, $p = .09$), and anticipated lack of rack space remains significant ($F(1, 96) = 58.03$, $p < .0001$). As lack of rack space is not a theoretical construct, but is instead specific to this context, we neither hypothesize nor elaborate on this specific relationship. However, it does suggest that anticipated risk is directly related to the availability of the resource in question in this system.

[iv]Bootstrapping analysis following Preacher and Hayes (2008) set at 1000 iterations also provides a 95% confidence interval for this indirect effect that does not include zero (lower bound: -.27, upper bound: -.0013), indicating mediation.

Table 1

TYPOLOGY OF SHARING SYSTEMS

	Lower Exclusivity	**Higher Exclusivity**
Lower Rivalry	**Quadrant 1 – Public Goods Sharing** *Access to the sharing system is generally open to anyone by virtue of citizenship or location. Underlying goods are generally non-depletable, assuming ongoing maintenance, and one user's consumption does not rule out another's simultaneous consumption.* Public parks Public roads Public schools Public television or broadcasting World wide web Open-source software	**Quadrant 2 - Access/Club Goods Sharing** *Access to the sharing system is restricted to individuals with certain status, characteristics, relationship to other sharers, or donation ability. However, the underlying good in question is very difficult to deplete, either because membership is restricted to a sustainable number or due to the nature of the good.* Country clubs/private clubs or restaurants Church recreation facilities Book clubs Investment clubs Community supported agriculture groups - http://www.localharvest.org/csa/
Higher Rivalry	**Quadrant 3 – Open Commercial Goods Sharing** *Access to the sharing system is generally open to anyone who can pay the entry fee, but there are very few other limits on who may participate. One consumer's use of a unit of the shared good makes it unavailable for another consumer to use.* Machinery rings - http://www.ramsak.co.uk/ Tool libraries: http://www.borrowtools.org/ Food banks - http://www.harvesthope.org/ Food co-ops (assuming open membership): http://foodcoop.com/ Bike sharing: https://www.niceridemn.org/ Timeshares: https://www.rci.com/RCI/ Fractional ownership: http://www.netjets.com/ Car sharing: http://www.zipcar.com/	**Quadrant 4 – Closed Commercial Goods Sharing** *Access to the sharing system is restricted to individuals with certain status, characteristics, relationship to other sharers, or donation ability. One consumer's use of a unit of the shared good makes it unavailable for another consumer to use.* HMOs - http://www.cigna.com/our_plans/medical/hmo/for_you.html Health Co-ops - http://mychristiancare.org/medi-share/ Surrogacy Banks - http://www.circlesurrogacy.com/ Cell phone sharing plans: http://www.verizonwireless.com Frequent flyer mile sharing plans - http://www.usairways.com/en-US/dividendmiles/programdetails/purchasemiles/default.html

Table 2
STUDY 1: MEASURES AND RESULTS

Construct	Measures	Alpha	Unstd. Parameter Estimate	Std. Parameter Estimate	T-value
Gross Utility of Ownership	Stated willingness to pay for ownership (i.e., reservation price)	---	-.00002	-.05	-1.06
Price of Ownership	Calculated current costs for monthly car payment, insurance, fuel costs, maintenance, parking and taxes	---	.0007	.17	3.99*
Price of Sharing	Price of chosen plan	---	-.0004	-.17	4.86*
Technical Costs of Sharing	It would be inconvenient to have to set the driver's seat and other car features to meet my preferences every time I use it. It would be annoying to have to familiarize myself with the controls of different cars	.72	-.09	-.06	-2.32*
Search Costs of Sharing	It would be inconvenient for me to find the car I wanted to borrow each time. It would be inconvenient to search for the car pick-up spot.	.76	-.05	-.04	-1.26
Transaction Utility of Sharing	Sharing programs tend to be a good deal.	--	.18	.23	4.23*
Transaction Utility of Ownership	Buying or leasing a car for myself is a good deal.	---	-.09	-.11	-2.98*
Flexibility/Mobility Utility of Sharing	As a sharing program member, I can get a car virtually everywhere I go. Being a sharing program member makes it easy to obtain transportation in many cities.	.74	.10	.11	2.04*
Storage Utility of Sharing	One great thing about sharing is not have to be responsible for garaging a car myself. By sharing I can avoid paying for overnight parking for my vehicle.	.69	.002	.0009	.06
Anti-Industry Utility of Sharing	Sharing a car allows me to fight back against the greed of the oil industry. By sharing a car I can refuse to play the auto industry's marketing game.	.85	-.05	-.05	-1.41
Social Utility of Sharing	Sharing a car allows me to be part of a group of like-minded people. My friends would approve of the sharing option. My family would approve of the sharing option	.83	.002	.01	.005
Moral Utility of Sharing	It's wrong to own a car and let it sit unused much of the time. Sharing cars reduces our usage of natural resources.	.70	.07	.07	1.42
Degree of Substitutability	I believe a shared car substitutes quite well for a personally owned car. Sharing a car is just as good as owning one. There is no substitute for owning my own car or truck (reversed)	.83	.35	.23	6.25*
Sharing Knowledge	I am familiar with car sharing programs. I have experience with car sharing programs. I don't know much about how a car sharing program works (reversed)	.74	.12	.10	3.02*
Perceived Product Scarcity Risk	There is a high likelihood that the car I want will not be available when I want it. There's a risk that I will not be able to get the car that I want at the time I want to use it. It's possible that when I want a car, it won't be available. A car will almost certainly be available for me whenever I want it. (reversed)	.88	-.22	-.18	-4.58*
Likelihood of Choosing a Sharing Option	How likely would you be to choose a sharing option the next time you need a car? (1-very unlikely, 6-very likely) I would prefer a sharing option to owning my own car. I would be likely to choose a sharing program instead of buying a car myself.	.93	--	--	--

Figure 1

AUGMENTING THE UTILITY MODEL: THE ROLE OF PRODUCT SCARCITY RISK IN COMMERCIAL SHARING PROPENSITY

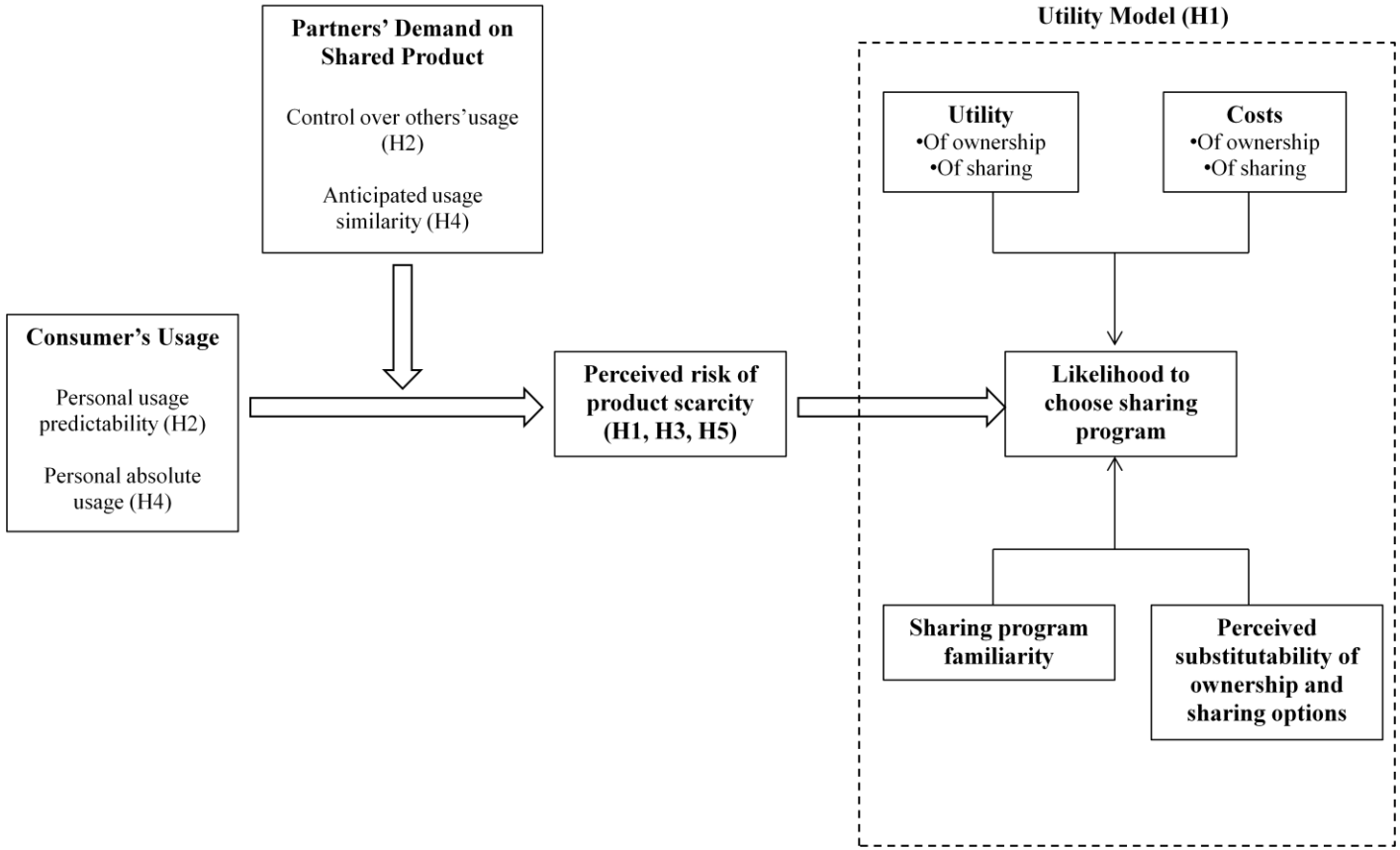
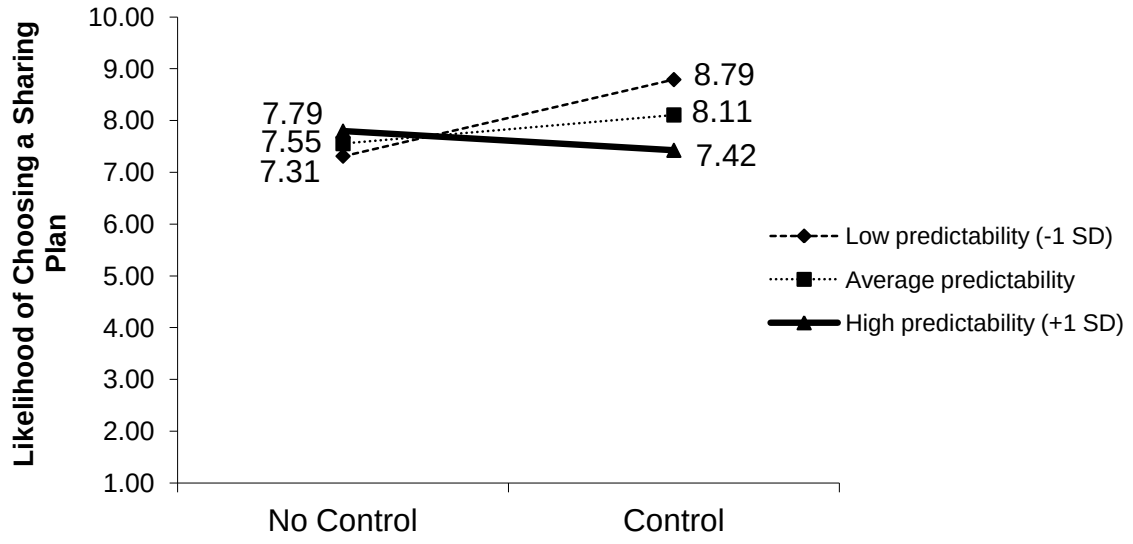


Figure 2

STUDY 2: EFFECTS OF PERSONAL USAGE PREDICTABILITY AND CONTROL OF OTHERS' USAGE

Panel A: Sharing Likelihood



PANEL B: PERCEIVED RISK REDUCTION CREATED BY SHARING

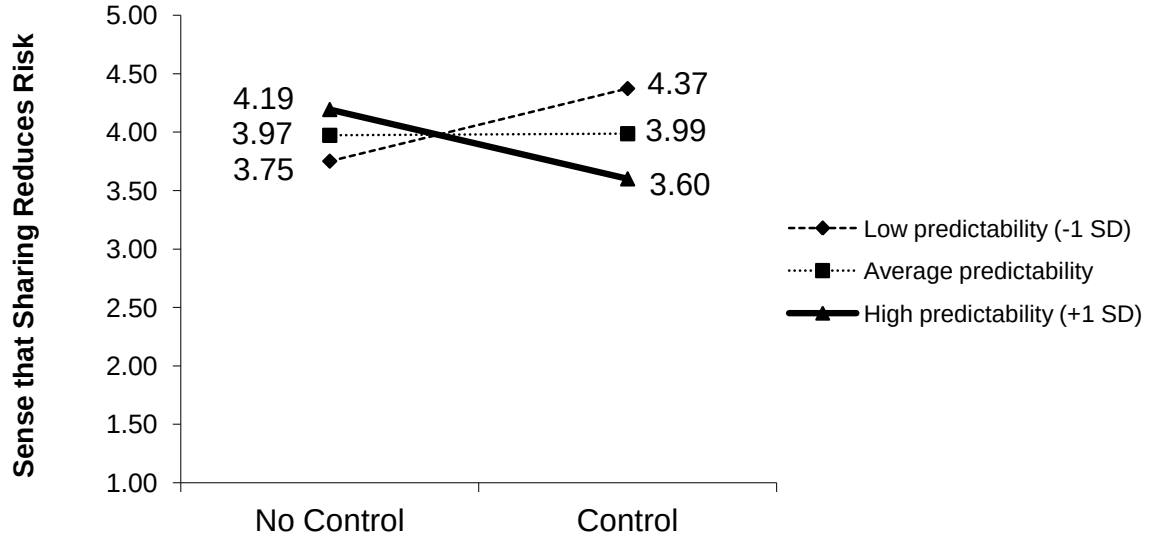
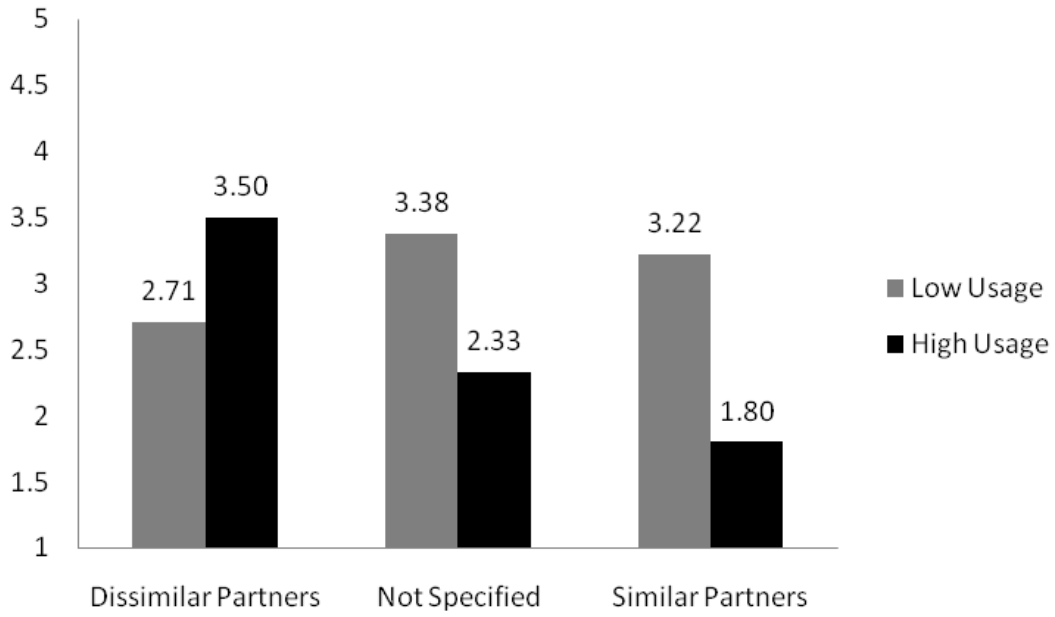


Figure 3

STUDY 3: EFFECTS OF PARTNER SIMILARITY AND USAGE RATE ON SHARING AND RISK

Panel A – Sharing Likelihood



Panel B – Risk Perceptions

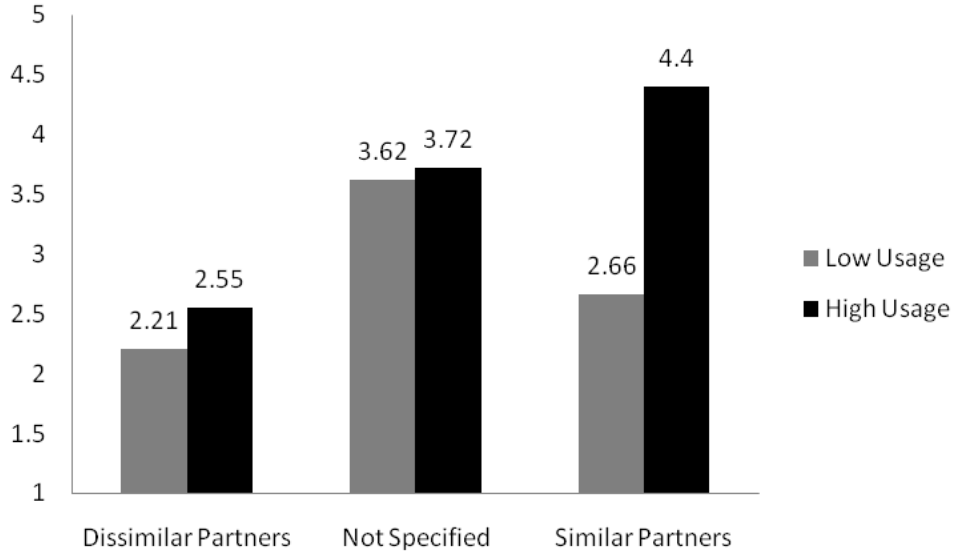
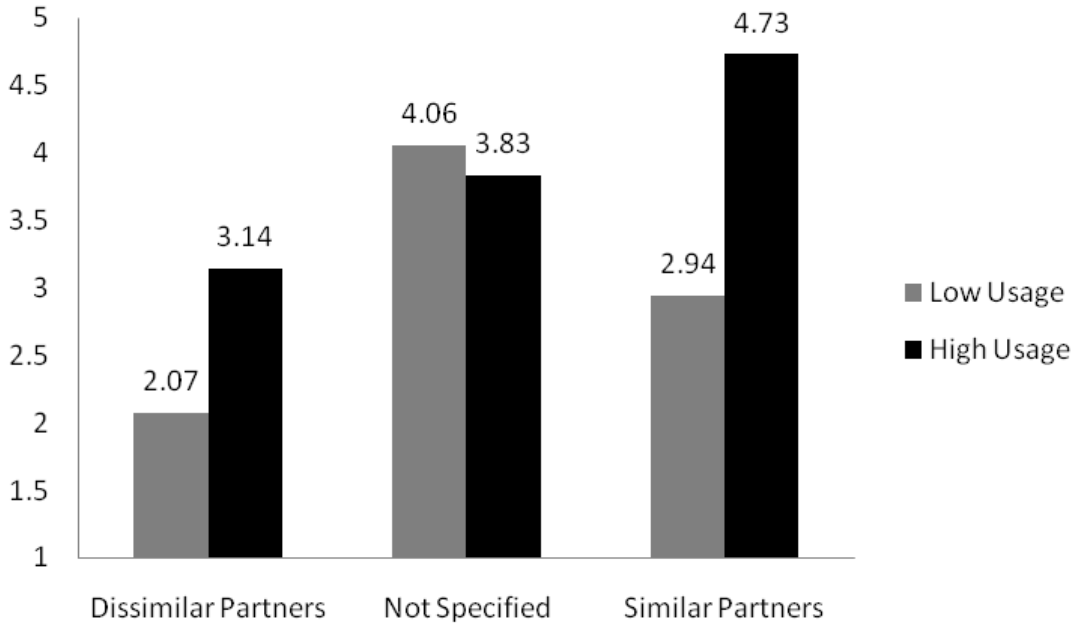


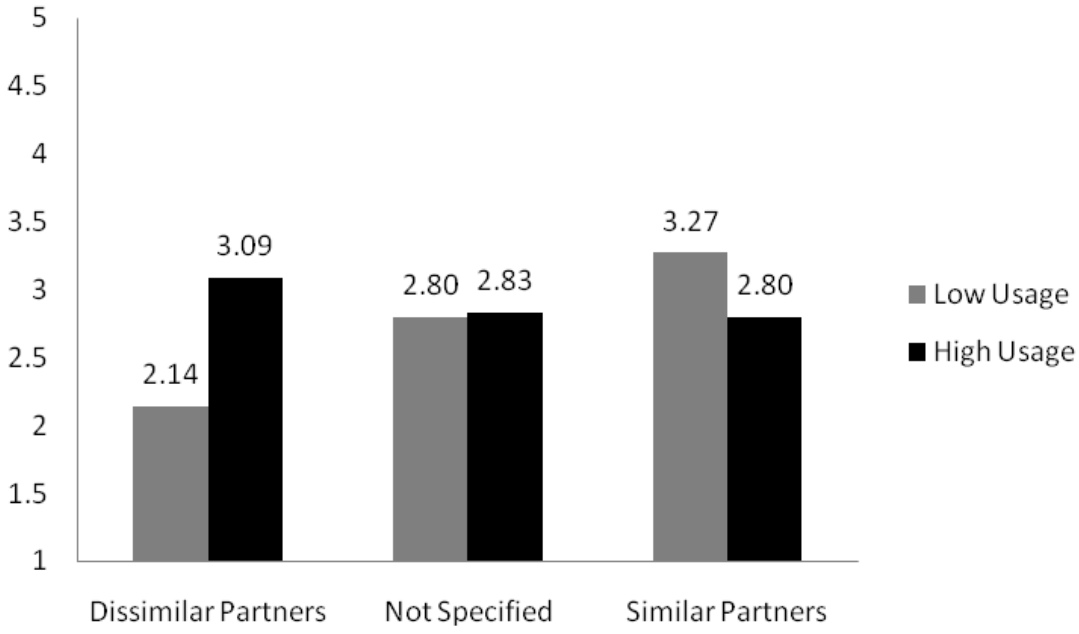
Figure 4

STUDY 3: EFFECTS OF PARTNER SIMILARITY AND USAGE RATE ON RISK AND TRUST

Panel A - Product Scarcity Risk (Lack of Rack Space)



Panel B – Trust in Potential Sharing Partners



Appendix A

CELL PHONE PLAN MATRIX FOR STUDY 2

	*Sharing Plan**		*Personal Plan**	
Shared Minutes	*Cost/Month (2 lines)*	*Cost per Additional Line*	*Personal Minutes*	*Cost/Month (each line)*
550 (2 lines, max 3)	$60	$10	450	$40
700 (2 lines, max 5)	$70	$10	900	$60
1400 (2 lines, max 5)	$90	$10	Not available	Not available
2100 (2 lines, max 5)	$110	$10	Not available	Not available
Unlimited (2 lines, max 5)	$120	$50	Unlimited	$70

*All plans include rollover minutes, unlimited night and weekend calling, unlimited mobile-to-mobile calling to customers with your wireless carrier, and unlimited calling to up to 10 selected numbers on your preferred list.

* Sharing plan savings depend on number of minutes desired. For unlimited sharing plans with 5 lines, savings are $80 per month ($350 - $270), or about 23%. For 2100 shared minutes and 5 lines, savings are $60 per month ($200 - $140), or about 30%. For 1400 shared minutes and 3 lines, savings are $20 per month ($120 - $100), or about 16%.

Description of CellControl Plan for Study 2

CellControl is a service that enables you to share your cell phone minutes with others while also controlling their usage.

FEATURES

- Restrict amount of time the phone can be used for messaging, browsing and outbound calling.
- Set limits for the number of text and instant messages allowed per billing cycle.
- Select the amount of web browsing/data usage allowed per billing cycle.

Appendix B

DESCRIPTION OF BIKE SHARING SYSTEM FOR STUDY 3

(adapted from www.washingtonrides.com)

Letsgo allows users to rent a bike from terminals at self-serviced automated bike stations throughout the city. After use, individuals can return the bike to any station.

Requirements for Joining:
To participate in bike sharing, individuals can purchase an annual membership or short term subscription. Short term subscriptions can be purchased for a day or for the week. Once a membership or subscription is acquired, bike can be rented throughout the city.

Cost to Join and Use:
Annual membership share costs $50. A one-month subscription to the bike-sharing program costs $10.00.

In addition to subscription costs, individuals must pay a usage cost which is based on the length of bicycle use:
First ½ hr – Free
All subsequent ½ hrs – 1.00

When returning a bike, if there are no free stands at a particular station, users must keep the bike until they reach the next available station and will be charged accordingly.