M A R K E T I N G S C I E N C E I N S T I T U T E

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WORKING PAPER • REPORT NO. 02-103 • 2002

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"Digital convergence" and "bundled services" are key characteristics of the current marketing environment. Bundles of disparate services such as telecommunications and energy-related offerings are becoming commonplace. The challenge for service providers is to determine how to configure packages that best meet customers' needs.

In this report, authors Agarwal and Chatterjee suggest that one approach is to create a menu of bundles that makes the choice task easy for the consumers. Based on the literature on multi-attribute decision making, and using both qualitative methods (focus groups) and quantitative methods (surveys administered to households), they investigate the impact of three variables on perceived decision difficulty in bundle choice: (1) bundle size (the number of services in each bundle), (2) the number of unique services between competing bundles, and (3) the perceived similarity between the competing bundles.

They find that (1) larger bundles make decisions more difficult, (2) more unique (and fewer common) services between competing bundles increases decision difficulty for small (two-service) bundles (but interestingly not for large bundles), and (3) similar bundles of similar services present a more difficult choice compared to dissimilar bundles.

These findings suggest that firms need to manage the number and nature of services they put together in bundles, as well as how they present the bundles in the marketplace (e.g., highlighting the differences across bundles and making them less similar to each other).

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Introduction

Two forces shaping the marketing landscape of the 21st century are "digital convergence" and "bundled services." These capabilities now enable consumers to get phone, cable television, and Internet service all from the same company, all bundled through the same "wire," and all for one price. For example, consumers in Denver can use AT&T's upgraded, two-way cable to buy local phone service, 180 minutes of long distance, high-speed Internet access (through a modem leased from AT&T), and a "Silver" television package including HBO—all packaged in one bill for about $117 a month (*Denver Post* 2001). Following the lead of telecommunications, utility companies have also begun to introduce packages of energy-related offerings, combining electricity/gas services with heating and air conditioning repair and maintenance, home appliance repair, and electrician's services (*Public Utilities Fortnightly* 1999). Mixed bundles (i.e., bundles that combine telecommunications with utilities) are finding increasing customer acceptance as well. According to a recent J. D. Power and Associates report, 35 percent of telecommunications customers are as likely to purchase mixed bundles (local, long distance, and electric/gas services) from an electric/gas provider as they are from a local telephone service provider (*Utility Business* 1999).

Despite bundling's newfound popularity in the marketplace, there is yet very little consensus as to the benefits and drawbacks it offers to sellers and buyers. For example, while the press has touted the convenience of the "one-stop shopping" implicit in the marketing of bundled services, consumers have often shied away from one bill that gives them "sticker shock." Similarly, while bundled services have the potential to reduce churn by substantially raising the cost of switching to a competitor (for example, once a consumer has a cable modem as a direct outcome of bundling cable television with the Internet, it is difficult to switch to DSL), consumers have psychologically resisted being locked in with one vendor. Notwithstanding these problems, consumers, by and large, are cautiously enthusiastic about the idea of bundled services. When the Strategis Group surveyed 700 consumers about their interest in bundling different communications services, they found that 93 percent wanted some type of bundle, with 78 percent specifically requesting a local and long distance combination in their preferred bundle (*Marketing News* 2000).

As bundles proliferate and consumers get better accustomed to the concept of buying packages instead of individual products and services, bundle flexibility, or the ability of consumers to choose their preferred bundle, will become a key issue (*Wireless Review* 2000). This flexibility can take two forms: (1) sellers offer an à-la-carte selection, in which buyers estimate their reservation price and for that price select the products they wish to bundle together (i.e., the buyer, not the seller, constructs the bundle), or (2) sellers offer several bundles, similar to Macdonald's value meals (e.g., order "Number One" if you want a Big Mac, fries, and a soft drink), and consumers select their most preferred bundle from this menu. Our paper investigates the second form of bundle flexibility, and contends that the best menu

of bundles, from the consumers' perspective, is one that facilitates an easy selection of their preferred bundle. Our focus on decision simplicity (or decision difficulty) is important given that selecting between bundles is relatively novel to consumers (as compared to selecting between alternatives). When the decision task itself is unfamiliar, it is possible that consumers will avoid the decision altogether and fall back on their status quo (i.e., select individual items instead of bundles), particularly if they anticipate that the decision will be difficult (Luce 1998).

In examining decision difficulty in the context of bundled services, we are reinforcing the idea that bundling should help customers make choices—or at least, offering bundles should not make the decision any more difficult than offering the services individually. While the new economy has given consumers an astonishing array of communications and service options, marketers have not helped consumers sort through the options and select the best combination for them. Offering a menu or bundle of services together, instead of offering the services individually, may help in this endeavor.

In focusing our attention on decision difficulty, we need to be mindful of two things. First, creating menus that provide an easy decision environment for the consumers may not always be the most profitable strategy for the marketer. For example, the surest way of facilitating a decision is to offer a dominating bundle (i.e., a bundle that contains all the consumers' preferred services at a discount), but the service provider may lose money on every bundle that is sold. Second, just making the decision less difficult does not necessarily mean that the consumer is better off than before. For example, selecting between two bundles, one that is undesirable in all respects and the other only slightly less so, may be quite easy, but that does not mean that the consumer will be happy with the final choice. However, as we show shortly, decision features such as task complexity and similarity between the choice options, found to affect decision difficulty in multi-attribute and multi-alternative choices, can be readily adapted to the bundling context as well. In that respect, our work should help managers present choices that simplify the consumers' decision-making process without necessarily sacrificing the seller's profitability, or reducing consumer welfare.

Overview of Past Research

Bundling Research

Past research in service bundling has examined a wide range of issues ranging from the strategic optimality of bundling (from the seller's perspective) to the evaluation process inherent in determining the value of bundles (from the consumer's perspective). Eppen, Hanson, and Martin (1991), for example, suggest that sellers bundle components that have high setup costs and high contribution margin ratio, and target the bundle to the aggregate market while offering higher priced individual items to smaller customer segments. Similarly, Guiltinan (1987) presents a normative framework for selecting suitable services for different mixed-bundling discount forms (e.g., discounting one of two products when the other product is purchased at the regular price). For example, when the goal is to cross-sell current customers who buy one but not both services, the focus should be on the degree and type of complementarity among services; when the goal is new customer acquisition, the focus should be on price discounts.

Mathematical models have offered key insights into the bundling problem as well. For example, Bakos and Brynjolfsson (1999, 2000) show that bundling can create "economies of aggregation" for information goods (such as those available on the Internet) if their marginal costs are very low, suggesting that sellers can typically extract more value from each information good when it is part of a bundle than when it is sold separately.

Venkatesh and Mahajan (1993) propose a probabilistic approach to optimally price a bundle of products or their components under three alternative strategies: pure components, pure bundling, and mixed bundling. They show that a mixed bundling strategy is more profitable than pure components or pure bundling strategies provided the relative prices of the bundle and components are carefully chosen. Ben-Akiva and Gershenfeld (1998) develop choice models mimicking situations involving the selection of optional items or features from a menu. Their analytical approach considers large number of alternatives, the interrelated nature of demand for the individual alternatives, and the impact of bundling the alternatives. Finally, Hanson and Martin (1990) present a practical model for calculating optimal bundle prices identifying products that should be included in the seller's product line.

From the consumers' perspective, the processes of evaluating bundles have been studied by Yadav and his colleagues (Yadav and Monroe 1993; Yadav 1994, 1995). Some key insights include: (1) savings offered directly on the bundle have a greater relative impact on consumers' perceptions of transaction value than savings offered on the bundle's individual items, (2) consumers tend to examine bundle items in a decreasing order of perceived importance and make adjustments to form their overall evaluation of the bundle, (3) in a market characterized by heterogeneous preferences for items included in a bundle offer, consumers' bundle evaluations

may vary significantly depending on which item is featured as the price leader, and (4) perceived savings on one item may not always transfer readily to other items included in a bundle offer.

Judged in the context of past research, our research can be characterized as going back to the basics and answering some fundamental questions. For example, unlike past research that has examined bundling of familiar products and services, we examine bundling in the context of a much broader range of services. Similarly, whereas past work has focused on how consumers evaluate a single bundle and its components, we investigate consumer evaluations across multiple bundles. Finally, unlike past research that has typically focused on prices, we investigate non-price features of the decision which are likely to affect the perceived difficulty of the decision-making process.

Decision Difficulty Research

The most basic distinction between sources of decision difficulty is that decisions may be cognitively and/or emotionally difficult (Luce, Bettman, and Payne 2001). The common sources of cognitive decision difficulty include task complexity, or the number of alternatives involved in the decision and the number of attributes describing each alternative; time pressure or the amount of time available to complete the decision; the framing (description) and presentation of the information (e.g., exact versus inexact information, simultaneous versus sequential presentation of information); the magnitude of the tradeoffs involved in making the decision (e.g., price-quality tradeoffs); and the similarity or dissimilarity of the alternatives. How consumers respond to these variables are well reviewed in Payne, Bettman, and Johnson (1993), and Bettman, Luce, and Payne (1998). For example, it has been suggested that consumers select decision strategies by making cost-benefit tradeoffs. The costs involve the computational effort in using a decision strategy, while the benefits involve improved knowledge about the decision. When the computational costs become excessive, consumers turn from compensatory types of decision rules to non-compensatory heuristics to save effort.

Decisions are deemed to be emotionally difficult when their potential consequences threaten some important goals of the consumer (Luce, Bettman, and Payne 2001). For example, a decision that entails a substantial price-quality tradeoff is not only cognitively difficult, but also emotionally threatening (a relative loss has to be accepted either on quality or price). Other sources of emotionally difficult decisions include (but are not limited to) choosing between undesirable alternatives (avoidance-avoidance conflicts; see Chatterjee and Heath 1995), tradeoffs involving "moral" attributes (e.g., money versus environment; see Irwin and Baron 2001), and decisions where post-choice "counterfactual thinking" and associated regret are likely to be salient (e.g., "if only I hadn't traded off safety to save money"; see Kahneman and Miller 1986).

The review of decision difficulty research above shows that the current thinking about decision difficulty has been mostly confined to analyzing choices between multiple alternatives, or a single alternative (choice versus no choice), where each alternative is a collection of attributes. Typically, the starting point of such decisions

is making attribute tradeoffs across the competing alternatives. In the next section, we introduce the concept of decision difficulty in choosing between bundles, where each bundle is now a collection of alternatives, and consumers are forced to trade off alternatives across competing bundles.

Theory and Hypotheses

Consider a telecommunications/utility provider offering two service bundles to consumers. Bundle A packages residential telephone, cellular telephone, and Internet services, and Bundle B packages television programming, electricity and gas services, and residential telephone. The supplier has to decide how many packages to offer (e.g., do two bundles offer enough choice to the consumer, or should more than two bundles be offered?), how many services to offer in each package (e.g., should each bundle contain two, three, or more services?), and what should be the mix of services in each package (e.g., similar services, such as those in Bundle A, or dissimilar services, such as those in Bundle B). The consumers have to assess (1) how well each bundle fits their needs at the moment, (2) how much trust they have in the service provider to reliably provide the array of services, and (3) how easy or difficult it is to compare the bundles and select the one that is best suited for them.

This last issue, the difficulty of comparing between competing bundles, is the focus of our present investigation. We propose that the difficulty of the consumers' decision will depend on (1) the size of the bundles, derived from the number of services in the bundles, (2) the number of services that are unique to each bundle, and (3) the perceived similarity (dissimilarity) of the competing bundles, derived from how similar (dissimilar) the components of the bundles are perceived to be to (from) each other.

Size of the Bundles

Research on decision difficulty in multi-alternative, multi-attribute settings has typically focussed on the information load or the computational difficulty arising from processing many alternatives and/or attributes (see, for example, Helgeson and Ursic 1993; Payne 1982; Payne, Bettman, and Johnson 1988). A typical example is a choice between two automobiles, with each automobile described by multiple attributes (e.g., price, horsepower, gas-mileage, ride comfort). Faced with increasing information about alternatives and attributes, consumers may select decision strategies to minimize costs or computational effort by switching from compensatory-type decision processes to simpler heuristics or shortcuts (e.g., Payne, Johnson, Bettman, and Coupey 1990).

Table 1 describes two types of scenario that we consider in this paper. The scenarios are similar to multi-alternative and multi-attribute decisions in two ways. First, the alternatives are now bundles (bundles X and Y), and, second, the attributes are now the individual services or components within each bundle (e.g., services A-D in Bundle X). As the number of services in each bundle increases (i.e., as the bundles become bigger), consumers face an increasing computational challenge requiring more comparisons of services within, as well as between, the bundles. The increasing computational challenge makes the decision more difficult and may even lead to choice deferral (Dhar 1996).

H_1: Decisions will be perceived to be more difficult when there are more (compared to fewer) services in the competing bundles.

Table 1. Example Decision Scenarios

Scenario 1		Scenario 2	
Bundle X	*Bundle Y*	*Bundle X*	*Bundle Y*
Service A	Service E	Service A	Service E
Service B	Service F	Service B	Service F
Service C	Service G	Service C	Service C
Service D	Service H	Service D	Service D

Unique Services Between the Bundles

The premise that the computational difficulty increases with the number of services holds as long as all services are unique to the two bundles. Consider scenario 1 in Table 1, where each bundle has four unique or distinct services, and consumers, if so inclined, can make 16 service-pair comparisons across bundles X and Y. Now consider scenario 2 of the same table, where each bundle has two unique components (services A and B in Bundle X, and services E and F in Bundle Y). Consumers, if they so choose, can cancel the two common components across the two bundles (services C and D) and make four between-bundle service-pair comparisons. Hence, with fewer unique components, the number of comparisons, and thereby the computational effort, is lessened.

H_2: Decisions will be perceived to be more difficult when there are more (compared to fewer) unique services between the competing bundles.

Similarity/Dissimilarity Between Bundles

Research on multi-alternative and multi-attribute decision making suggests that similarity between two alternatives increases with the number of attributes shared by the alternatives, and decreases with the number of features unique to each alternative (Tversky 1977). The similarity between alternatives, in turn, can be a primary driver of decision difficulty. For example, when alternatives share many features, consumers need to expend more cognitive effort to determine differences between the alternatives (Shugan 1980; Cooper-Martin 1993). Alternatively, the similarity between alternatives may drive the abstraction level at which the alternatives can be compared, the abstraction process affecting the consumers' perception of decision difficulty (Corfman 1991). For example, when the alternatives share the same features or attributes, they are typically compared at the feature levels (e.g., two microwave ovens compared on brand name, wattage, size, and warranty). When there are no shared or common features between the alternatives (e.g., a microwave and a vacation), they can be compared only at an overall value or utility level. Thus, with

decreasing similarity (fewer common features, and more unique features), the level of comparison becomes more abstract (e.g., how much "value" can be derived from the two alternatives). Research suggests that such abstract comparisons are easier to make than comparisons at the more concrete or feature levels (Johnson 1984), and indeed consumers prefer to make such abstract comparisons (Corfman 1991). Extending this argument to the bundling perspective, we propose our third hypothesis:

H_3: Decisions will be more difficult when choosing between bundles that are perceived to be similar compared to choosing between bundles that are perceived to be dissimilar.

Similarity Judgments

If the similarity/dissimilarity of bundles is a driver of decision difficulty, it is important to understand what drives such similarity/dissimilarity judgments (i.e., what makes consumers view two bundles as similar or dissimilar to each other). The first driver of bundle similarity is the number of common components between the bundles. For example, in Table 1, bundles X and Y in scenario 2 (with two common services and two unique services) should be perceived to be more similar than bundles X and Y in scenario 1 (with zero common services and four unique services). The second driver of bundle similarity is the similarity of the bundle components. To illustrate, consider scenario 2 of Table 1. The global similarity assessment of bundles X and Y can be based upon the local similarity assessments of the unique service pairs between them (e.g., AE, AF, BE, and BF; see the feature sharing model in Tversky 1977).

H_{4a}: More unique (and fewer common) components will decrease the perceived similarity between competing bundles.

H_{4b}: The perceived similarity judgment of the two bundles (global similarity) will be positively related to the similarities of the unique service pairs between the bundles (aggregating local similarities).

Methodology

We conducted the research in three phases, a focus group phase, a pre-test phase, and a survey phase. The inputs from the first two phases gave us qualitative insights into the problem faced by consumers in choosing from multiple bundles, insights we used to create and refine the final survey instrument.

Focus Groups

Participants. In the first phase, we ran two focus groups. We had eight participants in the first focus group and six participants in the second focus group. The participants came from local area residences and were familiar with the residential services under discussion (telecommunications and utilities). Participants received $20 compensation for about 45 minutes of their time. An experienced moderator conducted the focus groups and kept video, as well as audio, records of the discussion.

Procedure. The 45-minute focus groups were organized in four stages. In the first stage, the participants were introduced to nine different residential services and asked what they liked or disliked about the services. The services, selected after researching the popular press on the types of service bundles offered by telecommunications, cable, and utility companies, are (1) residential telephone, (2) cellular telephone, (3) television programming, (4) Internet connection, (5) electricity and gas, (6) home appliance repair and service, (7) lawn and garden service, (8) heating and cooling maintenance service, and (9) plumbing services. In the second stage, each participant constructed a bundle of services of their choice, and discussed why they had put the services together in that fashion. In the third stage, subjects looked at two "similar" bundles (Bundle A comprising residential telephone, cellular, and Internet; Bundle B comprising residential telephone and cellular with television programming), and discussed why such a decision would be easy or difficult to make. In the fourth stage, participants looked at two "dissimilar" bundles (Bundle C comprising residential telephone, electricity and gas, and lawn and garden; Bundle D comprising cellular, appliance repair, and lawn and garden), and discussed why such a decision would be easy or difficult to make.

Results. When asked to construct their "ideal" bundle, the three most popular bundles constructed by the focus group participants were (1) residential telephone, cellular, and Internet, (2) appliance repair, heating and cooling, and plumbing, and (3) residential telephone, television, Internet, and electricity and gas. Participants used phrases like "they are related," "they go together," "a natural good combination," "they are linked together by technology," and "they have things in common," in justifying their choices. A second theme that came across was "necessity." For example, the third bundle above was seen as a combination of necessary services.

Given a choice between two "similar" bundles (Bundle A comprising residential telephone, cellular, and Internet, and Bundle B comprising residential telephone and cellular with television programming), the majority agreed that Bundle A appeared more logical with "related" services. The participants found it hard to see

a fit between television and the telephone services in Bundle B. The participants, however, did not think that making a choice between the two bundles would be easy, citing reasons such as missing information about prices, customer services, and the ability of the supplier to handle multiple services.

Given the choice between two "dissimilar" bundles (Bundle C comprising residential telephone, electricity and gas, and lawn and garden; Bundle D comprising cellular, appliance repair, and lawn and garden), most participants expressed the concern that the services did not seem like a "natural fit." The majority of the participants agreed that if asked to make such a choice, the decision would be very easy for them, and that they would not select any package (i.e., defer the decision). The latter finding is particularly interesting because it suggests that decision deferral may be an indication of an easy, rather than a difficult, decision. The summary transcripts of the focus groups are available from the authors.

Pre-test

The focus groups identified similarity across competing bundles as an important factor in consumers' bundle choice. We next conducted a pre-test to determine the extent to which familiar household services (telecommunications, utilities, and other services) are perceived to be similar or dissimilar to each other.

Procedure. One hundred seventy-seven student participants read a brief description of the nine residential services identified in the focus groups, and the nature of payment (e.g., monthly bills based on usage and prevailing market rates; fees for services rendered with no fixed monthly fee, etc.). The participants then rated the similarity or dissimilarity of each of the ${}^{9}C_{2}$ or 36 pairs of service on a 9-point scale ranging from 1 (very similar to each other) to 9 (very dissimilar to each other). To avoid patterned responses to a series of similarity ratings, we interspersed filler tasks after every 10 rating questions.

Analysis and Results. Figure 1 shows a two-dimensional similarity map created using the ALSCAL procedure in SPSS. The data were treated as ordinal matrix conditional, and both two- and three-dimensional maps were examined. The average stress (Kruskal Formula 1) was between 0.14 and 0.18. We select the two-dimensional map due to its ease of understandability. From Figure 1, we see that four services (cellular, Internet, residential telephone, and television programming) form a similar cluster, while the other five services are dispersed across the two-dimensional map.

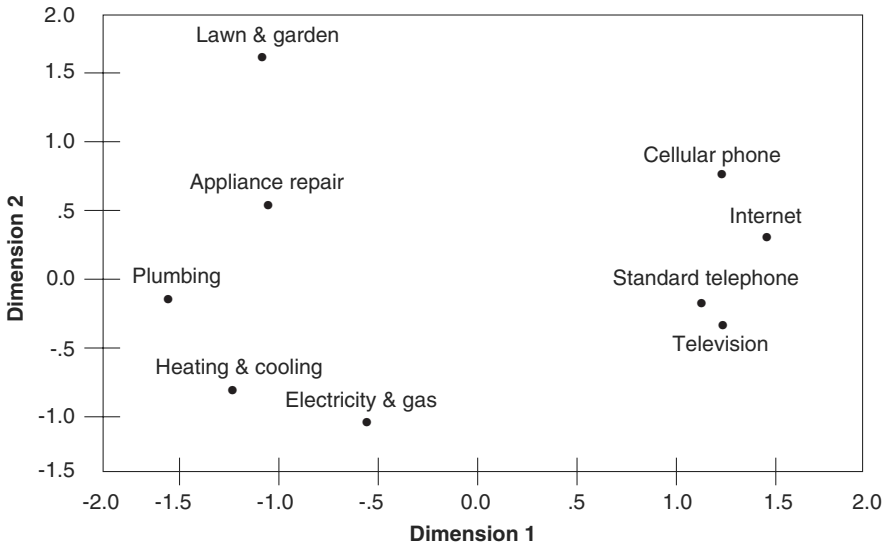
Survey

Our first task in the survey phase was to create hypothetical decision scenarios involving choices between two competing service bundles varying in the similarity of the services across the bundles, the number of services within each bundle, and the number of unique services between the bundles.

Creating Similar versus Dissimilar Bundles. The pre-test gave us a cluster of only four similar services (Figure 1), and led to a problem in constructing similar and dissimilar service bundles. For example, we wished to create a decision scenario where there would be (1) two competing bundles of four services each, (2) two

services unique to each bundle, and (3) all services within, as well as between, the two bundles similar to each other. To do so we would need a minimum of six "similar" services (see scenario 2 of Table 1), but since Figure 1 gave a cluster of only four similar services, we could not create the desired decision scenario. The upshot was that we were unable to treat similarity of the competing bundles as a manipulated variable in the survey (i.e., create similar and dissimilar service bundles for the survey participants). In addition, since perceptions of bundle similarity were likely to vary across respondents, we treated bundle similarity as a measured variable in the survey, with participants rating the similarity or dissimilarity of the competing bundles on a 9-point scale ranging from 1 (very dissimilar) to 9 (very similar).

Figure 1. Similarity Map of Nine Services in Pre-test



	Dimension 1	Dimension 2
Standard telephone	1.18	-0.29
Cellular phone	1.27	0.69
Television	1.23	-0.45
Internet	1.40	0.27
Electricity & gas	-0.53	-1.25
Appliance repair	-0.97	0.40
Lawn & garden	-0.93	1.60
Heating & cooling	-1.14	-0.80
Plumbing	-1.51	-0.16

We can, however, create competing bundles that vary in the number of services within each bundle and their uniqueness between the bundles. To develop these competing bundles, we created two parent sets of service components, each set comprising six service components (sets A and B in Table 2). The two sets were created such that each set had six service components (necessary to create our most extreme stimuli, i.e., competing bundles of four components with two unique components across the

bundles). As shown in Table 2, Parent Set A had four information technology services and two household maintenance services, while Parent Set B had two information technology services and four household maintenance services.

Table 2. Parent Set of Service Elements for Stimuli Construction

Parent Set A	Parent Set B
Standard telephone service	Standard telephone service
Television programming	Heating and cooling maintenance service
Cellular telephone service	Electricity and gas service
Internet	Internet
Plumbing service	Plumbing service
Lawn and garden services	Lawn and garden services

Table 3. Selecting Bundles from Parent Sets A and B

	Two-Component Bundles from a Set of Four Components		Three-Component Bundles from a Set of Five Components		Four-Component Bundles from a Set of Six Components	
	From Set A	*From Set B*	*From Set A*	*From Set B*	*From Set A*	*From Set B*
Number of possible bundles	${}^{4}C_{2}$ or 6	${}^{4}C_{2}$ or 6	${}^{5}C_{3}$ or 10	${}^{5}C_{3}$ or 10	${}^{6}C_{4}$ or 15	${}^{6}C_{4}$ or 15
Number of possible pairs of bundles	${}^{6}C_{2}$ or 15	${}^{6}C_{2}$ or 15	${}^{10}C_{2}$ or 45	${}^{10}C_{2}$ or 45	${}^{15}C_{2}$ or 105	${}^{15}C_{2}$ or 105
Number of possible pairs of bundles with one unique component	12	12	30	30	60	60
Number of possible pairs of bundles with two unique components	3	3	15	15	45	45
Number of pairs of bundles with one unique component selected for stimuli construction	3 out of 12 at random	3 out of 12 at random	3 out of 30 at random	3 out of 30 at random	3 out of 60 at random	3 out of 60 at random
Number of pairs of bundles with two unique components selected for stimuli construction	3 out of 3	3 out of 3	3 out of 15 at random	3 out of 15 at random	3 out of 45 at random	3 out of 45 at random

Number and Uniqueness of Services. We used the first four components of the two parent sets, A and B, to create two-component bundles, the first five components of the parent sets to create three-component bundles, and all the six components of the parent sets to create four-component bundles. In the case of the two-component bundles, we can construct ${}^{4}C_{2}$ or six different bundles of two components from four services (Table 2). These six bundles can then be put into ${}^{6}C_{2}$ or 15 different pairs of bundles. Of these 15 pairs, 12 will have one unique component between them, and 3 will have two unique components between them. We picked 3 pairs randomly (without replacement) from the first set of 12 pairs and all 3 from the second set of 3 pairs. Thus, we created six different decision scenarios for the two-component bundles, three with one unique component across the bundles and another three with two unique components across the bundles. We followed similar procedures to construct the three-component and four-component bundles (Table 3). Tables 4a and 4b describe the service components that went into the design of the decision scenarios.

Table 4a. Experimental Stimuli: Three Versions from Parent Set A

	Choice of Two-Service Bundles		Choice of Three-Service Bundles		Choice of Four-Service Bundles	
	One-Unique	*Two-Unique*	*One-Unique*	*Two-Unique*	*One-Unique*	*Two-Unique*
Parent Set A: *Version 1*	Television + Phone OR Cellular + Phone	Phone + Cellular OR Television + Internet	Cellular + Television + Internet OR Plumbing + Television + Internet	Phone + Television + Cellular OR Internet + Plumbing + Cellular	Phone + Cellular + Plumbing + Lawn and garden OR Television + Cellular + Plumbing + Lawn and garden	Phone + Cellular + Plumbing + Lawn and garden OR Television + Internet + Plumbing + Lawn and garden
Parent Set A: *Version 2*	Cellular + Television OR Internet + Television	Phone + Internet OR Television + Cellular	Television + Phone + Internet OR Plumbing + Phone + Internet	Phone + Plumbing + Television OR Phone + Internet + Television	Television + Phone + Internet + Plumbing OR Cellular + Phone + Internet + Plumbing	Television + Plumbing + Phone + Cellular OR Internet + Lawn and garden + Phone + Cellular
Parent Set A: *Version 3*	Phone + Internet OR Cellular + Internet	Phone + Television OR Cellular + Internet	Television + Phone + Cellular OR Plumbing + Phone + Cellular	Television + Internet + Phone OR Plumbing + Cellular + Phone	Phone + Television + Internet + Lawn and garden OR Cellular + Television + Internet + Lawn and garden	Phone + Lawn and garden + Internet + Television OR Plumbing + Cellular + Internet + Television

Design. The base design is a 3 x 2 within-subjects design, manipulating the number of components in the competing bundles (two, three, and four), and the number of unique elements between the competing bundles (one, two). The similarity/dissimilarity of the competing bundles is treated as a measured variable. Each participant evaluated 3 x 2 or six different decision scenarios (see any row of tables 4a and 4b).

Table 4b. Experimental Stimuli: Three Versions from Parent Set B

	Choice of Two-Service Bundles		Choice of Three-Service Bundles		Choice of Four-Service Bundles	
	One-Unique	*Two-Unique*	*One-Unique*	*Two-Unique*	*One-Unique*	*Two-Unique*
Parent Set B: *Version 1*	Lawn and garden + Phone OR Plumbing + Phone	Phone + Plumbing OR Lawn and garden + Internet	Electricity and gas + Lawn and garden + Internet OR Plumbing + Lawn and garden + Internet	Phone + Lawn and garden + Electricity and gas OR Plumbing + Internet + Electricity and gas	Phone + Heating and cooling + Plumbing + Lawn and garden OR Electricity and gas + Heating and cooling + Plumbing + Lawn and garden	Phone + Heating and cooling + Plumbing + Lawn and garden OR Electricity and gas + Internet + Plumbing + Lawn and garden
Parent Set B: *Version 2*	Plumbing + Lawn and garden OR Internet + Lawn and garden	Phone + Internet OR Lawn and garden + Plumbing	Lawn and garden + Phone + Internet OR Plumbing + Phone + Internet	Phone + Plumbing + Lawn and garden OR Internet + Electricity and gas + Lawn and garden	Electricity and gas + Phone + Internet + Plumbing OR Heating and cooling + Phone + Internet + Plumbing	Plumbing + Electricity and gas + Heating and cooling + Phone OR Internet + Lawn and garden + Heating and cooling + Phone
Parent Set B: *Version 3*	Phone + Internet OR Plumbing + Internet	Phone + Lawn and garden OR Plumbing + Internet	Lawn and garden + Electricity and gas + Phone OR Plumbing + Electricity and gas + Phone	Internet + Lawn and garden + Phone OR Plumbing + Electricity and gas + Phone	Phone + Electricity and gas + Internet + Lawn and garden OR Heating and cooling + Electricity and gas + Internet + Lawn and garden	Phone + Lawn and garden + Internet + Electricity and gas OR Plumbing + Heating and cooling + Internet + Electricity and gas

Two things merit note in the design. First, we attempted to generalize our results by including as many different combinations of services in each bundle as possible. Toward that end we created six different versions of the survey. The first three versions were constructed from Parent Set A (versions 1, 2, and 3; Table 4a). The remaining three versions were constructed from Parent Set B (versions 1, 2, and 3; Table 4b). Each participant was exposed to only one of the six versions. Second, in

order to reduce the transparency of the "uniqueness" manipulation, all participants rated the six scenarios in the following order: (1) two-component bundles with two unique components, (2) three-component bundles with one unique component, (3) four-component bundles with two unique components, (4) two-component bundles with one unique component, (5) three-component bundles with two unique components, and (6) four-component bundles with one unique component.

Stimuli and Measures. The survey booklet included an introduction and six sections (sections A through F). In the introductory page, the participants were asked to imagine that they had recently purchased a house and were considering different residential services for their new home. They were described six different residential services. The services that were described depended on the parent set (A or B) from which they were drawn (see Table 2). Thereafter, participants were asked to read through each of the next six sections and complete the task asked of them in each section, as described below.

Section A asked participants if they use each of the six services at present and/or if they have used the services in the past. Section B required participants to rate the similarity or dissimilarity of the ${}^{6}C_{2}$ or 15 possible pairs of the six on a 9-point scale, ranging from 1 (very dissimilar) to 9 (very similar). Section C introduced the participants to seven different decision scenarios. The first decision scenario served as a practice task to familiarize the participants to the choice task. The next six decision scenarios were derived from our design (any one row of tables 4a or 4b). For each decision scenario, participants imagined that their "preferred" firm was offering different pairs of competing service packages. The two bundles in any pair were labeled as Package 1 and Package 2. The participants read through the description of each pair of packages and then performed a choice task and a ratings task. In the choice task, participants circled one of three options, choose Package 1, choose Package 2, or defer the choice. In the ratings task, participants responded to a 9-point scale ranging from -4 (disagree completely) to +4 (agree completely), measuring perceived decision difficulty (i.e., "I found the decision very difficult"). The ratings, which are consumers' self-assessments of perceived decision difficulty, are the focus of our analysis.

Section D of the booklet described the seven pairs of bundles one more time and asked participants to rate the similarity/dissimilarity of the pairs on a 9-point scale ranging from 1 (very dissimilar) to 9 (very similar). The latter variable is a measure of the participant's perception of the similarity or dissimilarity of the two bundles, a predicted key driver of decision difficulty. Sections E and F of the booklet contained questions about the participants' shopping habits and basic demographic information.

Participants and Response Rates. A list of 1,200 Broome County, New York households was obtained from Marketing Systems Group, Fort Washington, Pennsylvania. Initially, 1,020 questionnaires were mailed in March 2000, with each household randomly receiving one of the six versions of the questionnaire. The survey included a cover letter, which introduced the authors and the funding agency and discussed the practical significance of the research. After a month, we made telephone calls to the remaining 180 households on the list, informing them

of the research and soliciting their participation in the survey. In all, we received 159 completed surveys, a response rate of about 13 percent. About 20 percent of the addresses on the list were incorrect, so the actual response rate is closer to 17 percent. The number of respondents in the six versions of the questionnaire range between 24 and 30 (see Table 5). There were 81 respondents in the three versions from Parent Set A (versions 1, 2, and 3), and 78 respondents in the three versions made from Parent Set B (versions 4, 5, and 6).

Table 5. Responses by Versions of Questionnaire

Version	Frequency	Percent	Cumulative Percent
1	30	18.9	18.9
2	24	15.1	34.0
3	27	17.0	50.9
4	24	15.1	66.0
5	29	18.2	84.3
6	25	15.7	100
Total	*159*	*100*	*100*

Our sample is 59 percent male, with an overall mean age of 53 years. Seventy-nine percent own their own houses with the mean ownership years being 20 years. The median income is between $40,000 and $55,000. About 48 percent of the sample use a dial-up modem, 19 percent have a cable modem, 27 percent use a lawn service, and 56 percent a plumbing service. While the previous service usage questions were asked of the whole sample, some service usage questions were specific to particular versions of the questionnaire. For example, among respondents sent questionnaires from Parent Set A (N = 81), 37 percent use a cellular phone, 100 percent have cable television, and 4 percent have a satellite dish. Similarly, among the respondents sent questionnaires from Parent Set B (N = 78), 78 percent use heating and cooling services and 95 percent use electricity and gas service. Thus the respondents are quite knowledgeable about the services included in our survey.

Analysis and Results

Design. Again, the base design is a 3 x 2 within-subjects design, manipulating the number of components in the competing bundles (two, three, and four), and the number of unique elements across the competing bundles (one, two). The similarity/dissimilarity of the competing bundles is treated as a measured variable. Each participant evaluated 3 x 2 or six different decision scenarios. The six different decision scenarios, in turn, varied based on the type of services that were included in the different bundles. As described earlier, these services varied depending upon

the parent set from where they were drawn (tables 4a and 4b), and hence parent set forms a between-subjects factor in the analysis.

Base Model. We ran a mixed ANOVA with number of components (2, 3, 4), number of unique components (1, 2) as the within-subjects factors, parent set (A, B) as the between-subjects factor, and perceived similarity of the bundles (measured on a 1 to 9 similarity-dissimilarity scale) as a covariate. The dependent variable in the ANOVAs was perceived difficulty measured on a 9-point agree-disagree scale ("I found the decision to be very difficult"). Overall, some main effects and two-way interactions were significant. Neither the covariate nor the three-way interaction (number of components x number of unique components x parent set) was significant.[1] The significant main effects and interactions are discussed below.

Number of Services. Hypothesis 1 suggests that decisions will be more difficult when there are more (compared to fewer) services in the competing bundles. As predicted, there was a significant main effect of the number of services on decision difficulty ($F_{2,275} = 5.08$, $p < 0.01$; $X_{\text{Two Services}} = 2.87$, $X_{\text{Three Services}} = 2.97$, $X_{\text{Four Services}} = 3.38$).

Number of Unique Services. Hypothesis 2 suggests that decisions will be more difficult when there are more (compared to fewer) unique services across the two competing bundles. Hypothesis 2, however, was not supported. The main effect of uniqueness for decision difficulty was not significant ($X_{\text{One Unique Service}} = 3.06$, $X_{\text{Two Unique Services}} = 3.08$; $F_{1,37} < 1$, n.s). However, the interaction between uniqueness and total number of services was significant ($F_{2,275} = 3.49$, $p < 0.05$). Uniqueness increased decision difficulty when the competing bundles had two services ($X X_{\text{One Unique Service}} = 2.66$, $X_{\text{Two Unique Services}} = 3.07$; $F_{1,143} = 3.81$, $p = 0.05$). Uniqueness did not affect decision difficulty when the competing bundles had more than two services (for three-service bundles: $X_{\text{One Unique Service}} = 3.09$, $X_{\text{Two Unique Services}} = 2.86$; $F_{1,142} = 1.87$, n.s; for four-service bundles: $X_{\text{One Unique Service}} = 3.44$, $X_{\text{Two Unique Services}} = 3.32$; $F_{1,140} < 1$, n.s).

The results suggest that uniqueness affects decision difficulty when selecting between small (two-service) bundles but not large (three- or four-service) bundles. Notice that in two-service bundles, the "two-unique" condition results in bundles with no common services between them, a feature which never holds in the case of the bigger bundles. One speculation, therefore, is that uniqueness, in general, will not affect decision difficulty unless it results in competing bundles that have no common services between them (e.g., two unique services in two-service bundles, three unique services in three-service bundles, and so on). A second speculation is that respondents give up on item-by-item comparison, a necessary condition for identifying unique services, and just assess the overall value of bigger bundles.

Similarity Between Bundles. Hypothesis 3 suggests that decisions will be more difficult when choosing between two similar bundles (compared to two dissimilar bundles). Participant's self-reports of decision difficulty were positively correlated with

1. In order to assess the impact of all the between- and within-subject variables simultaneously, we also used hierarchical regression analysis as suggested by Cohen and Cohen (1983). All the results of the mixed ANOVA were confirmed. However, the overall R^2 of the model was only 0.04, and suggests that our model may be missing other explanatory variables. We discuss this point later.

the perceived similarity of the competing bundles (R^2 = 0.09, p < 0.01), indicating that more similar the two bundles, the more difficult the decision. However, the small magnitude of the coefficient suggests that there are other variables besides similarity that drive decision difficulty. For example, as our focus groups showed, consumers typically look for tie-breaking information such as price, and vendor reputation, when deciding between similar bundles.

Forming Similarity Judgments. Hypothesis 4 proposed that consumers construct their bundle similarity judgments by, first, eliminating the common services between the two bundles, and, second, comparing the local similarities of the unique service-pairs between the bundles. To test this model, we ran a regression where participants' reported similarity score of the competing bundles served as the dependent variable, with the number of services in each bundle (NUMBER), the number of unique services between the two bundles (UNIQUE), the average of the perceived similarities of all the unique service-pairs between the two bundles (PAIRSIM), and the two interaction terms involving PAIRSIM (PAIRSIM*NUMBER, and PAIRSIM* UNIQUE) as the predictors.

The results are shown in Table 6. The fit of this model is reasonable (R^2= 0.15). As predicted, more unique components decreases the perceived bundle similarity (β = -.83, p < 0.01). Consistent with our hypothesis, the variable PAIRSIM is positively related to bundle similarity (β = .63, p < 0.01), and suggests that similarities of the services between the bundles (local similarities) affects the perceived similarity of the bundles (global similarity). One other significant result emerged. Bundle size appears to positively influence similarity judgments, with bigger bundles appearing to be more similar than smaller bundles (β = .69, p < 0.01). The interaction between PAIRSIM and number of components is significant and negative, suggesting that number of components moderates the effects. We ran separate regressions for two-, three-, and four-component bundles. The number-of-unique-components was negative and significant for two- and three-component bundles, as hypothesized, but not for four-component bundles. We found mean similarity (PAIRSIM) significant only in the four-component bundles. This suggests that item-by-item comparisons may be done only in larger bundles, while the smaller bundles are evaluated as a whole (e.g., "the two bundles are quite similar to the extent that they both serve my needs well").

Table 6. Regression Results for Similarity Model

PAIRSIM = Mean of the similarities of each pair of unique service between Bundle A and Bundle B

UNIQUE = Number of unique services between Bundle A and Bundle B

NUMBER = Number of services within Bundle A (or Bundle B)

Model		B	Std. Error	Beta	T	Sig. T
	(Constant)	2.761	0.698		3.957	0.000
	PAIRSIM	0.627	0.154	0.606	4.063	0.000
	UNIQUE	-0.830	0.316	-0.174	-2.627	0.009
	NUMBER	0.692	0.190	0.237	3.637	0.000
	PAIRSIM*UNIQUE	-0.027	0.071	-0.041	-0.374	0.709
	PAIRSIM*NUMBER	-0.093	0.039	-0.321	-2.397	0.017

$R^2 = 0.151$, $F_{5,892} = 31.67$, $p = 0.00$

Discussion

Summary Results and Implications

In this paper we assume a marketplace scenario where one or more service providers offer a menu of bundles to the consumers, and the consumers pick the bundle that best suits their needs. We take the approach that the best configuration of bundles is that which makes the selection decision least difficult for the consumer. Thus, our focus is not so much on whether or not a specific bundle is selected. Rather, our focus is on recognizing features of the decision task that facilitate decision making. Based on the literature on multi-alternative, multi-attribute decision making, as well as the inputs from two focus groups, we investigate the impact of three factors on the consumers' perception of decision difficulty in bundle choice: the number of services within each bundle, the number of unique services between the competing bundles, and the perceived similarity between competing bundles.

The first factor, the number of services in competing bundles, not surprisingly, increases consumers' perception of decision difficulty. The finding poses an important challenge for the service providers. To differentiate their bundles from their competition, providers may be tempted to pack as many products or services in their bundle as possible. However, as our results show, if all providers follow the same strategy by offering "large" bundles, the consumers will find the selection process very difficult and may end up not selecting any bundle at all. The reason for this reluctance could stem from the intractability of making multiple comparisons of the alternatives between the competing bundles. Alternatively, it could stem from the consumers' unwillingness to trust a single service provider to efficiently provide the many disparate services, or the sticker shock that they anticipate experiencing when the time comes to pay for one big bundle.

The second factor, the number of unique services between bundles, appears to affect the consumers' perceived decision difficulty in choosing between competing bundles only for small (two-service) bundles. However, it is not clear whether it is uniqueness in general, or one particular form of uniqueness (that leads to zero overlapping components across the competing bundles) that contributes to decision difficulty.

The third and final factor, perceived similarity between competing bundles, is found to have a weak (but significant) relationship with decision difficulty. Choosing between similar bundles is more difficult than choosing between dissimilar bundles. Although the survey results point to a weak relationship, the focus groups appear to think that similarity or "relatedness" is an important issue driving consumers' comparison between competing bundles. A related question, then, is, how are these similarity judgments formed in the first place? Our results suggest that such judgments are probably formed when consumers compare the unique services across the competing bundles one pair at a time. In addition, bigger bundles are perceived to be

more similar to each other compared to smaller bundles, making the choice decision difficult. Service providers, therefore, need to offer small bundles that are not perceived to be similar to one another, or to present them in a way that highlights differences between them.

Our paper is an exploratory study of some of the factors that appear to drive perceived decision difficulty in the consumers' choice between competing bundles. While we have considered service bundles, our framework is sufficiently broad to encompass bundles in general. For example, common bundles that consumers encounter almost routinely in their lives include fast-food meal bundles (main meal, side orders, and a drink), photographic equipment bundles (camera body, one or more lenses, and in some cases accessories and supplies such as flashes, tripods, and film) and personal computer bundles (a processor, a monitor, and occasionally peripherals such as printers and scanners). Our results can apply to such common bundles as well.

Future Research

The first task for future research in this area is to systematically identify the factors that affect customers' decision difficulty in any type of bundle selection. For example, some of the factors that we have not explicitly considered in the survey, but which may nevertheless influence consumers' perceptions of decision difficulty, may include the price of the bundles, to what extent the components functionally complement each other, the brand equity of the bundle provider, and how much consumers trust vendors to efficiently provide the services. The latter should be particularly relevant when vendors stray from their traditional domain, e.g., telecommunications companies providing utility services, and brokerage firms offering banking.

The second task for future research is to develop more sensitive measures of decision difficulty. In our research, we used one global measure of perceived decision difficulty (e.g., how difficult was the decision). Future research can expand on these measures by considering consequences of difficult decisions, such as the tendency to defer the decision, likelihood of regretting the choice made, or less confidence in the selected bundle. Although not reported here, we took measures of decision deferral (i.e., choose Bundle A, choose Bundle B, or choose not to make decisions at this time), but the correlation between decision deferral and perceived decision difficulty was not significant. Although it is reasonable to surmise that greater feelings of decision difficulty should lead to more incidences of decision deferral, the opposite may hold just as well. As some of our focus groups participants pointed out, it may be relatively easy to decide that none of the available bundles meet current needs, and therefore the decision is not to decide for the moment. Hence, this is a case of an easy decision leading to choice deferral. Thus, using measures such as decision deferral and post-choice regret would appear to make sense only in a forced choice context.

The third consideration for future research is to assess how consumers respond to different bundling contexts. For example, in this paper we considered bundles where the separate services were quite easy to identify. There are other, more subtle,

forms of bundling where it is not readily apparent that different services or products are being packaged together. An old example is the different programs that come bundled together on the computer's hard drive. A more recent example concerns how best to market Personal TV (e.g., TiVo) which allows you to play, pause, and re-play live television broadcasts. Should the Personal TV be marketed as a stand-alone service, or should it be bundled together into a set-top box that provides cable television or satellite television?

The final challenge for marketers is to develop personalized bundles of products and services to meet individual needs. The market for service bundles will be niche segments that will require highly tailored services. For example, for energy-related bundles, residential consumers are more likely to be receptive to a package that might consist of heating and air conditioning repair and maintenance, home appliance repair, and electrician's services. Small business customers, on the other hand, would probably like power quality consulting and energy audits built into their bundles. Future research may wish to address how best personalization can be made to bear upon the number and variety of bundles that service providers are going to offer in the marketplace.

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