Bundling Effects on Variety Seeking for Digital Information Goods

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Abstract
Prior research with consumable goods has consistently found a preference for greater variety when selecting items simultaneously as a bundle, rather than as a sequential series of individual decisions. However, digital information goods have a number of important differences from consumable goods that may impact variety-seeking behavior. In three experiments, we address two general research questions. First, as a precursor to studying digital goods, we disentangle the role of bundle cohesion (i.e., item relatedness) from the role of timing (simultaneous vs. sequential choice) as factors in variety seeking with consumable goods. Next, based on differences between digital and consumable goods, we theorize differences in the behavioral effects of bundle cohesion and timing upon variety preferences for digital goods. The results show a reduction of influences upon variety-seeking behavior with digital goods, providing important implications for the sellers of such goods in contrast to what has been suggested for consumable goods.

Keywords: variety seeking; digital goods; bundled goods; simultaneous choice; sequential choice; bundle cohesion

Introduction
A consistent result in prior research related to consumer choices of physical consumable goods is a preference for greater variety when selecting a group of multiple items at once, as opposed to when making a series of related decisions about individual items over time. For example, when buying multiple packages of yogurt at the grocery store, consumers purchase more different flavors, as opposed to purchasing yogurt daily at a retail store on separate days, where less variety in the item selection occurs (cf. [44]). In this paper, we explore variety-seeking behavior as it applies to consumer preferences for digital information goods. We hypothesize that the characteristics of digital information goods lead to a difference in variety-seeking behavior as compared to what has been observed repeatedly and consistently with consumable goods. Alvesson and Karreman [1] argue that interesting and significant research topics flow from such breakdowns in the applicability of prior explanations; and, in this vein we follow the advice of Venkatesh [51] and investigate the

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1 We use the traditional economic definitions of “consumable” and “durable” goods throughout the paper. A consumable good is one that may be worn out or depleted in use and typically yields utility over a single use. A durable good is one that does not quickly wear out and yields utility over multiple uses.
breakdown of theoretical elements from another discipline in the contexts of IS research. An understanding of variety-seeking behavior in digital good purchases will provide important insights for producers, retailers, and marketers of digital information goods.

For example, consider music as an exemplar digital good. Even with the availability of free music streaming services (such as YouTube and Pandora) as well as practices of copying music without permission, there is still a large market for music as a purchased digital good. In fact, Billboard projects a growth in the US digital music market to $19.6B by 2016 (billboard.com). In addition, there are multiple ways that music is sold, e.g., as single songs (in single or multiple buying sessions), as albums created by the artist/producer in traditional fashion, and as customized CDs and playlists. Both bundled and non-bundled options of different types are available. Consequently, understanding the impact (or lack thereof) of bundling on variety seeking is of clear practical significance.

In general, we follow Stremersch and Tellis [48] in defining bundling, or product bundling, as the sale of separate products (goods or services) as a single package. More specifically, we can differentiate between seller-driven and buyer-driven bundling. In the former, where the seller creates the bundle, the value of bundling has been studied extensively from the seller’s economic perspective, showing the benefits of bundling in a variety of conditions (e.g., [13]; [31]; [39]; [40]; [47]). Other seller-oriented issues include the acceptability of bundles of different types (involving substitutes or complements) and under different conditions (e.g., [22]; [50]).

Our interest, however, is upon buyer-driven bundling, i.e., customization, where the consumer can assemble multiple items into a bundle for acquisition. Additionally, we are interested in understanding consumer behavior, rather than in the determination of optimal bundling purchasing in a business setting [e.g., 7]. Breaking apart the more traditional types of digital goods (e.g., books, music albums, etc.) and selling them in sub-units or as customizable bundles is a growing
phenomenon [3]. For example, Apple Inc.’s iTunes marketplace allows consumers to purchase individual songs, full albums, and custom song sets, as well as other digital content, e.g., television episodes; Mix & Burn (mixandburn.com) allows customers to create customized compact discs (CDs); publishers such as McGraw-Hill allow instructors to create customized textbooks by combining content and chapters from multiple sources; and services such as Spotify and YouTube allow users to create custom online song and video playlists. Despite the marketplace, little research has explored the context of buyer-side bundling of digital goods.

Our research investigates the phenomenon of choice differences in variety seeking between bundled and non-bundled digital goods. As noted, the prior research investigating this phenomenon, including the aforementioned yogurt example, has mostly involved consumable goods, e.g., selecting candy bars ([16]; [34]; [36]). However, digital goods have unique characteristics compared to physical consumable goods that can impact the economics of consumption. In particular, digital goods are easily and cheaply reproduced, distributed, and modified [42]. Additionally, most digital goods are durable goods (i.e., they can be used multiple times without degradation). Once purchased singly or in a bundle, a digital music product, such as a song or collection of songs, can typically be rearranged multiple times with other digital goods in many combinations with no loss in quality (within the constraints of any digital rights management or security restrictions). The consumer’s anticipation of this flexibility may well have behavioral impacts on choice and consumption not present with other goods. We explore this potential difference in variety-seeking behavior between the purchase of consumable and digital goods.

As a first step in doing so, we recognize that the traditional methodology using consumable goods confounds two aspects of bundling that can operate individually. The two bundling factors that need to be disentangled are: (1) the timing of the choices when selecting multiple goods and (2) the cohesion of the bundle to be chosen. Timing concerns whether there is an interval between
purchases of the items in a bundle. We follow the established research on consumable goods in distinguishing between simultaneous and sequential choice. For example, with digital music, a consumer may buy several songs at once, or buy single songs individually in succession at different times (simultaneous vs. sequential choice, respectively). Similarly for consumable goods, e.g., the consumer can purchase snacks at a single point in time at the grocery store or individually as desired. Even small periods of time have been successfully used to differentiate choices as being sequential, so timing can be distinguished even within a single experimental session [e.g., 36, 38, 43].

As a second dimension, the cohesion of the items can vary independently of the timing of purchases. We define cohesion as the degree to which the items in a bundle of goods provide some value as a group aside from the simple additive value derived from each individual item, e.g., due to complementarity, inseparability, or some other perceived connection among the items. For example, the consumer can buy multiple songs as a more cohesive bundle (e.g., as a playlist) or as a much less cohesive bundle (simply as a set of digital files added to one’s music collection with no perceived connection among them at the time of purchase). Similarly, the consumer can buy snacks for just everyday eating (less cohesive), or be buying items to serve at a given party at a specific place and time (more cohesive). It is beyond the scope of this paper to enumerate all possible variations of cohesion, and contextual and individual differences may be involved [cf. 10, 53]. Operationally, we focus on clearly delineated levels of cohesion in our hypotheses and experimental designs as discussed below. Our studies are the first to take the initial step of explicitly distinguishing the two aspects of bundling: timing of bundle choices and the cohesion of bundle items for both consumable and digital goods. Doing so allows us to be more precise and to assure that we fully address the effects of bundling on choice behavior.

Using three experiments, we address the following general research questions: (1) As a precursor to studying digital goods, we disentangle the role of bundle cohesion (i.e., relatedness of
items in the bundle) from the role of timing (i.e., simultaneous vs. sequential item choice) within the traditional experimental paradigm used for consumable goods. This distinction has not been made in previous research; we develop this idea in the paper and argue that it is an important step for clarifying the bundling effects being studied. Thus, we set up our studies of digital goods by first addressing the question: *For consumable goods, how do timing and bundle cohesion co-contribute to variety seeking?* (2) Once we dissect the established baseline behavior for consumable goods, we address the primary question of interest: *How does variety-seeking behavior extend to the selection of digital goods?*

As background, we review the relevant research with consumable goods, highlighting the explanations that have been proposed for the difference in choices between bundled and non-bundled goods. We then consider the features of digital goods relative to these explanations. The results of our studies contribute to IS and decision research in two important ways. First and foremost, we test the hypothesis that the empirical finding of differential variety-seeking behavior for bundled and unbundled choice does not extend directly to the context of digital information goods. Second, we disentangle two factors that potentially impact variety-seeking behavior – bundle cohesion and timing.

**Background**

**Variety Seeking with Consumable Goods**

In the situation of choosing a bundle of items, Farquhar and Rao [14] modeled choice by including a factor that is sensitive to the heterogeneity among the elements in the bundle. *Variety seeking* (or diversification bias as it is also known) is a phenomenon where decision makers tend to choose a more diverse set of options, or seek increased variety, under certain decision environments [e.g., 36]. Consistently, researchers have observed a consumer preference for greater variety when selecting multiple items at once, as opposed to when making a series of related decisions about individual items over time. This general idea—that consumers are sensitive to the variety among elements in a product bundle while forming the choice set—has been verified in a number of situations (see
reviews [27], [32]), including real-world settings, e.g., differences in variety-seeking behavior using scanner data of consumers’ purchases of yogurt items of various flavors [44].

The behavioral decision making literature on product bundling has applied different definitions of what comprises “product bundling.” We identify the differences here to delineate the scope of our research. One type of studies looks at choosing among alternatives that are defined by multiple attributes, framing multidimensional options as bundled products (e.g., a car as a bundle of different features [24], [26]). The studies demonstrate that preferences depend on whether the multi-attribute options were evaluated together or singly. A second type of product bundling involves multiple products. The products may be complementary (e.g., DVDs and a player) or unrelated (e.g., a keyboard and calculator). Results show that the pricing of bundles, relative to the individual items, might be sub- or super-additive depending on the quality of the bundled items (e.g., [17], [54]).

A third type of bundling studies has looked at consumption of products within a single category over a specified time period (e.g., choices of snacks to eat at each session). Two key aspects of these studies are: (1) the temporal component of choice and (2) the actual consumption of the products within the period of the study’s design. One study had participants evaluate 45-second music clips, either the same favored clip repeated 15 times, or a mixed block containing 11 repetitions of the favored clip intermixed with 4 repetitions of the least favored clip [35]. Despite the inclusion of the least favored music, they found that evaluations declined more slowly with the mixed bundle. Similar effects have been observed with students selecting and watching movies [37], and for snacks consumed over successive days [36].

Three other studies in this category involve choices of music. Brickman and D’Amato [6] offered participants a simple jukebox of 8 initially novel musical selections which they could listen to in a single session over 40 trials. Participants initially showed a lot of variety in their choices. They started by sampling all the songs to see which they liked, choosing variety for information gathering.
Later, they more frequently listened to the same songs repeatedly, but the repeated listening was generally not consecutive, e.g., they would listen to two favored songs in alternation (ABAB), rather than grouped (AABB), and rather than four different songs (ABCD). Thus, the consumers exhibited variety seeking with two separate motivations: first for information gathering, and second for other purposes (only speculated by the authors). Similarly, Read et al. [38] compared preferences between simultaneous and sequential choice of two songs for immediate listening, finding greater variety (measured in terms of artists and genres) in the simultaneous choice condition. Galak et al. [18] also replicated the greater variety seeking with simultaneous choice of songs.

These first three forms of defining bundles in studies of variety-seeking behavior are mainly included here as contrast. Our research corresponds to a fourth form of bundling, common with digital goods, in which product bundles consist of multiple items from within a single category; however, unlike the third case, the consumption does not occur wholly within the study period. Still, in this fourth form of bundling as well, the empirical observation of variety seeking is well-established for consumable goods. The observed result is a systematic difference in variety-seeking behavior between sequential and simultaneous choice contexts (e.g., [38]). The contrast between sequential and simultaneous choice has been an active area of research on bundling. A clever naturalistic study demonstrating the effect was conducted by Read and Loewenstein [36] on a Halloween night. Some children who were trick-or-treating were offered two candy bars that they selected at a single house (simultaneous choice), while others were offered one candy bar from each of two adjacent houses (sequential choice). Children in the simultaneous choice condition were more likely to choose two different candy bars than those in the sequential choice condition, showing more variety in simultaneous choice. Simonson [43] found similar results with adults making sequential and simultaneous choices, both hypothetical and real, within other consumable product categories. The phenomenon of differences in variety seeking between bundled and non-
bundled choice has proven robust and consistent for consumable goods.

**Theoretical Drivers of Variety-Seeking Behavior**

In addition to identifying the presence of variety-seeking behavior, researchers have also proposed explanations for the behavior [34], both intrapersonal and interpersonal [32]. *Intrapersonal motivations* include: desire for stimulation, protection against satiation, acquisition of information, and allowing for future preferences to operate. So, variety can be sought because consumers see value in having a variety of experiences; they just like to try different things. Or, the consumer recognizes from past experience that repeated consumption of the same product leads to reduced marginal pleasure over time [52]. Listening to a favored song again and again eventually diminishes its appeal. The anticipation of this satiation can also impact choices. To protect against satiation, the consumer can purposefully reduce the opportunity for repetition by selecting variety.

Simonson [43] and Kahn [27] targeted preference uncertainty as a factor that influences variety seeking. The uncertainty may be due to a lack of current information or from the belief that one’s preferences may change over time. Intrapersonal motivations driven by uncertainty arise when time and effort are of concern [9, 43]; the consumer uses variety as a way of postponing the decision to save time and effort in the present. Thus, where uncertainty of preference about the products is present, variety can be used as an information-gathering strategy. As noted earlier, this was a factor in subjects’ initial listening choices as observed by Brickman and D’Amato [6, also see 11]. In the face of such uncertainty, having a variety of items, in addition to allowing information gathering, can give consumers options tomorrow. Studies verify that consumers prefer to choose from larger assortments [8, 41]. Maintaining a larger choice set postpones the final decision until later when preferences might differ. Again, this is only expected where preference uncertainty exists.

As for *interpersonal motivations*, the primary motivations are a desire for social distinctiveness and its contrasting desire to follow the behavior of peers. These motivations tend to be culturally-bound [29]; and, within a culture, they are expected to be more prevalent in explicitly social settings. Ariely
and Levav [2] verified the social aspect in an analysis of lunch orders at a Chinese restaurant in the U.S. The data showed more variability among orders within a table than would be expected by chance, supporting the operation of self-expression motives in a social setting. (“You’re ordering the shrimp? Ok, I’ll get something else.”) They found a similar pattern for beer and wine choices in two additional studies. Since our research is focused on individual choice in a non-group setting, such dynamics are unlikely to be operating in our studies.

In summary, there has been considerable research substantiating differences in variety seeking for bundled and non-bundled choice in the context of consumable goods. Explanations underlying these robust effects have also been identified and discussed. Our contribution is not in identifying this effect; but, in (1) clarifying its operation by disentangling bundle cohesion and timing aspects, and (2) studying the effect in an entirely new setting of choosing digital goods. The interest in both of these arises from a consideration of the features of digital goods.

**Variety-Seeking Behavior with Digital Information Goods**

Unlike the products used in prior work on variety seeking with bundles, most digital goods, such as music, are not consumed in the same sense. Although several studies, cited earlier, used music as the focal product, in each case the selections were consumed (i.e., listened to) *during* the study session only. These experiences are more akin to consumable goods in that the experiences are “consumed” immediately (though the songs themselves are not, since they continue to exist after the experiences). Prior studies on the selection of consumable goods that are not limited to immediate consumption represent the most direct comparison to our studies (e.g., [36]). The typical scenario in which consumers select digital goods in the real world is with the intention for later use, and we adopt this view in our studies. To answer the question—*What is the expected behavior in terms of variety seeking for digital goods, such as music?*—we begin by considering characteristics of digital goods that have been identified as distinct from those of consumable goods. These features are definitional for our purposes in differentiating between consumable and digital goods. We then consider the
explanations for variety-seeking behavior and their applicability to digital goods based on these definitional distinctions.

In contrast to consumable goods, a digital good (or copy of a digital good) can be used over and over again without degradation or expiration of the product, i.e. digital goods display the properties of a durable good. Consequently, multiple versions of the same identical product generally need not be purchased for multiple uses as is the case with consumable goods. A consumer might well buy two cups of the exact same brand, flavor, and size of yogurt, even within a single bundle; since, once a cup is consumed, it no longer exists. However, the consumer is highly unlikely to buy two exact copies of the same song, especially within a single bundle.

Another oft-mentioned characteristic of digital goods, one that has been shown to have an impact on bundling in economic analyses, is the negligible marginal costs of reproducing and transferring such goods. A consequence is the flexibility in packaging, repackaging, and modification of the product that is facilitated. Once purchased, a digital song generally can be rearranged with other songs in any combination numerous times with no loss in quality (subject to legal and technological constraints). A consumer’s anticipation of this may well have behavioral impacts not present with consumable goods.

In addition, another consequence of negligible marginal costs for digital goods is the viability of offering uncertainty-reducing strategies at low cost. In particular, music sampling is prevalent as an uncertainty-reducing measure that can be easily enabled for music as a digital good [42]. Similarly, booksellers, e.g., Amazon.com with their “Look Inside” feature, can offer sample passages at no cost to reduce the uncertainty of potential buyers. We apply this option in our studies with digital goods to minimize potential uncertainty effects, as described below.

With these characteristics of digital goods in mind, Table 1 summarizes the explanations for variety seeking described in the previous section as leading to differences between bundled and
unbundled choices, as well as the theoretically conjectured generalizations to digital goods. With respect to desire for stimulation, the baseline case with consumable goods of purchasing multiple instances of the identical product is no longer relevant. Still, for digital goods, to the extent that individuals are driven by an internal desire for more variety, the tendency would still be expected to express itself as variety in choices across market-defined categories (e.g., selecting music from different albums, artists, or music genres). This was the approach taken by Read et al. [38] in showing variety seeking differences at the time of consumption, and we follow their lead. Although this changes the measure of variety, a change in measure does not, of itself, change the underlying dynamics or the potential applicability of the explanations leading to the same variety-seeking effects with digital goods. Variety still may be supported by an internalized socially-motivated desire to appear distinctive. Thus, as indicated in Table 1, we would still expect variety-seeking effects to the extent that a desire for stimulation is operative, though it may be somewhat reduced with the elimination of the no-variability option of selecting multiple items of an identical good. In contrast, the motivation of protecting against satiation is largely dependent on the repetition of identical items. It may still operate to the extent that there is high similarity among the digital good items. However, in general this would be expected also to have a reduced impact on variety seeking differences, at most.

**** Insert Table 1 about here ****

The next two proposed motivations are posited to primarily operate in situations with high preference uncertainty, encompassing different reactions to the uncertainty of future preferences. As noted, a consequence of the negligible marginal costs of digital goods is the ensuing ease of providing samples. To approximate the real-world setting, we enabled this capability in our design. With sampling, the use of variety seeking to gather information is expected to be minimal. Sampling generally provides sufficient information to form an initial preference. This still leaves open the possibility of changing preferences between the time of choice and the times of future listening. To
the extent that preferences are anticipated to change, the motivation of delaying choice to allow for different future preferences can still apply, even with sampling. Finally, interpersonal motivations, as a direct effect, require a situation involving social comparison. In our design, subjects will provide their responses privately. Therefore, we do not expect any variety-seeking behavior to be driven by interpersonal motivation in our research setting.

In summary, the current research is aimed at understanding consumers’ variety-seeking behavior in the creation of bundles of consumable and digital goods. A difference in choices between bundled and non-bundled goods is a well-established phenomenon for consumable goods. As summarized by Table 1, several of the motivations for variety-seeking behavior present for consumable goods are not expected to be present for digital goods. Therefore, we expect the consistently significant differences in variety-seeking behavior for consumable goods between bundled and non-bundled choices to be lessened or eliminated in the context of digital goods. Within three experiments, we used music files (songs) as the digital good to be examined, and candy as the consumable good for comparison. Measures of variety in the selections made by participants were the primary dependent variables, which are detailed in the descriptions of each study.

**Experiment 1: Consumable Goods**

Prior to analyzing the bundling effects on choices for digital goods, we first disentangle two effects that are typically confounded in studies involving consumable goods, allowing us to be more precise in our digital good experiments. Specifically, our goal is to determine whether differences in variety-seeking behavior are driven only by the timing of the choice task, or whether the cohesion of the items in the bundle also plays a significant role. As discussed previously, we define cohesion as the degree to which the items in a bundle of goods provide value as a group aside from the additive value derived from each individual item, e.g., due to complementarity, inseparability, or some other perceived connection among the items.

A 2 x 2 between-subjects design is employed. The two factors are the timing of the bundling
choices (i.e., simultaneous vs. sequential) and the cohesion of the bundle to be chosen (i.e., a more vs. less cohesive bundle). Taking the lead from many prior studies on variety seeking behavior in consumable goods, we use candy as the product of choice in Experiment 1. In the simultaneous conditions, candy selections are made from a single display screen, all at once. In the sequential conditions, candy is selected from the same display, but one at a time with a forced time lag between each choice. To manipulate the cohesion factor, the participants either received all of their choices at the end of the study (high cohesion treatment), or the participants received one random item from among those selected – eliminating any potential relatedness among the items within the selected bundle (low cohesion treatment).

Consistent with previous work, variety is measured using the number of different items selected within the choice set. Prior research has established that there is an effect when both timing and cohesion are manipulated together; we explicitly propose the same effects for each of the two factors separately:

*H1:* For consumable goods, greater variety will be selected when choice is simultaneous compared to sequential.

*H2:* For consumable goods, greater variety will be selected for a more (vs. less) cohesive bundle.

**Participants**

Our experiments were designed to explore variety-seeking behavior when purchasing candy and digital music. Ideal participants would have good familiarity with these types of products, as well as be responsible for their own purchasing decisions. Therefore, college students represent an excellent population. Participants were primarily students who were recruited using solicitations made in classes, posted on campus, and advertised in an undergraduate weekly electronic newsletter. The mean age of the respondents was 23.3 years (standard deviation = 8.5), and 52% were female. Participants responded individually in a computer lab setting using a web-based experimental interface. A total of 159 participated, with 39-40 participants per each of the four conditions of the study. The participants in Experiment 1 were a subset of those that participated in Experiment 2,
The conditions in Experiments 1 and 2 were matched, e.g., those participating in the sequential high-cohesion condition for the music study also did so for the candy study. The music study, Experiment 2, was completed first by the participants so that these results would not be contaminated by participation in treatment groups with consumable goods. Since we already know from prior research that variety-seeking differences occur for consumable goods and since we anticipate a reduction of these effects for digital goods, any carryover effects between studies would only weaken the ability to validate prior results in Experiment 1.

Procedure
Participants completed an on-screen questionnaire, including requests for standard demographic information (e.g., gender, age), information about music and digital goods consumption, as well as information about use and familiarity with related technologies. Next, Experiment 1 was conducted. The first task in Experiment 1 was a preference rating task, in which the participant judged the ten brands of candy that were available from which the participant would later choose. The candy names were displayed in an alphabetical order, and the participant was asked to sort the candy brands in his/her preference order from most (top) to least (bottom) preferred. This data allowed us to compare the subsequent candy choices to preference rankings.

Each participant then selected four candy bars. Each candy bar was selected from a list of ten offered brands of candy, again arranged alphabetically. In other words, the participant had an option to choose any combination of four candy bars, e.g., four different candy bars, four identical candy bars, or anything in between. The selection task varied within the 2 x 2 factorial between-subjects design. In the high-cohesion conditions, the participants received all four candy bars at the end of the study. In the low-cohesion conditions, the instructions were:

*At the end of the study, you will receive 1 candy bar. The candy bar will be selected at random from the 4 candy bars offered.*

2 The brands for selection were: Baby Ruth, Hershey’s Milk Chocolate, Hershey’s Milk Chocolate with Almonds, Kit Kat, Milky Way, Nestle Crunch, Reese’s Peanut Butter Cups, Snickers, Take 5, and Twix. These brands were selected because they were commonly available at local grocery stores.
bars that you select.

In the simultaneous conditions, all four candy selections were made from a single screen. In the sequential conditions, the candy bars were selected one at a time. Between choices, a cartoon was shown for 30 seconds, before the next choice was requested. In all choice conditions, participants were able to select the same candy bar type multiple times, if they so wished.

Following these tasks, the subjects were paid a fixed amount for their participation. They also received candy according to the instructions of the condition in which they participated. The mean session length for all tasks included in both Experiment 1 (candy) and Experiment 2 (digital music) was only 32 minutes; thus, fatigue was not considered to be a factor affecting responses.

**Results and Discussion**

As the measure of variety seeking, we use the number of different candy bars among the four selected. The variable ranges from 1 (i.e., all four selected candy bars are the same) to 4 (i.e., all four candy bars are the different). Of interest are: (1) disentangling the effects of bundle cohesion and timing upon variety seeking with consumable goods; and, secondarily (2) replicating results of prior research studies, which would validate our experimental setup.

The pattern of results in Figure 1 follows that of an equal-weight linear model. Planned contrasts were analyzed using one-tailed t-tests (since the hypotheses are directional), not assuming equal variances. The high-cohesion conditions (upper line) supported, with marginal significance ($\alpha=0.1$), greater variety seeking than the low-cohesion conditions ($t(156) = 1.38, p = .085$).

Similarly, the simultaneous choice conditions (at right) supported, with marginal significance, greater variety seeking than sequential choice ($t(152) = 1.38, p = .084$). Furthermore, combining the two factors (the contrast marked by asterisks, as typically tested in previous work) showed there was significantly greater variety seeking for simultaneous high-cohesion choice than sequential low-cohesion choice ($t(73) = 1.91, p = .03$).

**** Insert Figures 1 and 2 about here ****
As a second, indirect corroborative measure of variety seeking, we analyze the participants’ mean rankings of the candy bars selected. Recall that the ten available candy bars were ranked by each participant in order of preference from 1 (most preferred) to 10 (least), prior to the selection of 4 candy bars. For each subject, we calculate the mean preference for the 4 candy bars selected. Since multiple instances of the same candy can be selected, the mean preference per subject still ranges from 1 (selecting 4 of the most preferred candy bar) to 10 (selecting 4 of the least preferred candy bar). Figure 2 displays the mean rankings across subjects for each of the four conditions of the study. Note that higher means indicate more choices of less-preferred candies, suggesting a tradeoff of preference for variety. This can be reflective of greater variety seeking and/or less use of preference in making choices. Since Figure 1 is taken as primarily reflecting variety seeking, any difference in the data pattern between Figures 1 and 2 is suggestive of the influence of preference upon choice.

There is a significant main effect of bundle cohesion, (one-tailed unequal variance t(131) = 2.36, p = .01). This effect is more substantial in the sequential case (t(58) = 2.34, p = .01) than in the simultaneous case (t(71) = .89, p = .19). Thus, there is a greater selection of less-preferred candy in the high-cohesion conditions compared to the low-cohesion conditions, particularly with sequential choice. This is consistent with the increased variety seeking in the high-cohesion compared to the low-cohesion conditions. Combining the two factors (the contrast marked by asterisks in Figure 2) indicated a significantly greater selection of less-preferred candy bars for simultaneous high-cohesion choice than for sequential low-cohesion choice (t(67) = 2.21, p = .02). Thus, the increased variety seeking observed with simultaneous high-cohesion choice (Figure 1) generally translated to increased choice of less-preferred candy (Figure 2). The one exception to the pattern, i.e., for the timing factor (t(151) = 0.38, p = .35), may indicate that preference-based explanations, e.g., choosing variety to anticipate changing preferences, may be less operative in
explaining the effect of the timing factor upon variety seeking in choice. The results are only suggestive, though. At a minimum, the finding suggests potentially different mechanisms underlying the effects of bundle cohesion and timing upon choice.

In summary, the common finding of differences in variety seeking for bundled and non-bundled choice (the asterisk-marked conditions in Figures 1 and 2) was replicated. Having Experiment 1 follow Experiment 2 in the same study session did not affect this robust result, and the 30-second delays between selections were sufficient to differentiate simultaneous and sequential choice. Thus, our experimental setup was verified as sufficiently parallel to the designs of previous studies, i.e., we obtained the same result with our design that has been repeatedly found in previous research. The phenomenon was observed for the consumable good. Further, by separating two aspects of bundling, our results also indicate that both high (as compared to low) bundle cohesion and simultaneous (as compared to sequential) timing contribute, roughly equally, to the increase in variety seeking (consistent with Hypotheses H1 and H2). We are now prepared to address the main issue: Does the phenomenon extend to digital goods?

**Experiment 2: Digital Goods**

Using music as the digital good, we adopted a 2 x 2 between-subjects design paralleling Experiment 1. The first factor is the timing of the choices: simultaneous vs. sequential, manipulated similarly as in the candy study. The second factor is the level of cohesion (more vs. less cohesive) for the bundle of songs to be chosen. Levels of this factor are selected to correspond with real-world analogs for greater fidelity of the experimental setup. In the high-cohesion conditions, the participant selects songs that would be burned to a CD, thus receiving a set of songs as a physical bundle. Within the music domain, this is akin to buying an album of related songs, except that the CD is put together by the consumer, not by an artist and/or producer, often with some connection

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3 A third factor was also used when collecting the data. Some subjects selected 5 songs, rather than 10, in the choice task. No reliable difference (main effect or interaction) was found for this factor, and the data were not included in the primary analyses reported in this paper in order to focus on the main discussion.
in mind, i.e., higher cohesiveness. In the low-cohesion conditions, the songs would be received as
digital files added to the person’s music library, having no physical connection among them. This is
expected to parallel the purchase of individual songs – representing a less cohesive buying option in
the marketplace.

Measures of variety are the primary dependent variables, but are modified from the candy study
since consumers rarely purchase multiple copies of the same song due to the nature of digital goods
discussed earlier. For music, we follow Read et al. [38] and look at variety across the standard
dimensions by which music is categorized, including variability in the number of genres, artists, and
albums represented in the chosen music bundle. For example, a bundle of ten songs all from the
same artist would be considered less variable than a bundle with several different artists. We use the
number of different genres, artists, and albums to measure the amount of variety in a chosen bundle.
We also apply a more sensitive measure, Simpson’s Diversity Index (DI) [45], to identify any
significant differences in variety-seeking behavior. Additionally, we capture participants’ music
preferences as an indirect measure to provide convergent validity on the analyses using their choices.

As discussed previously, we expect the differences in variety-seeking behavior to be lessened for
digital goods depending on the primary explanations that are operative. To the extent that the
primary motivation for variety seeking behavior is desire for stimulation or is due to the anticipation
of unstable preferences, we expect that similar effects may be observed for digital goods as for
consumable goods. To the extent that other explanations are primarily operative, including
information gathering and protection against satiation, variety-seeking effects should be muted. In
summary, at the minimum, we would expect any observed effects due to each factor (i.e., bundle
cohesion and timing) to not be reversed. However, the stronger version of our expectation is of no
effect of timing and cohesion upon choices among digital goods. Since the observance of no effect
is a null hypothesis, for testing purposes we state the hypotheses in parallel with Hypotheses 1 and 2,
as supported for consumable goods:

**H3:** For digital goods, there will be greater variety in the simultaneous (vs. sequential) choice tasks.

**H4:** For digital goods, greater variety will be observed in the more (vs. less) cohesive choice tasks.

**Participants**

As noted in Experiment 1, participants were primarily students recruited using solicitations made in classes, posted on campus, and advertised in an undergraduate weekly electronic newsletter. Based on the data from Experiment 1, a standard power analysis using a power level of .80 suggested a sample size of 26 participants per experimental group. A total of 100 participants completed the study (a subset of these also participated in Experiment 1), approximately evenly distributed across the four experimental groups (varying from 24 to 26 participants per group).

Table 2 contains demographic information for the sample. The sample was fairly evenly split across genders and generally comprised an advanced college population in terms of age. Also shown are the summary statistics from the questionnaire on prior digital music experience, which was completed by participants at the end of the study. The sample was generally knowledgeable about digital music and so was judged to be drawn from a relevant population: 83% owned a digital music player, with 75% owning most of their music in a digital format. Also, relevant to the bundling issue of the study, 69% of the participants had purchased individual songs, with just over half acquiring most of their music in this way (as opposed to an album format). Analyses indicated no significant differences across the treatment groups in responses to these items.

**** Insert Table 2 about here ****

**Procedure**

Following consent and initial instructions, participants engaged in the music study. The database for the music study consisted of all songs from 64 albums; each album used in the study contained at least ten songs. The albums were from four genres: Country, Rock, Rap/Hip Hop, and Pop. There were 8 artists/bands available within each genre, and two albums available for each artist. The music study consisted of the following steps: (1) choice set determination, (2) rating task, (3) ranking
task, and (4) choice task. Following the music study, participants completed the demographic questionnaire (see Table 2), and the candy study. Finally, respondents received a fixed fee for participating.

**Choice Set Determination.** The first step was to identify a set of songs from the music database that were not owned by the participant to be used for the subsequent tasks in the experiment. This filtering step was performed to remove ownership as a factor on participants’ subsequent choices. The goal was to identify, from the song database, a structured set containing 80 songs (2 genres x 2 artists x 2 albums x 10 songs) not owned by the participant. We began by showing the four genres from which each participant selected one genre. The participants were then shown all the songs from the database in that genre, arranged by artist and album. They could check off individual songs they owned and full albums they owned. They then selected a second genre from the three remaining and repeated the task. Participants continued this process until there were enough non-owned songs identified to complete the structured set of 80 songs. From the songs not owned, two artists were selected at random from each genre, then the first ten non-owned songs per each of the artist’s two albums were used to comprise the structured set for further data collection.

**Rating Task.** Once the structured set of 80 songs was determined, the participants rated each of the 80 songs on a 5-point scale as to their like or dislike of the song: 1 = “I hate it”, 2 = “I don’t like it”, 3 = “It’s OK”, 4 = “I like it”, and 5 = “I love it”. The songs were presented to the participants in a single display organized by genre, artist, and album. By clicking on the song’s title, audio samples (30-second clips) were available for each song.

**Ranking Task.** Once each song was rated, participants were asked to rank the songs with more positive ratings to obtain a partial ordering of the 80 songs in the structured set. If the participant rated two or more songs as “5,” these songs were placed in a list. The participant was

\[\text{\footnotesize \textsuperscript{4}}\] The scale follows that used by Yahoo! Music at the time of the study, a familiar one for most participants.
able to manipulate songs in the list in preference order from most (top) to least (bottom) preferred. They repeated the ranking task for songs rated “4,” and then for songs rated “3.” (Songs rated “1” or “2” that were disliked were not ranked; thus, only a partial ranking of the 80 songs was obtained.) During the ranking task, the participant could again listen to audio samples of songs in the list.

**Choice Task.** The first three steps above were common to all participant groups. The choice step varied for each of the four groups of participants within the 2 x 2 factorial between-subjects design. In all cases, the participants were presented the 80 songs in the structured set, using the same display as used for the Rating Task, except a check box accompanied each song instead of the 1-5 rating scale. Thus, the songs were presented to the participants in a single display organized by genre, artist, and album. Again an audio sample of each song was available to participants.

The first factor in the design was the cohesion of the bundle to be chosen. For the high-cohesion conditions, the participants received the following instructions.

*Suppose you are purchasing a customized CD as a special offer. You should put together a group of 10 songs from the 80 songs that you have just rated and ranked to receive on this CD. These songs would then be burned to a CD for your use.*

For the low-cohesion conditions, they saw:

*Suppose you are buying songs for your mp3 player, My Music folder on your computer, or similar device where you store your digital music. You should select 10 songs from the 80 songs that you have just rated and ranked to receive and add to your collection.*

These instructions were shown prior to displaying the screen on which choices were made and were also repeated at the top of the choice display.

The second factor was the timing of the choices. For the simultaneous choice conditions, all choices were made at once from a single display. For the sequential choice conditions, the following instruction followed that above for the high- and low-cohesion conditions, respectively:

- *Over the next few screens, you will be putting together your customized CD, placing songs on the list one at a time.*
- *Over the next few screens, you will be adding the songs to your collection, choosing one song at a time.*

In the sequential choice condition, participants made one selection from the choice display and
submitted the selection. Paralleling Experiment 1, they then saw a cartoon for 30 seconds, to separate the choices so that they were experienced as sequential, not simultaneous. Following the cartoon, they proceeded to the next choice, continuing until all the selections were made.

**Results and Discussion**

Figure 3 shows the results of analyses addressing the variety in music choice, by participant condition. The analyses use three levels along which songs are traditionally stratified: (a) genre, (b) artist, and (c) album. Recall that the study participants were asked to perform choice tasks based on the structured set of 80 songs (2 genres x 2 artists x 2 albums x 10 songs). For genre variety, we calculate the number of selected songs in the more-selected of the two genres, ranging from 5 to 10 songs. For artist variety, we counted the number of different artists represented in the selected set. This value ranges from 1 to 4, the number of artists available in the 80 song set from which selections were made. For album variety, we similarly counted the number of different albums represented in the selected set. This measure ranges from 1-8, the number of available albums to choose from in the 80 song set. The y-axis for each graph in Figure 3 represents the range of possible participant responses for each measure.

The main result, observed from Figure 3, is the consistency of variety seeking across conditions. Comparing simultaneous to sequential choices, within bundle cohesion condition (i.e., testing the slopes of all the line segments in the graphs), no significant differences were obtained (two-tailed, unequal variance t(df ranges from 43 to 50), all p > .10). Similarly, no significant differences arise in direct comparisons between high- and low-cohesion choices. There is a general lack of significant effect for bundle cohesion and for choice timing with music as a digital good.

**** Insert Figure 3 about here ****

We follow-up these initial analyses by applying a more sensitive measure to the observation of variety seeking using the Diversity Index (DI), as defined by Simpson [45]. The measure captures the probability that any two items in the choice set would be in the same category, i.e., from the
same album or artist. DI is defined as:

\[
\text{DI} = \sum_i p_i^2,
\]

where \(p_i\) represents the proportion in each category. The index has a maximal value of \(\text{DI} = 1\) when there is minimal diversity, i.e., all items in a single category. The minimal value of DI occurs when there is maximal diversity, i.e., items are uniformly spread out across all categories. For albums, where the maximal number of categories is 8, the greatest diversity occurs when the 10 chosen songs are spread out across albums as evenly as possible, i.e., when there are 2 items selected from each of 2 albums and 1 item selected from the other 6 albums, leading to a minimal value of \(\text{DI} = .14\). For artists, where the maximal number of categories is 4, the greatest diversity occurs when there are 3 items selected from each of 2 artists and 2 items selected from the other 2 artists, leading to a minimal value of \(\text{DI} = .26\). The measure is more sensitive than the pure category counts analyzed in Figure 3, since it takes into account the distribution across the categories.

Figure 4 shows the values for DI (a) across albums and (b) across artists for each of the experimental conditions. Also shown are the results of applying a general linear ANOVA model to the DI data. As observed, across both the album and artist DI data, only the main effect of timing for the Album data is even marginally significant (and in the opposite direction as is generally found). Overall, analyses of the more sensitive DI measure confirm the main result, the consistency of variety seeking across conditions.

Since we were not able to identify any significant effect, we did a robustness check to increase the power by adding the data for which subjects chose five instead of ten songs (see Footnote 2). This doubles the sample size to 200. Adding number of selections (5 or 10) as a between-subjects factor to the analysis of the DI measure\(^5\) does not change the results (\(F(1,197)\) per test, all \(p > .10\)).

** Insert Figures 4 and 5 about here ****

As a final validating analysis, we calculated the mean preference ranking of the songs selected.

---

\(^5\) Since the range of values for DI differs depending on whether five or ten songs were selected, a normalized (to the range \([0, 1]\)) value of DI was used for the analysis to achieve scale comparability.
Recall that each participant provided a partial ranking of the 80 songs from 1 (most preferred) up to 80 at maximum (least preferred), prior to the song selection task. All songs rated as 1 or 2 were given the same rank of the highest numbered ranking, among those rated 3 to 5, plus 1. Figure 5 displays the participants’ mean rankings for each of the conditions of the study. Higher means indicate more choices of less-preferred songs. For this measure, the pattern can be reflective of greater variety seeking and/or less of an effect of preference upon the choices. For music as a digital good, no statistically significant differences across timing or bundle cohesion were obtained. The pattern of this indirect measure of variety seeking is entirely consistent with that of Figures 3 and 4; there is no indication of variety seeking differences attributable to either manipulation of the study.

Thus, the main result of Experiment 2 is the lessening, or disappearance, of the variety-seeking effect for the digital music good. The results are not consistent with Hypotheses 3 and 4, in contrast to the support received for the standard result with consumable goods as expressed by Hypotheses 1 and 2. The variety-seeking effect is not supported with digital music in our study. The explanations for variety seeking that are potentially applicable in the digital setting—desire for stimulation or the anticipation of unstable preferences—show no signal of being operative for digital goods.

Clearly, one potential limitation of Experiment 2 is that of identifying a null effect. The limitation is lessened by the anticipation of the null effect as described previously. Although this is inconsistent with typical experimental reporting, in this case we argue the importance of the null results, an argument made more generally by Greenwald [20]. Also, the standard effect was shown using similar displays as for consumable goods in Experiment 1. Experiment 2 shows the lack of a significant difference in variety-seeking behavior due to timing and bundle cohesion for digital goods. This is in strong contrast to the consistent significant difference observed for consumable goods and as replicated in Experiment 1 using an identical design and subject population. We also

Note that all participants in the analyses had at least 9 songs that were rated 3 to 5. Thus, the minimum mean ranking is 5.5 for all participants selecting 10 songs (used as the baselines for the y-axes in Figure 5), as expected.
employed several robustness checks, including a doubling of the sample size, to the same result. To strengthen further the conclusions of Experiment 2, we follow with an additional study.

**Experiment 3: Alternative Bundling of Digital Goods**

Since we identified a null effect, we use an alternative operationalization of the bundle cohesion factor in Experiment 3 to strengthen the design of Experiment 2 and to provide a further validity check on the results. Although the extension of the timing factor (sequential/simultaneous) from the consumable goods to the digital goods case was straightforward, the extension of the bundle cohesion factor was not. For the consumable good candy in Experiment 1, bundle cohesion was manipulated as either receiving all the candy chosen (high cohesion) or receiving one randomly selected candy from the chosen ones (low cohesion). For digital music in Experiment 2, bundle cohesion was manipulated as either receiving a physical CD (high cohesion) or receiving songs transferred to your library (low cohesion). As noted, the motivation for Experiment 2 was to select levels of bundle cohesion that are realistic to the participants’ experience. However, in doing so, questions can be raised about the bundling cohesion levels used for music and their parallels to the levels used in the candy study.

For the low-cohesion level, the issue is one of correspondence between the candy and digital music manipulations. In the music study, participants made choices as if receiving all the songs selected; whereas, in the candy study only one random song is to be received. To address this concern, in Experiment 3 we use a low-cohesion level that is more comparable to the design used with candy in Experiment 1, in which the participant is choosing under the direction of receiving one song to be randomly chosen from those selected. The manipulation also strengthens the low-cohesion condition (i.e., makes the bundle to be chosen even less cohesive than in Experiment 2).

For the high-cohesion level of Experiment 2, a similar issue of the adequacy of the manipulation arises. As noted above, one of the recognized features of digital goods is their ease and quality of reproducibility. In this light, the direction of receiving the songs on a physical CD may not have
signaled greater cohesiveness to all participants. For example, some people may buy music CDs without any plans to listen to them as a cohesive whole – they simply rip all the songs from the CD to their music library. The operationalization of low-cohesion would not be distinguished for such participants from the high-cohesion level of Experiment 2 (adding all the songs to the music library, without receiving them on a CD). Experiment 3 strengthens the high-cohesion manipulation through the direction of creating an unalterable playlist that is protected from editing and copying, i.e., making the bundle to be selected even more cohesive than in Experiment 2.

With these changes, Experiment 3 carries over the 2 x 2 between-subjects design used for Experiment 2. The first factor is the timing of the choices: simultaneous or sequential, manipulated in the same way. The second factor is the cohesion of the bundle to be chosen, either high- or low-cohesion, using stronger versions of each level, as discussed above. The same variety measures are carried over from Experiment 2 as the dependent variables in the design. The same expectations and hypotheses—Hypotheses 3 and 4—are tested.

**Participants**
We recruited students from a paid subject pool maintained by the business school. A total of 125 people successfully completed the study, approximately evenly distributed across the experimental groups (varying from 29 to 32 per group). Table 2 contains demographic information on the sample. The sample was comparable to that used in Experiment 2. The participants are generally knowledgeable about digital music, and most have experience with purchasing individual songs.

**Procedure**
The procedure followed that of Experiment 2 and used the same song database. The initial steps, common to all participant groups, of (1) choice set determination, (2) rating task, and (3) ranking task were identical to those in Experiment 2. The same questionnaire was also used. Only the choice task was altered to accommodate the new manipulations.

**Choice Task.** The display of 80 songs and the availability of sampling during choice were
just as in Experiment 2. The choice step varied for each of the four groups of participants within
the 2 x 2 factorial between-subjects design and was randomly assigned to participants. The first
factor in the design was the cohesion of the bundle to be chosen. For the high-cohesion conditions,
the participants received the following instructions.

*Suppose you are purchasing a customized music playlist as a special offer. You should put together a group of 10
songs from the 80 songs that you have just rated and ranked to receive on this playlist. Assume that this playlist
would then be made available to you at any time for listening only (but not for editing or copying).*

For the low-cohesion conditions, they saw:

*Suppose you are given a special offer to receive one song that you could add to your mp3 player, My Music folder
on your computer, or similar device where you store your digital music. This song will be chosen at random from a
group of 10 songs that you select. You will make these selections from the 80 songs that you have just rated and
ranked.*

The second factor was the timing of the choices. As before, for the simultaneous conditions, all
choices were made at once from a single display. For the sequential choices, the following
instruction followed that above for the high- and low-cohesion conditions, respectively:

- **Over the next few screens, you will be putting together your customized playlist, placing songs on the list one at a
time.**
- **Over the next few screens, you will be making these selections one at a time.**

Each sequential selection was separated by the display of a cartoon for 30 seconds.

**Results**

Figure 6 (paralleling Figure 3) shows the results of the analyses—by genre, artist, and album—
addressing the variety in music choice, by participant condition. The metrics are as defined for
Experiment 2. As illustrated by the figures, the consistency of variety seeking across conditions that
was found in Experiment 2 persists, even with the stronger manipulations of the bundle cohesion
factor. Using a general two-way linear model, none of the comparisons in Figure 6 show a main
effect of bundle cohesion (albums: \(F(1, 121) = .09, p = .76\); artists: \(F(1, 121) = .27, p = .61\); genres:
\(F(1, 121) = .02, p = .88\)) nor of timing (albums: \(F(1, 121) = .65, p = .42\); artists: \(F(1, 121) = 2.15, p
= .15\); genres: \(F(1, 121) = .56, p = .46\)).
Figure 7 (paralleling Figure 4) shows the results of the analyses of the Diversity Index. Even with the stronger experimental manipulations and the more sensitive measure of variety seeking, no significant differences were obtained. Continuing, we calculated the mean preference ranking of the songs selected, following the same procedure as in Experiment 2. Figure 8 (paralleling Figure 5) displays the participants’ mean rankings for each of the conditions of the study. Consistently for digital music, no statistically significant differences across timing or bundle cohesion were obtained.

*** Insert Figures 6, 7 and 8 about here ***

Thus, overall the results are consistent with those of Experiment 2. Strengthening the manipulation of cohesion to further separate the high- and low-cohesion conditions did not alter the results. Hypotheses 3 and 4 again are not supported. In summary, the evidence indicates that the variety-seeking effects are not only lessened, but are effectively eliminated with digital music goods.

**General Discussion**

Digitization has opened new avenues for information goods bundling and sales strategies, and we need to better understand consumer behavior in this expanding area. The current research provides insight into bundling effects within a choice task for digital information goods that differ from those observed with consumable goods as studied in most bundling and variety-seeking research. With the ongoing evolution of the music industry and digital information goods in general, the practical importance of the proposed research is also apparent. Considerable past research has demonstrated that variety seeking differs between non-bundled and bundled choice. As a precursor to the main issue of the research, we disentangle the role of bundle cohesion from the role of timing as factors in variety seeking with consumable goods, showing both are contributors to the phenomenon and in roughly equal and additive fashion. By observing the common finding of variety seeking differences, we also validate our design before applying it to the study of digital goods.

Turning then to the primary issue of interest, we identified a number of important differences between digital and consumable goods that were hypothesized to alter this phenomenon based on
the explanations that have been provided for the robust results with consumable goods. As expected, the results showed a reduction, if not outright elimination, of the phenomenon with digital goods.

Although our prediction was based upon an analysis of the given explanations for differences in variety seeking, we recognize that our studies were not designed to test particular explanations. At best, the nature of the results is suggestive with regard to the explanations, as summarized in Table 1. Our study does provide the first evidence of a setting in which there is a lack of difference in variety seeking between bundled and non-bundled choice. Having established the reduction of the phenomenon (the goal of our studies), future work can now be directed at testing plausible explanations directly.

Despite the null conclusion, the validity of the results is substantiated by the rejection of the null hypothesis in our studies using candy as the choice good, which replicates the findings of prior research with our design. Also, the anticipation of diminished effects was identified a priori based on a consideration of the explanations that have been advanced for the effect with consumable goods and the differences between digital and consumable goods. Finally, the results are consistent across robustness checks as well as two studies with digital goods, one using manipulations of cohesion with realistic scenarios and a second using even stronger manipulations of cohesion that were more parallel to those used in the study with consumable goods (Experiment 1), in which variety-seeking behavior differences were observed. Despite the use of these design manipulations to reduce the chances of Type II errors (i.e., false acceptance of a non-effect), the two digital good experiments both support the lack of a significant difference in variety-seeking behavior due to timing and bundle cohesion for digital goods. This presents a strong contrast to the consistently significant difference observed for consumable goods.

From a practical standpoint, the minimal or non-existent role of bundling on variety-seeking
behavior with music choices has implications for consumers’ preferences for digital goods such as music. As the mechanisms for delivering digital goods to consumers expand, it is of note that differences in variety-seeking behavior across diverse conditions like those studied in our research are not indicated. If support for this finding is upheld, retailers do not need to consider the impacts of such differences on the content selected. Whether the consumer is buying a group of songs in a single session, placing songs in a Wish List over time then buying them in bundles, or buying songs singly over time, the implications of our work are that the universal and robust finding of differences in behavior found with consumable goods is not indicated for digital goods. Unlike with consumable goods, there appears to be no advantage to an environment with sequential vs. simultaneous choice, or for framing the choice as involving a more or less cohesive bundle.

Both of the primary results, i.e., the dual influences of timing and bundle cohesion on variety seeking behavior in the selection of consumable goods and the diminishment of these effects in the selection of digital goods, provide a significant contribution toward understanding human decision making in different settings and offer paths to further insight into the underlying dynamics of variety-seeking behavior. Detailing the roles of the different proposed explanations upon variety seeking should be aided by this finer knowledge of the conditions under which the behavior does and does not occur and is a natural direction for future research.

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Table 1. Motivations for Variety Seeking and their Conjectured Applicability to Digital Goods.

<table>
<thead>
<tr>
<th>Motivations for Variety Seeking (from literature on consumable goods)</th>
<th>Applicability to Digital Goods</th>
</tr>
</thead>
<tbody>
<tr>
<td>Desire for stimulation</td>
<td>Still applicable, though to a somewhat reduced extent</td>
</tr>
<tr>
<td>Protection against satiation</td>
<td>Not generally applicable, a slight impact at best</td>
</tr>
<tr>
<td>Acquiring information</td>
<td>Depends on the familiarity with the choice set; could still apply if the set were totally unfamiliar; likely to have little effect where sampling is available</td>
</tr>
<tr>
<td>Delaying choice to allow for future preferences</td>
<td>Could still apply if one’s preferences are anticipated to possibly be different in the future</td>
</tr>
<tr>
<td>Desire for social distinctiveness</td>
<td>Likely to be lessened in a non-social setting</td>
</tr>
</tbody>
</table>

Figure 1. Candy Study: Mean Number of Different Candy Bars Selected (Maximum of 4) Across Conditions (*conditions differ, one-tailed t, p = .03).

Figure 2. Candy Study: Mean Ranking of the Candy Bars Selected (Range: 1-10) Across Conditions (*conditions differ, one-tailed t, p = .02).
Table 2.
Study Participants, Experiments 2 and 3: Demographics.

<table>
<thead>
<tr>
<th>Participant Attributes</th>
<th>Experiment 2 Percentages (n = 100)</th>
<th>Experiment 3 Percentages (n = 125)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender (% Female)</td>
<td>52%</td>
<td>66%</td>
</tr>
<tr>
<td>Age (Mean years [SD])</td>
<td>22.8 [7.7]</td>
<td>22.9 [6.3]</td>
</tr>
<tr>
<td>Paid Subscription</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Have you ever had, or do you currently have, a paid subscription to an online music service (e.g., Rhapsody, Yahoo Music, …)? (% Yes)</td>
<td>10%</td>
</tr>
<tr>
<td>Pay Per Download</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Have you ever used an online pay per download service (e.g., Amazon mp3s, iTunes,…)? (% Yes)</td>
<td>64%</td>
</tr>
<tr>
<td>Digital Music player</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Do you own an iPod or other portable digital music device? (% Yes)</td>
<td>83%</td>
</tr>
<tr>
<td>Downloaded</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Have you ever downloaded a song or album using the Internet? (% Yes)</td>
<td>94%</td>
</tr>
<tr>
<td>Purchased Single</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Have you ever purchased a music single (as opposed to a music album)? (% Yes)</td>
<td>69%</td>
</tr>
<tr>
<td>Frequency: On average how often do you currently acquire new music?</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Never have or less than once per year</td>
<td>2%</td>
</tr>
<tr>
<td></td>
<td>Once per year</td>
<td>16%</td>
</tr>
<tr>
<td></td>
<td>Once per month (about 12 per year)</td>
<td>38%</td>
</tr>
<tr>
<td></td>
<td>Once per week (about 50 per year)</td>
<td>24%</td>
</tr>
<tr>
<td></td>
<td>More than once per week</td>
<td>20%</td>
</tr>
<tr>
<td>Mode: Most often I acquire music as –</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Complete albums</td>
<td>44%</td>
</tr>
<tr>
<td></td>
<td>Individual songs</td>
<td>55%</td>
</tr>
<tr>
<td></td>
<td>Don’t acquire</td>
<td>1%</td>
</tr>
<tr>
<td>Own: Most of the music I own –</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Is in digital format (e.g., mp3)</td>
<td>75%</td>
</tr>
<tr>
<td></td>
<td>Is on physical media (e.g., tapes, CDs)</td>
<td>24%</td>
</tr>
<tr>
<td></td>
<td>I don’t own any music</td>
<td>1%</td>
</tr>
</tbody>
</table>
Figure 3. Experiment 2: Variety Measures—By Album, Artist, and Genre—Across Conditions.

(a) Variety across Albums: Number of Albums, by Condition.

(b) Variety across Artists: Number of Artists, by Condition.

(c) Variety across Genres: Number of Songs in the More Preferred Genre, by Condition.
Figure 4. Experiment 2: Diversity Index (DI)—By Album and Artist—Across Conditions.

(a) Variety across Albums: DI by Condition. The scale ranges from .14 (maximum diversity) to 1.0 (minimum diversity).

(b) Variety across Artists: DI by Condition. The scale ranges from .26 (maximum diversity) to 1.0 (minimum diversity).
Figure 5. Experiment 2: Mean Ranking of the Songs Selected Across Conditions.

Figure 8. Experiment 3: Mean Ranking of the Songs Selected Across Conditions.
Figure 6. Experiment 3: Variety Measures—By Album, Artist, and Genre—Across Conditions.

(a) Variety across Albums: Number of Albums, by Condition.

(b) Variety across Artists: Number of Artists, by Condition.

(c) Variety across Genres: Number of Songs in the More Preferred Genre, by Condition.
Figure 7. Experiment 3: Diversity Index (DI)—By Album and Artist—Across Conditions.

(a) Variety across Albums: DI by Condition. The scale ranges from .14 (maximum diversity) to 1.0 (minimum diversity).

(b) Variety across Artists: DI by Condition. The scale ranges from .26 (maximum diversity) to 1.0 (minimum diversity).