Planning to Binge: How Consumers Choose to Allocate Time to View Sequential Versus Independent Media Content

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ABSTRACT

As streaming media online has become more common, several firms have embraced the phenomenon of "binge-watching" by offering their customers entire seasons of a television-style series at one time instead of releasing individual episodes weekly. However, the popularity of binge-watching seems to conflict with prior research suggesting that consumers prefer to savor enjoyable experiences by delaying them or spreading them out. Here we demonstrate how to reconcile these issues using both experimental studies and field data. We examine binge-watching preferences both when people are planning to consume and in the moment of consumption. Our studies show that binge-watching is more likely to be preferred when individual episodes are perceived to be sequential and connected, as opposed to when events are independent with points of closure. Furthermore, this pattern may occur because consumers experience increased utility from completing sequential content. These findings have implications for how firms might frame or divide up their content in ways that allow them to tailor their promotion and pricing to a range of consumer preferences.

Keywords: Experiential consumption, digital media, binge-watching

When Netflix released the high profile crime show “Jessica Jones” around Thanksgiving 2015, all 13 episodes went live at once. It was one of the firm’s dramatic endorsements of binge-watching, the idea that people enjoy the ability to allocate large amounts of time to consuming a series all in one sitting. The Digital Democracy survey defines binge-watching as watching three or more episodes of a TV series in one sitting (Deloitte 2015), while the definition from Netflix is based on whether viewers finish a 13-episode season within a week (Jurgensen 2013). Schweidel and Moe (2016) model binge-watching as an in-the-moment choice to continue watching the next episode of the same show on the media streaming platform Hulu. From a content provider’s perspective, binge-watching likely has its roots in all-day movie and television “marathon” screenings, but has been heralded as a trend made more feasible based on streaming services. Its prevalence suggests that people are making choices that allow them to consume significant amounts of media content continuously either by (1) planning or allocating time for future media consumption, and/or by (2) electing to continue or extend media consumption in the moment.

Both types of binge-watching decisions seem to conflict with prior findings suggesting that when individuals can allocate time for consumption, they often prefer to “savor” hedonic experiences by delaying them and deriving additional pleasure from anticipation (Loewenstein 1987) or spreading them out over time (Loewenstein and Prelec 1993). Notably, studies that demonstrate savoring usually consider consumption events that are in the same category, but otherwise distinct from one another (i.e., fancy dinners, music clips). We suggest it is possible that the utility gains from savoring media may depend on this feature.

In particular, in this paper we address the apparent clash between binge-watching and savoring by demonstrating that such preferences substantially depend on subjective perceptions

related to the continuity of the content regardless of its type. This contrasts with the way that binging has been framed in the marketplace. For example, Netflix has approached this question by dividing its content by genre, suggesting that irreverent comedies and political dramas are "savored" while horrors and thrillers are "devoured" (Koblin 2016; Netflix 2016). Instead we propose that savoring and binging preferences depend on the perceived interrelatedness of the individual viewing episodes of an experience in a way that extends across hedonic and utilitarian content. Here, the term "episodes" can refer more generally to different consumption occasions or opportunities within the domain of experiential products. As specific examples, it could be applied to the literal episodes of a TV show or the individual sessions of an online class. We show that when there are points of closure available in a media experience that make episodes more independent, consumers prefer to spread them out, whereas when the episodes are perceived to be pieces of a larger whole, continuous and/or sequential, consumers prefer to allocate their watching time in larger chunks.

THEORETICAL BACKGROUND

Binge-watching is typically associated with consuming media content, generally in the form of episodes within the seasons of a television-like series. Episodes can be relatively independent of one another (or only loosely affiliated), but they can also have distinct temporal and/or narrative progression that offers a more continuous macrostructure across the series. For example, *The Twilight Zone* is a TV series that consists of independent episodes, with each episode featuring a different cast of characters and storyline—consequently, the episodes can be watched in any order. At the other extreme, *Breaking Bad* is a series that closely follows the progression of the same characters within a complex storyline that unfolds across multiple

sequential episodes and seasons, so it would be difficult to comprehend if the episodes were watched out of order.

Traditionally, even heavily connected or serialized TV shows were not created with binge-watching in mind, since episodes were expected to be released weekly on a fixed schedule. Continuity was a potential mechanism for increasing viewers' loyalty over time, and encouraging the frequency of their engagement with the platform (e.g., "appointment television"). However, the emergence of online streaming services offers new models of engagement in addition to giving viewers the option to binge-watch entire seasons of a show in one sitting. Thus in this research we explore how variations in presenting content as part of a whole or as more independent units can influence preferences for binge-watching.

Though binge-watching is an accepted trend among consumers and media providers (Netflix 2013), a wealth of prior research shows that consumers prefer savoring hedonic consumption—that is, increasing the time spent on or allocated to the experience to extend one's enjoyment. Consumers may savor by spreading experiences out (Loewenstein and Prelec 1993) or by delaying consumption to build up anticipation (Loewenstein 1987). In this work, we hold these time- and choice-related savoring behaviors as distinct from the cognitive process of savoring where consumers build up anticipation for an upcoming experience (Bryant and Veroff 2007; Chun, Diehl and MacInnis 2017) or reminisce about a past experience (Smith et al. 2014).

Consumers often seem to factor in a desire to savor when planning sequences of experiences. For example, Loewenstein and Prelec (1993) found that when planning to dine at a fancy restaurant, people preferred to delay the experience and also spread out multiple fancy dinners across weeks. Related research has suggested that these plans do have beneficial effects—consumers retrospectively enjoy experiences more if there is a break or interruption that

spreads out consumption (Nelson and Meyvis 2008; Nelson, Meyvis, and Galak 2009). In addition, Shah and Alter (2014) demonstrate that when consumers plan future sequences of enjoyable activities, they exhibit savoring preferences by making choices that avoid or delay the elimination of specific categories of activities, effectively spreading them out by distributing them across the order of events to make them last.

In nearly all the studies that demonstrate consumer preferences for savoring, while the proposed hedonic experiences can occur in "sequences," they often lack a sense of connected progression. In other words, each fancy dinner in a series of plans to eat out from Loewenstein and Prelec (1993) might be considered as an "independent" consumption episode, with little relationship to or bearing on the enjoyment of future meals. In the context of media (such as TV shows), we define "independent" to mean that episodes are more distinguished by points of closure and have standalone narratives, and "sequential" to describe content that contains interconnected episodes perceived to make up an overarching, linearly progressing, narrative. With this distinction in mind, we contend that many of the previous studies have focused on series of independent stimuli. For example, Nelson and Meyvis (2008) used massages and music clips from different songs, while Shah and Alter (2014) considered sets of distinct vacation sites or art performances.

In contrast, we predict that people are more likely to binge-watch when the units (i.e., episodes) of an experience are perceived to be more sequential, or when they are perceived to be parts of a larger whole. Thus, when planning or allocating time for future consumption of an experience, consumers will plan to "binge" sequential content by aggregating episodes in larger chunks, but savor independent content by spreading out the episodes (as in Loewenstein and Prelec 1993). Similarly, in the moment of consumption, consumers will binge-watch sequential

content by continuing the experience, but savor independent content by delaying the experience (as in Loewenstein 1987). In addition, we predict that this preference is sufficiently strong such that individuals will also be willing to pay more for the opportunity to binge-watch sequential content compared to independent content.

Since sequential episodes generally involve interconnected pieces of a whole season or a story arc, we contend that the desire to complete the series may be stronger for these shows relative to independent shows, resulting in increased binge-watching. Previous research has found that people have strong preferences for complete sets (e.g. Evers, Inbar, and Zeelenberg 2014). Furthermore, research on pseudo-sets suggests that people will invest more effort in doing additional tasks when they are framed as "completing" a set of tasks as opposed to simply adding to a tally or record of finished tasks (Barasz et al., in press). Similarly strong preferences exist for completing interrupted tasks (Klinger 1975; Lewin 1926; Martin and Tesser 1996; Ovsiankina 1928), suggesting that consumers could anticipate and/or derive an additional "completion utility" from "finishing" a sequence of media episodes. Since independent episodes are self-contained, making their enjoyability or usefulness separable, consumers should be less motivated to watch them together as a whole. Thus we additionally propose that consumers may be deriving a resolution- or completion-based utility from binge-watching sequential content. This allows us to further hypothesize that approaching the completion of sequential (vs. independent) content should lead to greater increases in perceived quality, enjoyment, and consumption in larger chunks.

Additionally, if binge-watching is based primarily on the degree to which "episodes" are perceived to be related or connected, it should be agnostic to whether the content is consumed for more pleasurable or more practical reasons. Binge-watching has generally been associated

with hedonic consumption and indulging, similar to the indulgent behaviors of binge-eating and binge-drinking. For example, media news sites promote binge-watching by licensing viewers to "Go Ahead" and binge (Poniewozik 2012). Yet, content hosting platforms such as YouTube often offer "utilitarian" or educational video content such as Khan Academy lectures or "how to" videos, in addition to the "hedonic" or pleasurable video content. Critically, both these types of video content can be independent or sequential. Our proposed mechanism of "completion utility" allows us to directly test whether consumers will be more likely to "binge" more sequential over more independent media episodes, regardless of whether it is consumed for hedonic or utilitarian purposes.

Binging as a pleasurable activity has also typically been associated with impulsivity. Specifically, binge-eating and binge-drinking behaviors have been related to lapses in self-control and addiction (Gold, Frost-Pineda, and Jacobs 2003) or an escape from self-awareness (Heatherton and Baumeister 1991). Therefore, under an impulsivity explanation, the desire to binge-watch should be stronger for sequential content that is to be aired immediately, relative to planning for content consumption in the future. In contrast, our completion utility mechanism predicts that binge-watching is more about preserving the "whole" nature of the experience regardless of whether it's in the "near" future or "far" future. Thus if preferences for binge-watching are indeed driven by utility from uninterrupted completion, we contend that these preferences will not depend on when the experience first begins, as long as the episodes of the experience are available together.

We tested these predictions in the following program of research. Study 1 provides some initial evidence that consumers associate TV shows that are perceived to be sequential with binge-watching. Studies 2 and 3 take a more causal approach to the question, and use multiple

quantification methods to demonstrate that consumers are more likely to *plan* to binge-watch when media episodes are sequential compared to independent, across both hedonic and utilitarian content. Study 4 builds on this by showing that consumers are also willing to pay more for the opportunity to binge-watch sequential content in both the near and far future. We then demonstrate that as consumers near "completion" of an experience, they get increasing utility, as measured by reports of increasing quality of the experience (Study 5) and enjoyment within an incentive-compatible setting (Study 6), in line with our prediction of a completion utility. Finally, Study 7 tests for both our main effects and the completion utility mechanism using field data from an online educational content provider where we compare viewing patterns for a course with more independent lecture videos versus more sequential ones.

STUDY 1: PERCEIVED BINGE-WATCHABILITY OF TV SHOWS

To test our hypothesis within currently available media, we first looked at whether TV shows that were perceived to be more sequential with overarching storylines across episodes were also perceived as more "binge-watchable" by viewers.

Design and Method

We recruited 120 participants on Amazon's Mechanical Turk (MTurk) platform (N = 120, M_{Age} = 32, 41% female), in exchange for monetary compensation for their participation. All participants viewed the titles of 60 real, currently available TV shows across a range of content genres (see Web Appendix 1 for the list of show names and genres) and were asked to select all the shows that they were familiar with or had watched before. Participants indicated familiarity with 25.66 (SD =13.52) shows on average.

Participants were then randomly assigned to one of two types of categorization tasks: independent vs. sequential and one-by-one vs. binge-watch. Participants in the independent/sequential condition categorized all the shows they had marked as familiar by dragging them into boxes that were labeled “Independent” or “Sequential” using their computer mouse. Independent shows were defined as “those that may differ in content from episode to episode, or the episodes can be watched in any order because they have self-contained story lines.” Sequential shows were defined as “those whose episodes make up an overall story-arc and should be watched in chronological order.”

Participants in the one-by-one/binge-watch condition categorized all of the shows they had marked as familiar as “One-by-one” and “Binge-watch.” One-by-one was defined as wanting to “watch just one episode of the show each day or each week,” while Binge-watch was defined as wanting to “watch multiple episodes or even an entire season of the show in a single setting.”

Finally, all participants were asked to indicate which of the familiar shows they particularly loved or hated by dragging their names into boxes that were labeled “Love It” or “Hate It.” Since these labels indicate relatively extreme opinions, participants were not required to assign all of the shows to a category, and could choose to drag over only a subset.

Results and Discussion

We calculated a “Sequential Index” for each show in the sequential/independent condition by determining the proportion of participants who had classified the show as sequential (rather than independent). For any particular show, this proportion was based on a subsample of the total participants in the condition, since participants only categorized shows that they were

familiar with. We also calculated a "Binge-Watch Index" for shows rated in the one-by-one/binge-watch condition in a similar manner. Comparing these two indices offers an initial test of our hypothesis that consumers are more likely to binge-watch sequential shows compared to independent shows. As illustrated in Figure 1, we found a significant positive correlation between the Sequential Index and the Binge-Watch Index ($r = 0.61$, $t(58) = 5.86$, $p < 0.001$).

[Insert Figure 1 about here]

We conducted an additional regression to control for individual enjoyment of the shows, as well as variance that might be associated with the popularity of the shows within this particular sample. We ran a linear regression with the Binge-Watch Index as the dependent variable and each show's Sequential Index, "lovability" (as measured by the percentage of participants across both conditions who categorized the show as one they loved), and "popularity" (as measured by the percentage of all participants who said they were familiar with the show, pooled across conditions) as independent variables ($R^2 = 0.72$, $F(3,56) = 47.13$, $p < 0.001$). We still found a significant positive effect of the Sequential Index ($\beta = 0.24$, $t = 4.24$, $p < 0.001$), suggesting that consumers are more likely to binge-watch sequential content. We also found a significant positive effect of "lovability" ($\beta = 1.03$, $t = 7.95$, $p < 0.001$), which suggests that consumers are more likely to binge-watch shows that they love. There was no effect of the relative popularity of the show ($\beta = -0.03$, $t = -0.28$, $p = 0.78$).

In summary, these findings provide preliminary correlational evidence in support of our hypotheses that people are more likely to consider binge-watching multi-episode content when it is perceived to be sequential rather than independent. However, other factors like variability in the nature of content, genre, and execution of the TV shows could have contributed to the increased likelihood of binge-watching certain shows over others. Therefore, in the following

studies, we directly manipulate the perceived independent or sequential nature of the programming.

STUDY 2: NUMBER OF PLANNED VIEWING SESSIONS

Study 2 was designed to test our prediction that consumers are more likely to plan to binge-watch a show when it is framed as having sequential episodes relative to the same show framed as having independent episodes. Additionally, since binge-watching is typically associated with hedonic motivations such as indulgence, or "spoiling oneself", we investigated whether the importance of perceived continuity or independence held across both hedonic and utilitarian viewing motivations.

Design and Method

We recruited 682 adults through MTurk (M_{Age} = 34, 46% female). Participants were randomly assigned to one of four conditions in a 2 (episode continuity: independent vs. sequential) × 2 (perceived purpose of content: hedonic vs. utilitarian) between-subjects design. All participants were told to imagine that they were planning on watching a fictional BBC murder mystery series set in Victorian England that consisted of 12 episodes that were each 30 minutes long.

In the independent condition, participants were told that each episode featured a self-contained story line and could be watched on its own. In the sequential condition, participants were told that each episode contributed to an over-arching mystery and that episodes should be watched in chronological order. We additionally manipulated the perceived purpose of the content to control for whether binge-watching might depend on having a hedonic motivation for

media consumption. Participants in the hedonic condition were told to imagine that they were watching the show in their leisure time, while participants in the utilitarian condition were told to imagine that they were watching the show as part of an assignment for a European history class. (Exact wording of the show descriptions can be found in Web Appendix 2.)

After reading the description of the content, participants first indicated how they would want to allocate time across separate sessions to view the 12 30-minute episodes of the show. They could choose from the following options: 12 sessions (30 minutes each), 6 sessions (1 hour each), 4 sessions (1.5 hours each), 3 sessions (2 hours each), 2 sessions (3 hours each), or 1 session (6 hours total). The degree of binge-watching was characterized by the number of sessions, with a lower number of sessions corresponding to more binge-watching.

Participants then rated how enjoyable and useful they thought that watching the show would be on 7-point Likert scales (e.g., 1 = “Not enjoyable at all”, 7 = “Extremely enjoyable”). They further indicated their perceptions of the hedonic vs. utilitarian nature of the media on a 9-point scale from “practical” to “frivolous” (Karmarkar, Shiv, and Knutson 2015), and whether they had ever watched a show like this before (yes/no). Finally, participants answered a few questions on demographics (e.g., age, gender), and rated how often they binge-watched TV shows and how busy they were on a daily basis using 7-point Likert scales.

Results and Discussion

We conducted a 2 (episode continuity: independent vs. sequential) × 2 (perceived purpose of content: hedonic vs. utilitarian) ANCOVA on the number of preferred sessions, with reported daily busyness and tendency to binge-watch television shows as covariates. In support of our hypothesis, we found a significant main effect of episode continuity ($F(1, 676) = 4.63$, $p =$

0.03) such that participants in the sequential condition planned to binge-watch more by choosing fewer sessions (M = 5.52, SD = 3.33) compared to participants in the independent condition (M = 6.16, SD = 3.46).[1]

In this analysis, there was no main effect of perceived purpose of content ($F(1, 676) = 1.48$, $p = 0.23$), nor an interaction between perceived purpose of content and episode continuity ($F(1, 676) = 0.59$, $p = 0.44$). In other words, the binge-watching effect was similar across hedonic and utilitarian motivations in this study, suggesting that this effect is not derived from a hedonic consumption motivation to spoil oneself. The preferred number of sessions increased with higher reported daily busyness ($F(1, 676) = 9.60$, $p < 0.01$), indicating that people who saw themselves as busy were less likely to binge-watch. In addition, the frequency with which participants reported binge-watching television shows in general predicted the preferred number of sessions, with more binge-watching corresponding to fewer preferred sessions ($F(1, 676) = 20.81$, $p < 0.001$). Thus people who felt they commonly binge-watched shows were more likely to plan to binge-watch in this instance, convergent with Netflix data suggesting that it is possible to define binge-watching "segments" in their customer base (Schrage 2013).

In summary, this study finds that consumers are more likely to plan to binge-watch a television series when the episodes are described as sequential (versus independent), holding all other characteristics of the content the same. Critically, these findings did not vary across hedonic and utilitarian motivations of the content. One possible limitation of this result is that participant responses were restricted to selecting the numbers of episodes for a single sitting, constraining their options for planning ahead. Therefore, in Studies 3A and 3B, we replicated support for our primary hypothesis by having participants choose or create viewing calendars, allowing for a more natural and flexible planning response. Study 3B additionally tested these

principles within-subject, as a stronger test of whether sequential effects persist across individual differences in binge-watching preferences.

STUDY 3A: CLUMPINESS OF CALENDAR CHOICES

Study 3A tests binge-watching preferences across sequential and independent content in a way that allows participants to indicate how they would watch the episodes across multiple days using more natural planning settings and tools.

Design and Method

We recruited 408 adults through MTurk (M_{Age} = 35, 45% female). Participants were randomly assigned to one of two conditions regarding episode continuity: independent or sequential. Participants were told to imagine that they were planning on watching a 6-episode science fiction show that would be available for streaming on Netflix. In the independent condition, each episode of the show had a self-contained story featuring a different cast of characters. In the sequential condition, each episode followed the same team of space explorers in an overarching story. All participants then chose among 4 pre-designed calendars (see Figure 2).[2]

[Insert Figure 2 about here]

Results

The calendar setting affords more flexibility in participant responses, but also creates a challenge in quantifying the amount of binge-watching. To achieve this, we used the individual-level entropy measure of “clumpiness” described in Zhang, Bradlow, and Small (2015). Clumpiness is calculated based on the number of events (in our case, the number of episodes)

and the inter-event times, and takes on a value between 0 and 1, with values closer to 1 corresponding to greater clumpiness and hence, more binge-watching. The clumpiness of different calendars can be directly compared as long as they contain the same number of episodes. (See details on how clumpiness in calculated in Web Appendix 3.)

A one-way ANOVA (episode continuity: independent vs. sequential) on the clumpiness of the chosen calendar showed a significant main effect of episode continuity ($F(1, 406) = 4.48$, $p = 0.04$). Specifically, participants in the sequential condition chose a clumpier calendar ($M = 0.47$, $SD = 0.17$) compared to participants in the independent condition ($M = 0.43$, $SD = 0.19$), indicating more binge-watching in the sequential condition.[3]

STUDY 3B: CLUMPINESS OF CALENDAR CREATIONS

In Study 3B, we sought to replicate the results of Study 3A using a within-subjects design and an in-person laboratory sample. Additionally, instead of choosing from preset calendars for viewing the episodes of a show, participants were able to create their own calendars.

Design and Method

We recruited 192 students and community affiliates at a large university ($M_{Age} = 23$, 65% female). Using a within-subjects design, all participants were presented with descriptions of the independent and sequential versions of a science fiction show that would be available on Netflix. For each version of the show, participants designed their own calendars that reflected how they would want to view the 6 episodes of the show across 6 days by using their mouse to place episode labels onto a blank calendar. The order of presentation was counterbalanced across the sample, so participants first read the description and designed a calendar for either the

independent or the sequential version of the show. Participants who had first completed this task for an independent show then did so for a sequential one, while participants who had first completed this task for a sequential show then did so for an independent one.

We conducted a 2 (within-subject episode continuity: independent vs. sequential) × 2 (order of presentation: independent first vs. sequential first) repeated measures ANOVA on the clumpiness of the calendars that participants created. We found a main effect of episode continuity ($F(1,190) = 87.19$, $p < 0.001$) such that participants created more clumpy calendars when the show was described as sequential ($M = 0.45$, $SD = 0.16$) versus independent ($M = 0.35$, $SD = 0.18$).

There was also a significant effect of the order in which options were presented ($F(1,190) = 35.39$, $p < 0.001$), but no significant interaction between order and episode continuity ($F(1,190) = 1.23$, $p = 0.27$). Examining the data suggests that participants create an "average" calendar for the first condition they encounter, and then adjust the clumpiness of their calendars up or down depending on the order. As seen in Figure 3, the first calendar created in both conditions had an average clumpiness of 0.4. Participants who saw the independent calendar first adjusted the clumpiness of their calendar design *up* for the subsequent sequential show, while participants who saw the sequential calendar first adjusted the clumpiness of their calendars *down* for the independent show.

[Insert Figure 3 about here]

In summary, studies 3A and 3B provide further support for the robustness of our hypothesis that consumers prefer to binge-watch sequential (versus independent) shows when allocating or planning time for consumption. Specifically, these differences hold for a more flexible measure of binge-watching relative to Study 2, and for both between and within-subject

designs. Building on this, we next sought to understand whether and how these preferences translated to actual purchase behaviors. In Study 4, we examine whether consumers were additionally willing to place a higher monetary value on the opportunity to binge-watch a show when the episodes were sequential.

STUDY 4: WILLINGNESS-TO-PAY TO BINGE-WATCH

In this study, we examine whether consumers place a higher dollar value on the opportunity to binge-watch a newly airing TV show, depending on whether the episodes were described as more or less continuous. A secondary objective of the study was to determine if the main effect of episode continuity depends on the length of the planning horizon. If the main effect of episode continuity is mainly driven by consumers' impulsivity, or desire to consume sequential content "sooner" versus "later," then we should expect an attenuation of the effect if the show is going to air farther in the future. However, since our hypothesis is based on consumers experiencing utility from *completing* the interconnected episodes of sequential content as a whole, we predict that the sequential effect on binge-watching preferences should also hold for shows that will only start to air farther in the future.

Design and Method

We recruited 218 adults at a large university (due to a technical error in data collection we are unable to report demographics, but the subject pool was similar to the one used in Study 3B). Participants were randomly assigned to a condition in a 2 (episode continuity: independent

vs. sequential, within-subject) × 2 (air time: 2 weeks vs. 6 months from now, between-subject) mixed effects design. The order in which the independent and sequential shows were presented was counter-balanced across participants.

Participants were told to imagine that they were planning on watching a fictional alternate history show that would be available for streaming on Amazon Video for $20 in either 2 weeks or 6 months, with the episodes released one-by-one each week. After reading a description of the show, participants were asked how much *more* (above the base price of $20) they would be willing to pay for all the episodes to be made available on the day of release, instead of having to wait for the episodes to be released weekly. Having all the episodes available immediately would enable them to binge-watch, and is similar to tactics commonly used by media firms like Netflix, where they release an entire season of a show at once. We predicted that since participants prefer to binge-watch sequential content (compared to independent content), they would be willing to pay a higher premium to do so, regardless of whether the show would air in 2 weeks or 6 months.

Results and Discussion

We first conducted a 2 (order of presentation: independent first vs. sequential first, between-subjects) × 2 (episode continuity: independent vs. sequential, within-subjects) repeated measures ANOVA on the willingness to pay for binge-watching, to ensure that order did not influence the main findings. We found a significant main effect of episode continuity ($F(1,216) = 10.31$, $p < 0.01$). While there was a main effect of order ($F(1, 216) = 9.94$, $p < 0.01$), there was no significant interaction with episode continuity ($F(1, 216) = 1.14$, $p = 0.29$). The main effect of order is consistent with the patterns of results observed in Study 3B. Participants appeared to

pick a reference amount they would be willing to pay for the first condition they encountered, and then adjusted it up (for independent-then-sequential) or down (for sequential-then-independent), depending on the order of presentation.

Since there was no significant interaction between order and episode continuity, we collapsed across order conditions and conducted a 2 (episode continuity: independent vs. sequential, within-subjects) × 2 (air time: 2 weeks vs. 6 months from now, between-subjects) repeated measures ANOVA on the WTP for binge-watching. We found a significant main effect of episode continuity ($F(1, 216) = 9.67$, $p < 0.01$) such that participants were WTP more to binge-watch the sequential show ($M = \$5.54$, $SD = 6.14$) compared to the independent show ($M = \$3.91$, $SD = 5.22$; paired $t(217) = 3.11$, $p < 0.01$). However, there was no main effect of air time ($F(1, 216) = 0.002$, $p = 0.96$) and no significant interaction ($F(1, 216) = 0.14$, $p =0.71$). Figure 4 plots the WTP to binge-watch for participants in the 2 weeks air time condition in Panel A and the 6 months air time condition in Panel B.

[Insert Figure 4 about here]

These results demonstrate that consumers placed a meaningful monetary value on the ability to binge-watch, and that this value was higher for sequential shows compared to independent shows. Notably, the effect held regardless of whether participants were told that the show would be airing in two weeks or in six months. This is consistent with our proposed mechanism that consumers derive utility from uninterrupted completion of sequential content, which should be unaffected by the start time of the experience, and argues against the likelihood that differences in WTP for binge-watching are being driven by “impatience” or consumers wanting to watch sequential content sooner. It also suggests that it is possible for media firms to

notify consumers of the opportunity to binge well in advance of releasing media, without impacting this pattern of behavior.

Up to this point, we have explored the effects of sequential (versus independent) episode continuity on how people would *plan* to allocate time to watch the TV content in the future. In Studies 5-7, we examine the underlying mechanism by testing whether consumers derive completion-based utility when consuming sequential content, as measured by how the perceived quality of content changes upon completion (Study 5), how enjoyment changes depending on whether consumers binge or savor the content (Study 6), and how the degree of binge-watching changes as consumers near completion in the moment of consumption (Study 7).

STUDY 5: PERCEIVED QUALITY OF TV SHOWS UPON COMPLETION

In Study 5, we test for evidence of completion utility for sequential shows by looking at how the perceived quality of TV shows, as measured by episode ratings, changed across seasons. We hypothesized that consumers are more likely to prefer binge-watching sequential (vs. independent) shows because they derive more utility from completing sequential shows. So we expect ratings across the episodes to increase more for sequential shows compared to independent shows.

Design and Method

We obtained the current episode ratings posted on IMBD for 53 out of the 60 TV shows used in Study 1, based on user votes for each episode of each show, as well as the number of votes that were cast for each episode.

Results and Discussion

For each TV show, we tested whether the ratings increased over time by regressing the mean IMBD ratings for each episode on the episode number. The resulting coefficient represents the degree of change of perceived quality, which we refer to as "quality improvement", with more positive coefficients being associated with greater quality improvement. For each regression, we also included the number of user votes as an explanatory variable to control for the popularity of the episode. We found there to be a significant positive correlation between the quality improvement and the Sequential Indices for each TV show ($r = 0.36$, $t(51) = 2.72$, $p < 0.01$). The Sequential Indices were those obtained in Study 1 as the percentage of participants who categorized the TV show as sequential (rather than independent).

To examine the magnitude of the quality improvement for sequential vs. independent shows, we first defined sequential shows as those with a Sequential Index greater or equal to 0.5 and independent shows as those with a Sequential Index less than 0.5. We found that sequential shows had a higher average quality improvement ($M = 0.13$, $SD = 0.23$) than independent shows ($M = 0.004$, $SD = 0.11$; $t(47.88) = 2.65$, $p = 0.01$). So for sequential shows, on average the absolute episode rating increased by 0.13 per episode, while for independent shows, on average the ratings remained about the same with very little change.

To further compare the trends in ratings across episodes over time, for each show we calculated the average rating across all episodes of the show, the "early" ratings (average of the first 3 aired episodes), and the "late" ratings (average across the latest 3 aired episodes at the time we conducted this study). Sequential shows had a significantly higher overall average rating ($M = 8.22$, $SD = 0.93$) than independent shows ($M = 7.69$, $SD = 0.63$; $t(50.94) = 2.44$, $p = 0.02$). To determine whether ratings improved between early and late episodes, we then conducted a 2

(episode continuity: independent vs. sequential) × 2 (episode time: early vs. late) ANOVA on the average episode ratings. We found a significant main effect of episode continuity ($F(1,102) = 15.30$, $p < 0.001$), no main effect of episode time ($F(1,102) = 1.07$ $p = 0.30$), and a significant interaction ($F(1,102) = 4.09$, $p = 0.04$). Critically, the late ratings were significantly higher than the early ratings for sequential shows ($M_{Early} = 8.00$, $SD = 1.02$; $M_{Late} = 8.54$, $SD = 0.75$; $t(56.79) = 2.39$, $p = 0.02$), but the early and late ratings did not differ significantly for independent shows ($M_{Early} = 7.67$, $SD = 0.87$; $M_{Late} = 7.50$, $SD = 0.85$; $t(39.98) = 0.65$, $p = 0.52$).

A possible interpretation of this result is that when watching more sequential shows, the audience experiences more utility from "completing" more of the show, as measured by the increase in ratings between the earlier and later episodes. However, it is important to note that the shows could be strategically designed to progress in ways that allow more enjoyment as there is more engagement in a narrative storyline converging to resolution.

STUDY 6: COMPLETION-DEPENDENT CHANGES IN ENJOYMENT

In Study 6, we directly test for evidence of completion utility by measuring enjoyment of independent vs. sequential videos at two separate time points within an incentive-compatible setting. If consumers experience completion utility for sequential content, then we expect them to experience greater enjoyment after binge-watching vs. savoring the sequential videos.

Design and Methods

We recruited 279 participants on MTurk ($M_{Age} = 36$, 51% Female). Participants were randomly assigned to a condition in a 2 (episode continuity: independent vs. sequential) × 3 (video rating time: early vs. late binge vs. late savor) between-subjects design. All participants

were first asked to watch the first half of a two-part video series. Participants in the early rating time condition ("early raters") were asked to rate the enjoyment of the videos on a 7-point Likert scale (1="Did not enjoy at all", 7="Enjoyed very much"), and then concluded the study. Participants in the late binge condition ("binge raters") watched the second video immediately before completing the personality questionnaire, and then rated their enjoyment. Participants in the late savor condition ("savor raters") completed a personality questionnaire before watching the second video and rating their enjoyment, allowing them to savor the first video.

In the independent episode continuity condition, participants were informed that the second video had a completely different storyline and featured different characters. In the sequential episode continuity condition, participants were informed that the second video was a continuation of the first one, and that it followed the same storyline with the same characters.

Results and Discussion

We removed 3 participants who indicated they had seen the videos before, leaving us with 276 total participants in the analysis. To determine whether participants experienced completion utility from watching the full two-part video series, we looked at whether enjoyment changed after participants watched the second half of the videos, depending on whether participants were forced to binge or savor the videos (see Figure 5).

[Insert Figure 5 about here]

First, there was no significant difference between the early raters for independent and sequential conditions, though there was a trend towards higher enjoyment ratings for independent videos ($M_{Sequential} = 4.98$, $SD = 1.57$; $M_{Independent} = 5.52$, $SD = 1.62$; $t(97.8) = 1.70$, $p = 0.09$). This suggests that lack of completion may impact the overall enjoyment of the videos.

Our critical measure was to examine if enjoyment was affected differentially by savoring versus binging for independent and sequential videos. We conducted a 1-way ANOVA looking at just participants in the sequential condition (video rating time: early vs. late binge vs. late savor) and found a significant effect of video rating time ($F(2,139) = 3.62$, $p = 0.03$). In the sequential condition, compared to early raters, binge raters reported significantly higher enjoyment of the videos, ($M = 5.84$, $SD = 1.38$, $t(96.71) = 2.91$, $p < 0.01$), but savor raters reported the same level of enjoyment ($M = 5.52$, $SD = 1.82$, $t(85.43) = 1.55$, $p = 0.12$).

We also conducted a 1-way ANOVA looking at just participants in the independent condition (video rating time: early vs. late binge vs. late savor) and found no significant effect of video rating time ($F(2,131) = 1.58$, $p = 0.21$). In the independent condition, binge raters ($M = 6.02$, $SD = 1.26$, $t(87.33) = 1.66$, $p = 0.10$) and savor raters ($M = 5.52$, $SD = 1.62$, $t(84.63) = 0.52$, $p = 0.60$) reported the same level of enjoyment as the early raters.

In summary, we demonstrated that when consumers are forced to savor or binge a video series, they experience significantly more enjoyment after binging compared to savoring, but only if the videos are sequential. In other words, enjoyment actually increases across videos when people binge sequential content, providing evidence that consumers get completion utility from sequential content.

STUDY 7: FIELD DATA TESTS OF SEQUENTIAL VS. INDEPENDENT CONTENT

In the previous studies, we demonstrated that when planning time to consume media content, consumers prefer binge-watching sequential content compared to more independent episodes. This effect occurs across media genres, and we show that it extends across hedonic and utilitarian consumption motivations, including viewing material for educational purposes (e.g.,

Study 2). In addition, we find evidence consistent with an underlying mechanism in which consumers derive completion utility from completing sequential content. In Study 7, we validate both the effect and the mechanism using actual consumption patterns found in field data related to viewing educational (utilitarian) content.

Methods

We obtained clickstream data from students enrolled in two courses offered through Coursera: Introduction to Marketing ("Marketing") and Introduction to Financial Accounting ("Accounting") during Fall 2013. The Marketing course was taught over 6 weeks by three separate professors, and consisted of 83 lectures ranging from 5-30 minutes in length. Each week was referred to as a "module" with the lectures offered in one week being represented independently of the material from other weeks. In contrast, the Accounting course was taught over 6 weeks by a single professor and consisted of 69 lectures. Each week, the material built on the lectures from the previous week and contributed to an overarching case study.

Table 1 lists examples of the lecture videos for the Marketing and Accounting courses shown in the syllabus. Based on the structural differences in the course designs, we categorized Marketing as an independent set of "episodes" (e.g., classes) and Accounting as a more sequential set of episodes. With this in mind, our hypothesis was that students should be more likely to binge-watch the more sequential Accounting lectures compared to the independent Marketing lectures.

[Insert Table 1 about here]

Out of the 299,133 individuals represented by the data source, we restricted our analysis to those who had paid for the course, had watched at least one lecture, and had taken *both*

Accounting and Marketing within the time period represented by the data. This allowed us to control for heterogeneity more generally, and for binge-watching as an individual difference. This process resulted in a sample of 553 students. For reference, according to Times Higher Education (Parr 2013), the average completion rate for MOOCs among registered users is less than 7%. (See Web Appendix 3 for additional details on the data cleaning process.)

For each student, we observed the time at which they arrived at the URL of a lecture video. To analyze the data, we examined: (1) the time between URL arrivals, (2) how long students spent watching lectures in a single sitting or "session", and (3) how much they spread lectures out based on the average time between sessions.

Results

To compare binge-watching behavior between the two courses, our primary analysis examined the average time between URL arrivals, which represents how rapidly students watched the next class in the series. Since the sample was selected based on students who had taken both classes, we were able to conduct a within-subjects analysis. This allows us to address possible individual preferences for binge-type consumption. For example, according to Netflix, some individuals have more of a general tendency to binge-watch compared to others (Schrage 2013), while Schweidel and Moe (2016) distinguish between bingers and non-bingers on Hulu to predict advertising response. In our own Study 2, we found that people who self-reported to be heavier binge-watchers were more likely to plan to binge-watch media content, regardless of the type of content. By comparing the same students across the two courses, we are able to control for such individual differences in consumption patterns. In the Coursera data, we found that on average, the time between URL arrivals was significantly longer in the independent Marketing

course (M = 23.49 hours, SD = 31.76) compared to the sequential Accounting course (M = 19.60, SD = 20.53, $t(552) = 2.68$, $p < 0.01$).

We also looked at the average time between "sessions" of lecture video consumption. To define a session, we grouped together consecutive URL arrivals that were within 2 hours of each other as the cutoff time. This analysis is robust to different cutoff times (see Web Appendix 3 for details). The average inter-session time was 187.11 hours (SD = 213.76) in the Marketing course and 126.36 hours (SD = 247.44) in the Accounting course, with the difference being significant ($t(520) = 7.80$, $p < 0.001$).[4] Both these analyses suggest that when taking an independent class, students are more likely to savor and spread videos out compared to when taking a sequential class.

Since the two courses were not offered at the exact same time, we focused the remainder of our analysis on two overlapping weeks when students were engaging in the two courses at the same time. We refer to these two weeks as Week A and Week B. We first looked at the average session time, which represented how long students watched lectures in a single sitting, similar to the measure used in Study 2, with longer sessions corresponding to more binge-watching. Figure 6 plots the average session lengths across the two courses and two weeks.

[Insert Figure 6 here]

We found that session lengths were longer in the Accounting course than in the Marketing course in both Week A ($M_{Accounting} = 0.81$ hours, SD = 0.86, $M_{Marketing} = 0.48$ hours, SD = 0.61, $t(413.97) = 4.61$, $p < 0.001$) and in Week B ($M_{Accounting} = 1.06$ hours, SD = 1.08, $M_{Marketing} = 0.51$ hours, SD = 0.62, $t(425.95) = 6.72$, $p < 0.001$). This suggests that students engaging in the independent Accounting course consumed more lecture content in each session compared to students in the sequential Marketing course.

We also found that session lengths increased significantly between Weeks A and B for the Accounting course ($t(514.73) = 3.01$, $p < 0.01$), but not for the Marketing course ($t(312.86) = 0.37$, $p = 0.71$). This suggests that students engaging in the sequential Accounting course binge-watched more by engaging in longer uninterrupted sessions as they progressed through the course towards completion, which is consistent with our theory that consumers prefer binge-watching sequential content because of the utility derived from approaching completion.

Together these analyses suggest that students are more likely to binge during academically-motivated consumption when the content of the classes is seen as sequential (i.e., the Accounting course) compared to independent (i.e., the Marketing course). We also observe that students binge-watch more as they approach completion when consuming the sequential Accounting content, which provides evidence for our proposed mechanism that consumers derive completion utility from consuming sequential content in larger uninterrupted chunks.

GENERAL DISCUSSION

Across a series of experiments and empirical analyses, we found converging evidence in support of our hypothesis that consumers prefer binge-watching sequential content compared to independent content. We used a variety of different quantification methods to capture binge-watching, including the simple categorization of shows for binge-watching vs. savoring, various ways of planning future viewing, and WTP for the opportunity to binge-watch. In addition, we were able to expand the domain of these effects beyond hypothetical questions about popular media and TV shows, to incentive-compatible viewing sessions (Study 6), as well as a broader range of experiential products including online courses, for which we were able to observe consumers' binge-watching behaviors in the moment of consumption (Study 7).

Our findings in Studies 5-7 additionally offer evidence that consumers may experience a "completion utility" for sequential content, as expressed through increasing ratings, enjoyment, and more binge-watching near the completion of the content. This is consistent with prior research that shows consumers are motivated to complete sets (Evers, Inbar, and Zeelenberg 2014; Barasz et al., in press) and that they have strong preferences for uninterrupted completion of tasks (Klinger 1975; Lewin 1926; Martin and Tesser 1996; Ovsiankina 1928). Notably, a completion-based mechanism allows for the possibility that binging can occur regardless of the specific purpose for consumption, and/or whether the content is hedonic or utilitarian. While most of the literature related to binging is couched in terms of "enjoyment", we do show that these effects are not dependent on having hedonic content or a hedonic motivation. For instance, Study 2 demonstrates binge-watching for sequential content regardless of whether it is framed as hedonic or utilitarian. Additionally, in Study 7 we found that students pursuing courses in applied subjects also showed more "binging" of sequential material compared to more independent classes, in a pattern consistent with seeking completion.

Another theory for explaining binge-watching is that it might relate to impulsive consumption (akin to being tempted into eating too many cookies). However, in Study 4, we found no evidence of such impulsiveness or the desire to start consumption earlier. Specifically, higher WTP to binge-watch sequential content did not depend on the timing of the start of consumption, consistent with the effect being driven more by the desire for uninterrupted completion, or consumption of a "whole" at one time (e.g., Barasz et al., in press). Across all our experiments, we found preferences for binging sequential content in the moment of consumption, in the near future, and in the "delayed" future. This suggests that binging can be planned for as an overall strategy, regardless of the relative temporal frame. Websites that offer "Top 10" lists

of shows to binge-watch during summer break for example (Travers 2017) seem to be aware that consumers may plan their binge-watching ahead of time, in addition to binge-watching in the moment (Schweidel and Moe 2016).

However, the question of whether self-control may play a role in binge-watching remains an interesting topic for future research. Based on our results, self-control could prevent binging by allowing people to resist the desire for completion. However, self-control could also lead to increased binging, based on people "sticking through" media even if they don't enjoy it, to achieve a goal of completion. This suggests that completion utility may be related to research in behavioral economics showing that the sunk-cost fallacy and escalation of commitment can drive continued investments in failing projects (Staw 1976; Arkes and Blumer 1985; Garland and Conlon 1998). In other words, people are driven to complete things even when it is very costly for them to do so, merely because they are reluctant to forego the effort they have already invested. In our studies, one could argue that this could contribute to completion utility for sequential experiences, even when the viewer is not deriving much enjoyment, if he or she is driven by the desire to complete the episodes after an initial investment in the series.

Our research additionally offers novel managerial insights for firms that host a range of media content. Previous marketplace insights on binge-watching have either segmented content by genre (Netflix 2016), or have segmented the customers themselves as having an intrinsic likelihood to be high or low binge-watchers (Schrage 2013). Schweidel and Moe (2016) leverage the heterogeneity in binge watching tendencies across individuals to predict advertising response. Our findings offer a more generalizable factor that can predict savoring vs. binge-watching across consumers, as well as across a wide range of media, and independently of whether the consumption motivation is hedonic or utilitarian.

The distinction between content that is perceived to be more independent or sequential can allow firms to strategically time their release of the media in ways that align with either consumer preferences or overall firm goals. In addition, there may be flexibility in how a show is promoted, depending on the content platform. For example, reality competition shows often have a temporal progression such that competitors are whittled down to a winner by the season finale, but each episode can be enjoyed on its own, allowing either the episodes or the series to be emphasized. Indeed, it may be possible to design content to achieve particular viewing patterns. In Study 5, we found that IMBD ratings for individual episodes increase more over time for more sequential content. Thus, content creators could actually anticipate the audience to be more likely to binge-watch sequential content, and strategically design sequential content to progress with increasing quality.

As the availability of streaming content rises, consumers may change their habits over time; for example, consumers may be converted towards binge-watching as the "new normal" (Netflix 2013; Schrage 2013). Interestingly, firms like Netflix and Amazon that offer original content for video streaming have started to design "binge-worthy" shows that stretch a single storyline that was originally intended for a single movie across multiple episodes of a TV series through "plotblocking" and stingy narratives (Matthews 2016). However, these types of prolonged cliffhangers may lead consumers to lose interest as they dilute the feeling of the completion-based utility that we propose consumers experience for this type of sequential content by stretching the narrative too thin. Furthermore, firms still find success using "linear-centric" models and releasing episodes of sequential shows weekly rather than streaming entire seasons at once. For example, the recent success of HBO's television-style drama miniseries *Big Little Lies* has been attributed to the anticipation built up between weekly installments, with

momentum generated through buzz and positive word-of-mouth, particularly through digital channels (Adalian 2017).

Collectively, our studies demonstrate that the interconnectedness of episodes within media content is an important factor in shaping consumer's binge-watching preferences, both when planning to consume content as well as in the moment of consumption. Furthermore, the findings demonstrate that these preferences may arise from a completion utility, beyond a simple desire to prolong hedonic consumption. In this way, the work expands our understanding of how and when people "savor" experiences, and offers a framework for thinking about media consumption across content and platform types.

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FOOTNOTES

1. Note that it is possible to treat the number of preferred sessions as discrete choices rather than a continuous response; see Web Appendix 3 for additional analyses.

2. Exact wording of the descriptions can be found in Web Appendix 2.

3. We can also treat the preferred calendar as a discrete choice rather than a continuous clumpiness response; see Web Appendix 3 for analyses.

4. Eleven students were excluded from this analysis because they only had one session based on our cutoff criteria, so they had no observed inter-session times.

TABLES

Table 1: Examples of Video Lectures Names for Marketing and Accounting Courses in Study 7

Accounting	**Marketing**
Week 1 1.1.1: Financial Reporting Review (21:16) 1.2.1. Balance Sheet Equation (14:18) 1.2.2: Assets, Liabilities, and Stockholders' Equity (18:59) 1.3.1: Debit and Credit Bookkeeping I (21:37) 1.3.2: Debit and Credit Bookkeeping II (10:57) 1.4.1: Relic Spotter Case, Part 1 (20:30) 1.4.2: Relic Spotter Case, Part 2 (14:29) 1.5.3: 3M Company: Tour of an Annual Report (10:06)	**Module 1** Marketing 101: Building Strong Brands Part I (15:10) Strategic Marketing (11:39) Segmentation and Targeting (12:45) Brand Positioning (12:48) Brand Mantra: The Elevator Speech (9:41) Experiential Branding (13:24) Strategic Marketing (11:39) Marketing 101: Building Strong Brands Part II (4:10)
Week 2 2.1.1: Revenues and Expenses (21:17) 2.1.2: Relic Spotter Case, Part 3 (14:33) 2.2.1: Adjusting Entries I (15:58) 2.2.2: Adjusting Entries II (17:14) 2.2.3: Relic Spotter Case, Part 4 (24:33) 2.4: 3M Company: Income Statement and Balance Sheet (9:58)	**Module 2** Brand Messaging and Communication (12:08) Brand Elements: Color & Taglines (11:41) Brand Elements: Packaging (10:09) Brand Elements: Choosing a Brand Name (19:57) Brand Elements: Persuasion (13:59) Repositioning a Brand (18:58)

FIGURES

Figure 1: Correlation Between Sequential Shows and Binge-Watchable Shows in Study 1

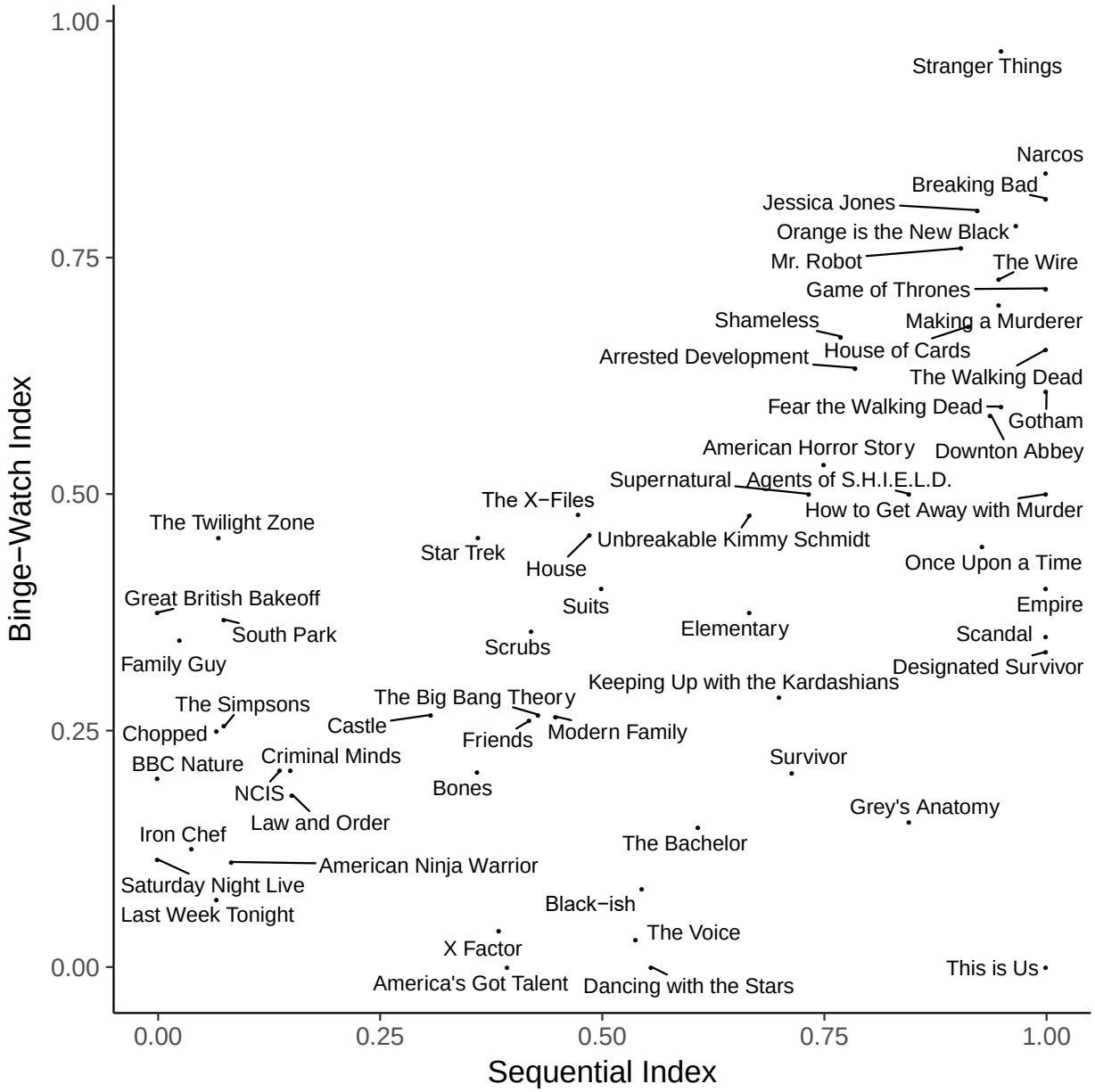


Figure 2: Calendar Choices for Participants in Study 3A

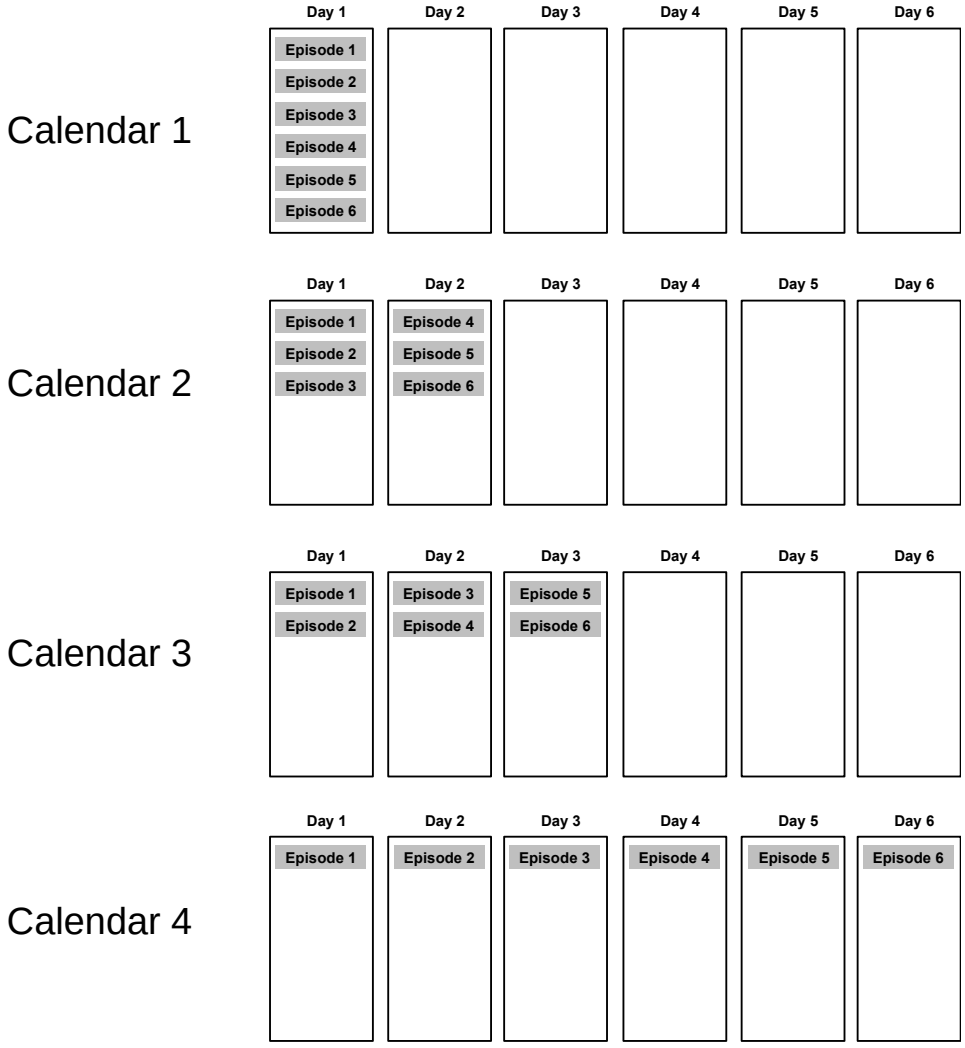


Figure 3: Effect of Episode Continuity on Calendar Clumpiness in Study 3B

(Errors bars represent sample standard errors, *** p < 0.001, ** p < 0.01, * p < 0.05)

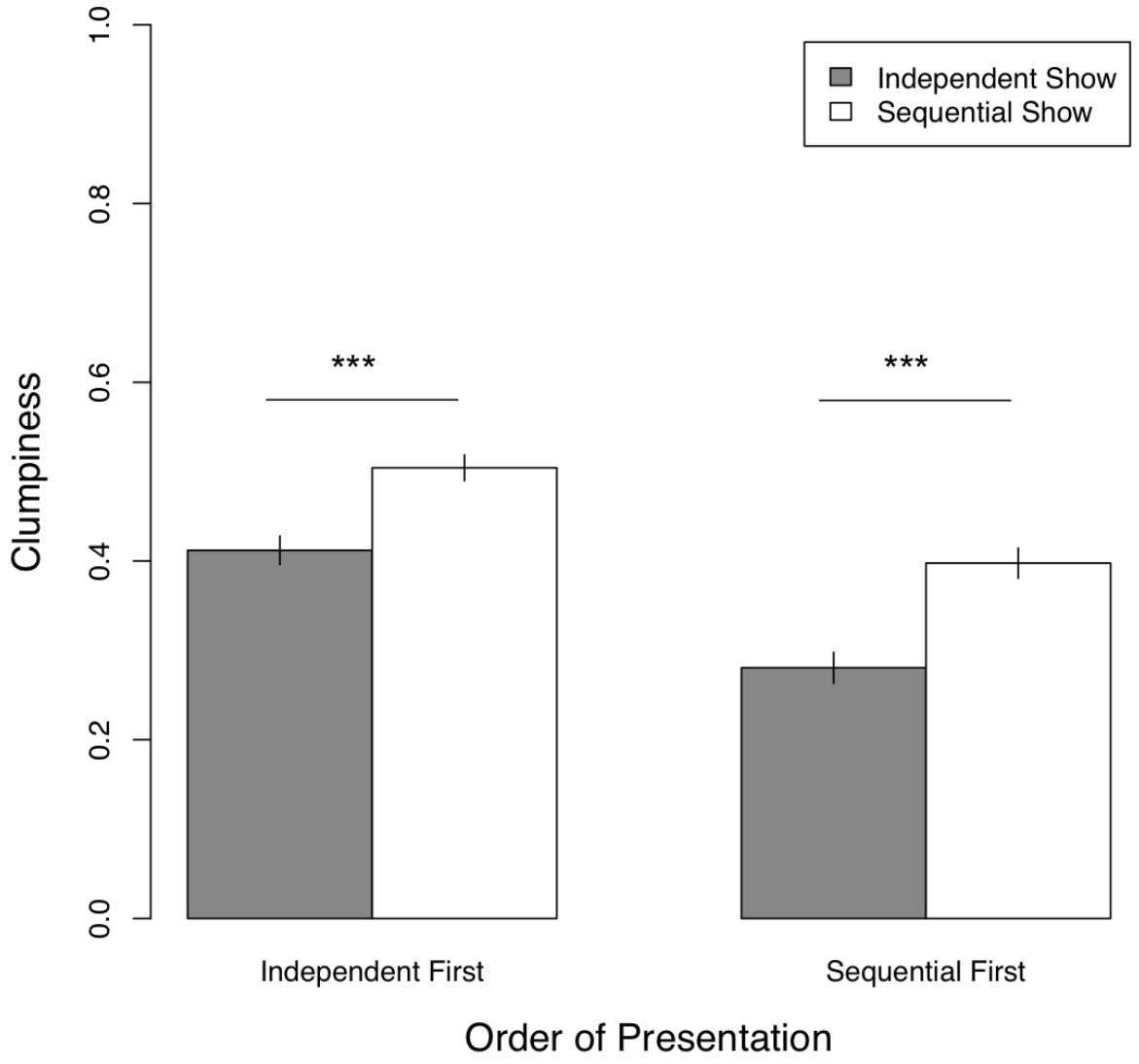


Figure 4: Effect of Episode Continuity on WTP to Binge-Watch in Study 4

(Errors bars represent sample standard errors, *** p < 0.001, ** p < 0.01, * p < 0.05)

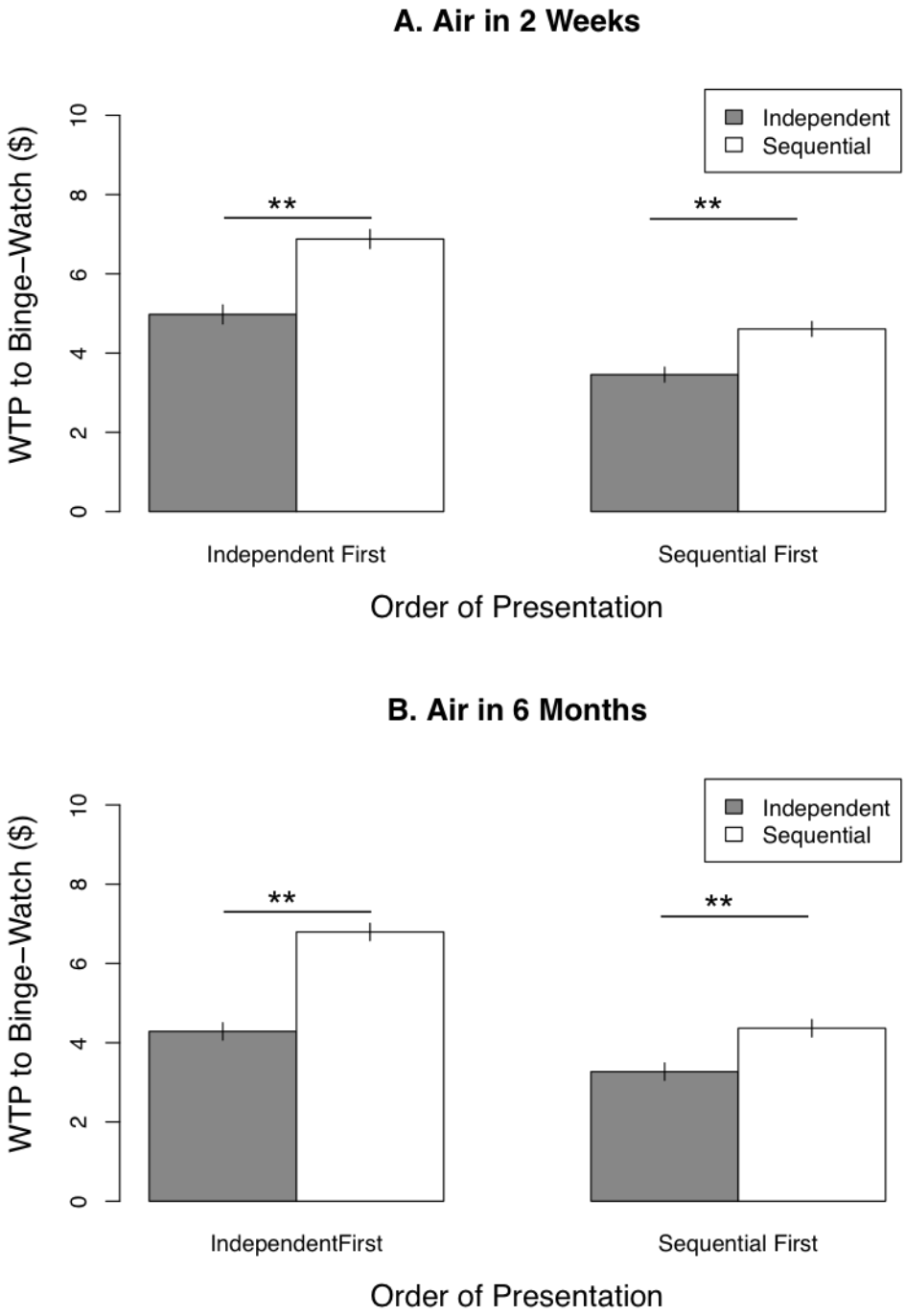


Figure 5: Enjoyment of Videos in Study 6

(Errors bars represent sample standard errors, *** p < 0.001, ** p < 0.01, * p < 0.05)

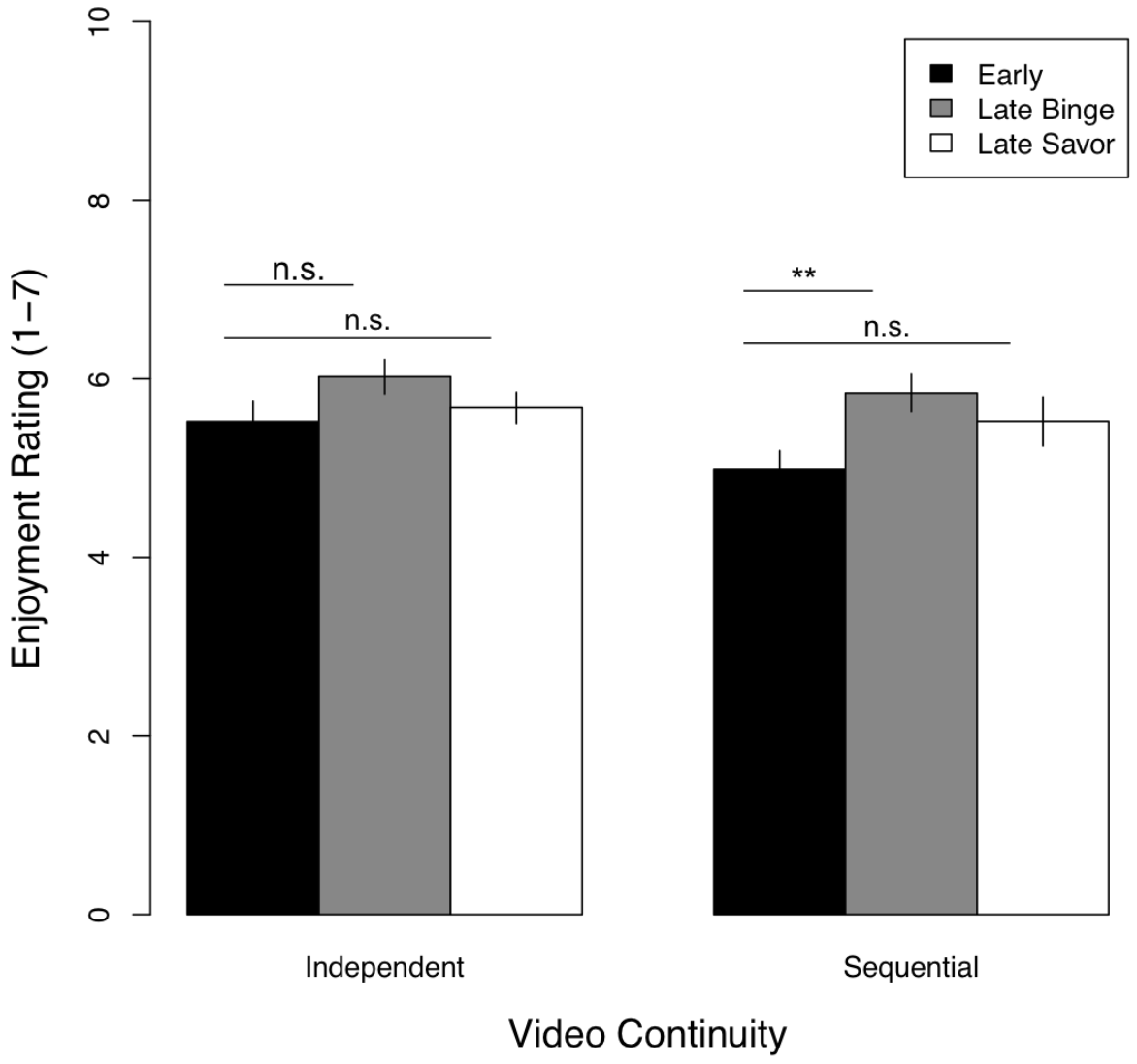
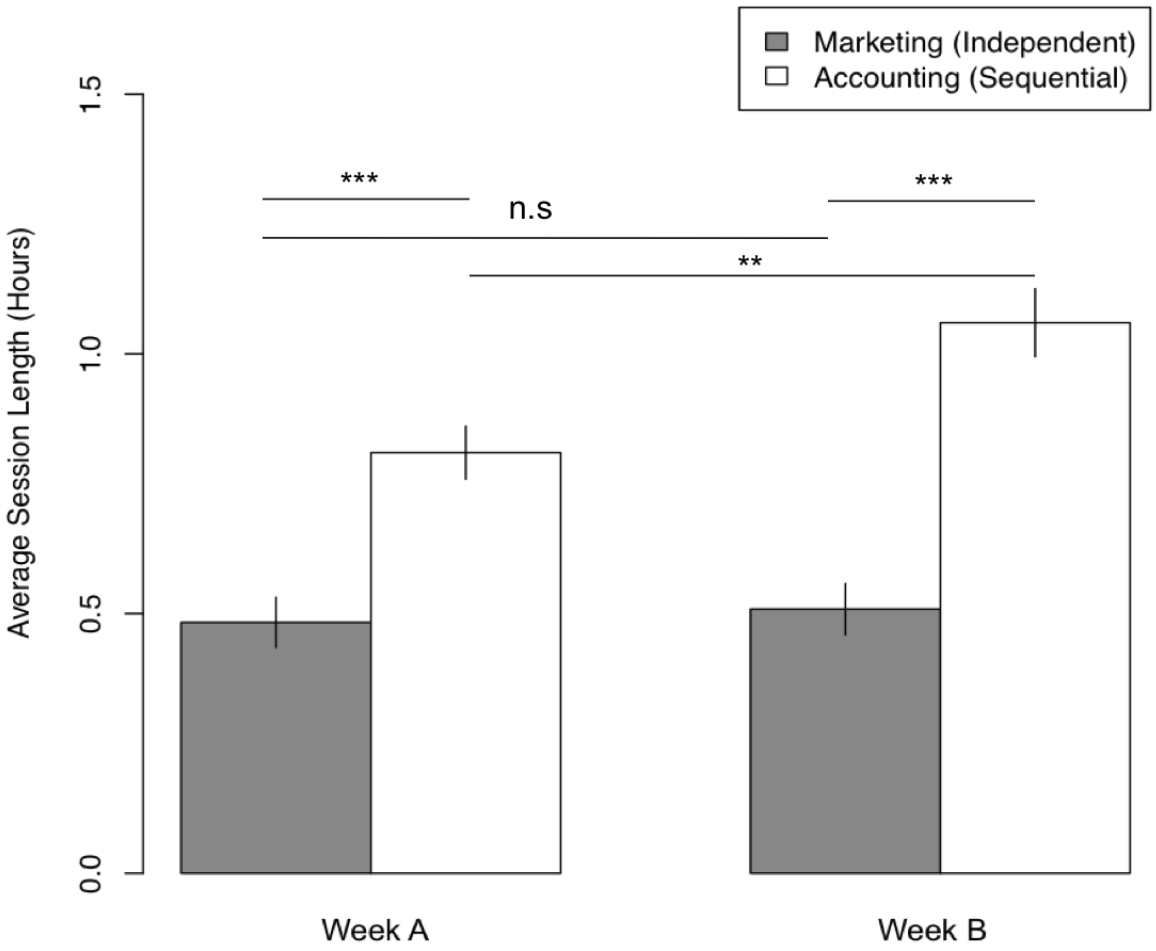


Figure 6: Average Length of Lecture Video Sessions in Study 7

(Errors bars represent sample standard errors, *** p < 0.001, ** p < 0.01, * p < 0.05)



WEB APPENDIX

Appendix 1: List of TV Shows Used in Studies 1A and 1B

TV Show Name	**Genre**
Agents of S.H.I.E.L.D.	*Action, Drama, Sci-Fi*
American Horror Story	*Drama, Horror, Thriller*
American Ninja Warrior	*Action, Game-Show, Sport*
America's Got Talent	*Game-Show, Music, Reality-TV*
Arrested Development	*Comedy*
BBC Nature	*Documentary*
Black-ish	*Comedy*
Bones	*Comedy, Crime, Drama*
Breaking Bad	*Crime, Drama, Thriller*
Castle	*Comedy, Crime, Drama*
Chopped	*Reality-TV*
Criminal Minds	*Crime, Drama, Mystery*
Dancing with the Stars	*Family, Game-Show, Music*
Designated Survivor	*Drama, Thriller*
Downton Abbey	*Drama, Romance*
Elementary	*Crime, Drama, Mystery*
Empire	*Drama, Music*
Family Guy	*Animation, Comedy*
Fear the Walking Dead	*Drama, Horror, Sci-Fi*
Friends	*Comedy, Romance*
Game of Thrones	*Adventure, Drama, Fantasy*
Gotham	*Action, Crime, Drama*
Great British Bakeoff	*Reality-TV*
Grey's Anatomy	*Drama, Romance*
House	*Drama, Mystery*
House of Cards	*Drama*
How to Get Away with Murder	*Crime, Drama, Mystery*
Iron Chef	*Game-Show, Reality-TV*
Jessica Jones	*Action, Crime, Drama*
Keeping Up with the Kardashians	*Drama, Reality-TV*
Last Week Tonight	*Comedy, News, Talk-Show*
Law and Order	*Crime, Drama, Mystery*
Making a Murderer	*Documentary, Crime*
Modern Family	*Comedy, Romance*
Mr. Robot	*Crime, Drama, Thriller*
Narcos	*Biography, Crime, Drama*
NCIS	*Action, Comedy, Crime*

Once Upon a Time	*Adventure, Fantasy, Romance*
Orange is the New Black	*Comedy, Crime, Drama*
Saturday Night Live	*Comedy, Music*
Scandal	*Drama, Thriller*
Scrubs	*Comedy, Drama*
Shameless	*Comedy, Drama*
South Park	*Animation, Comedy*
Star Trek	*Action, Adventure, Mystery*
Stranger Things	*Drama, Fantasy, Horror*
Suits	*Comedy, Drama*
Supernatural	*Drama, Fantasy, Horror*
Survivor	*Adventure, Game-Show, Reality-TV*
The Bachelor	*Game-Show, Reality-TV, Romance*
The Big Bang Theory	*Comedy, Romance*
The Simpsons	*Animation, Comedy*
The Twilight Zone	*Fantasy, Horror, Mystery*
The Voice	*Game-Show, Music, Reality-TV*
The Walking Dead	*Drama, Horror, Thriller*
The Wire	*Crime, Drama, Thriller*
The X-Files	*Drama, Mystery, Sci-Fi*
This is Us	*Comedy, Drama*
Unbreakable Kimmy Schmidt	*Comedy, Drama*
X Factor	*Music, Reality-TV*

Appendix 2: Description of TV Shows for Studies 2-4

Study 2:

Hedonic Condition: Imagine that in your leisure time, you are planning on spending a total of 6 hours watching an award-winning BBC television murder mystery series. This series is a period piece that takes place in an immersive Victorian London atmosphere, with intriguing characters and an intricate plot line.

Utilitarian Condition: Imagine that you are taking a European history class. The instructor has assigned you to spend a total of 6 hours watching an award-winning BBC television series. The series is a period piece that takes place in a historically accurate Victorian London setting, with intriguing characters and an intricate plot line.

Independent Condition: The series consists of 12 independent 30-minute episodes. Each episode can be watched on its own and features a self-contained murder mystery that is solved by the end of the episode.

Sequential Condition: The series consists of 12 sequential 30-minute episodes. Each episode contributes to an over-arching murder mystery that is solved by the end of the series. The videos should be watched in chronological order.

Studies 3A and 3B:

Independent Condition: Imagine that Netflix has just released a new science fiction anthology series. The series consists of 6 independent 20-minute episodes. Each episode is a self-contained story about what future space explorers might encounter on other planets in the universe. Each episode features a different cast of characters and a different story.

Sequential Condition: Imagine that Netflix has just released a new science fiction series. The series consists of 6 sequential 20-minute episodes. Each episode takes you through the story arc of a team of future space explorers as they journey to another planet in the universe that may hold extraterrestrial life. Each episode takes you through the development of the characters in the mission and another step through their journey to make contact.

Study 4:

Independent Condition: Imagine that Amazon Prime Video has just released a new anthology series on alternate histories. The series consists of 12 independent 45-minute episodes. Each episode is a self-contained story set in an alternate reality that explores what the world would have been like if certain major historical events had unfolded differently. Each episode features a different cast of characters and a different story. For example, one episode focuses on World War II, another episode focuses on the fall of the Roman Empire, and another episode focuses on the American Revolution.

Sequential Condition: Imagine that Amazon Prime Video has just released a new series on alternate histories. The series consists of 12 sequential 45-minutes episodes. Each episode takes you through the story arc of a group of American rebels in an alternate reality where the Axis powers won World War II and Germany has conquered the United States. Each episode takes you through the development of the characters in the resistance and another step through their journey to take back their country.

Appendix 3: Supplementary Data Analysis

Study 2: Discrete Analysis

It is also possible to consider the data in terms of discrete choices. To do this, we conducted an ordered logistic regression on the session choices, which revealed a significant effect of the sequential viewing type ($\beta = 0.48$, $t = 2.39$, $p = 0.02$), so participants in the

sequential condition were more likely to select a choice with fewer sessions. We also conducted a proportional z-score test, which revealed that the proportion of participants who selected fewer than 3 sessions was significantly higher in the sequential condition ($z = 3.18$, $p < 0.01$). These results are consistent with the results from the ANCOVA analysis that treated the number of sessions as a continuous response variable.

Studies 3A and 3B: Calculating Clumpiness

Clumpiness is calculated using the following equation from Zhang, Bradlow, and Small (2015), where n denotes the number of events (in our case, the number of episodes), N denotes the total number of potential events, and x denotes inter-event times (IETs).

$$\text{Clumpiness} = 1 + \frac{\sum_{i=1}^{n+1}\left(\frac{x_i}{N+1}\right)\log\left(\frac{x_i}{N+1}\right)}{\log(n+1)}$$

To calculate Clumpiness for the calendars, we set n = 6 for the 6 episodes. We assumed that each day contained 6 potential event times or slots, which allows all 6 episode to be placed on the same day, giving us a total of N = 36 potential event times across the 6 days (although the analyses are robust to different event times). We didn't specify in the calendars shown to participants how far apart episodes would be within a single day, so to calculate IETs between episodes, we use the number of empty slots between days plus 1. A schematic for this calculation is shown in Figure 3. For example, for the first calendar in Figure 2, which is the most clumpy, $x_1 = 1$, and $x_2,\ldots x_6 = 1$, and $x_7 = 31$, so it's clumpiness is equal to the following:

$$\text{Clumpiness} = 1 + \frac{6(1/37)\log(1/37) + (31/37)\log(31/37)}{\log(36+1)} = 0.65$$

For the fourth calendar, which is the least clumpy, $x_1 = 1$, and $x_2,\ldots x_6 = 6$, and $x_7 = 1$:

$$\text{Clumpiness} = 1 + \frac{2(1/37)\log(1/37) + 4(6/37)\log(6/37)}{\log(36+1)} = 0.10$$

Study 3A: Discrete Analysis

For the discrete analysis of Study 3A, we conducted an ordered logistic regression on the session choices, which revealed a marginally significant effect of the sequential viewing type (t = 1.88, p = 0.06). Using a proportional z-score test, we also found that the proportion of subjects who chose one of the three clumpiest calendars (Calendars 1, 2, or 3) was significantly higher in the sequential condition (z = 2.06, p = 0.04).

Study 7: Data Cleaning Details and Robustness Checks

We started with a total sample of 143300 Marketing students and X Accounting students. To be observed in this sample, students needed to have a free account on the Coursera website. We then removed students who had not registered for the course, leaving us with 143262 Marketing students and 155833 Accounting students. We also removed students who had not paid for the course, since we wanted to make sure that all students had the same goal to earn a certificate, which required paid registration. There is also a very high first-week attrition rate (>95%) among students in MOOCs in general, but this number is much lower among students who have paid. This left 3774 Marketing students and 3951 Accounting students. We also removed students who had not watched any lecture videos, which left 3563 Marketing students and 3824 Accounting students. Finally, we removed students who had not registered and paid for both the Marketing and Accounting courses, which left us a matched sample of 553 students total who had taken both courses.

We also looked at whether our main effect that when taking the independent Marketing course, students tend to spread out sessions more compared to when taking the sequential Accounting course. The following table compares the inter-session times between the Marketing and Accounting courses for different session cutoffs.

Cutoff Time	**Marketing**	**Accounting**	**t**	**p-value**
15 min	105.49 hours (SD = 159.45)	69.67 hours (SD = 161.85)	6.69	$p < 0.001$
30 min	144.32 hours (SD = 180.96)	91.83 hours (SD = 230.47)	8.36	$p < 0.001$
1 hour	168.99 hours (SD = 204.15)	112.53 hours (SD = 243.17)	7.95	$p < 0.001$
2 hours	187.11 hours (SD = 213.76)	126.36 hours (SD = 247.44)	7.80	$p < 0.001$
3 hours	194.71 hours (SD = 213.92)	132.71 hours (SD = 248.79)	7.97	$p < 0.001$