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Innovation Sequences over Iterated Offerings: A Relative Innovation, Comfort, and Stimulation Framework of Consumer Responses

Innovations commonly involve changes to iterated market offerings (e.g., new games, car models, film sequels). To better understand consumer iteration responses, the authors develop and test a theoretical framework grounded in (1) prior innovations serving as reference states (comparators) for later innovations and (2) consumer desires for both comfort and stimulation. In Study 1's online game, prior innovations and loss aversion (greater loss than gain impact) moderate evaluations of current innovations, whereby an introduction-weaker-stronger innovation sequence (Periods 1–3 of four periods) generates more entertainment than an introduction-stronger-weaker sequence because the former's weak-opening-then-rise does less harm than the latter's strong-opening-then-drop. Study 2 replicates Study 1 and shows that an introduction-weaker-weaker sequence produces enough habituation and diminishing negative returns to outperform an introduction-stronger-weaker sequence at Period 4. Study 3 offers marketplace corroboration with a film industry test in which minor (fewer) innovations perform better (e.g., sales, return on investment) earlier in franchises, whereas major (many) innovations perform better later, thereby reconciling prior research's opposing prescriptions for the use of major versus minor sequel innovations. The framework and results implicate carefully sequenced innovations for managing consumer iteration responses, including the possibility of interspersing weaker/minor innovations among stronger/major innovations.

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Iterated market offerings—that is, offerings that consist of new or updated versions of a given product or service—are ubiquitous. Examples include upgrades, new models, and/or new installments in a series within a given product (e.g., Apple's iPhone 6, the latest Honda Accord model), movie (e.g., *Transformers 4: Age of Extinction*), video game (e.g., *Assassin's Creed IV: Black Flag*), book (e.g., *A Time to Kill*'s sequel, *Sycamore Row*), software platform (e.g., Windows 10), and play or musical (e.g., *The Phantom of the Opera*'s sequel, *Love Never Dies*). Because consumers often enjoy iterated offerings, sellers commonly use them to bolster profits, stock prices, and earnings. Apple's shares had a cumulative return of 14% in the three trading days following each in a series of six iPad launches (Nadler 2013). In the video game industry, the *Halo* iterations routinely break sales records set by their predecessors (first-day sales of the last three iterations were $170 million, $200 million, and $220 million, respectively). Finally, in the film industry, sequels captured the top three spots in the 2013 U.S.-Canada box office, with total earnings of roughly $1.2 billion (*Iron Man 3*, *The Hunger Games: Catching Fire*, and *Despicable Me 2*).

Yet research on the marketplace popularity of innovations typically does not address innovation sequences but instead has focused on phenomena such as innovation diffusion rates (Bass 1969; Chandrasekaran and Tellis 2007; Peres, Muller, and Mahajan 2010), wherein innovations consist largely of single new products ranging from incremental

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to radical innovations relative to the status quo (e.g., Tellis, Prabhu, and Chandy 2009). We know of only three studies of innovation sequences. The first assesses market returns and aggregate consumer responses to firm-level sequences of major innovations that differ in their number per quarter (Moorman et al. 2012), such that it is only tangentially related to the present investigation of product-specific iterations that mix innovation levels. The other two studies assess major and minor innovations in film sequels. One concludes that major innovations outperform minor innovations (Sood and Drèze 2006), whereas the other concludes that minor innovations outperform major innovations (Hennig-Thurau, Houston, and Heitjans 2009). We therefore develop a theoretical framework to help understand consumer responses to iterations and then test features of this framework to reconcile the prior research conflict and show that carefully sequencing weaker and stronger innovations (subject to situational factors) can improve iteration appeal and thereby mitigate threats of consumer defection (see Kumar, Bhagwat, and Zhang 2015).

The framework is based on three psychological tendencies: (1) reference dependence, in which consumers judge current innovations and product experiences relative to reference states such as prior innovations and product experiences; (2) consumer desires for comfort; and (3) consumer desires for stimulation. This relative innovation comfort stimulation (RICS) framework implicates accelerated minor innovations interspersed among major innovations to manage consumer innovation expectations, increase innovation appreciation, and increase stimulation through continuous brand activities and improvements. It also implicates prudent mixes of older product features (to ensure consumer comfort) and newer product features (to ensure consumer stimulation), mixes that adjust over the product franchise as needs for comfort and stimulation change (comfort earlier, stimulation later).

We test and support the framework in three diverse studies. Study 1 investigates consumer experiences with an online rock-paper-scissors (RPS) game consisting of four 28-play periods. Consumers encountering an introduction-weaker-stronger ("weaker-stronger" hereinafter) innovation sequence across Periods 1–3 are more entertained and more interested in downstream product-related activities (e.g., interest in the game's forthcoming app) than are consumers encountering an introduction-stronger-weaker sequence ("stronger-weaker" hereinafter). Study 1 also indicates direct and indirect evidence of various psychological processes underlying such innovation-sequence effects, including relative innovation evaluation, loss aversion, and potential innovation habituation and/or first-impression effects. Study 2 expands the investigation to three new product classes in which consumers receive descriptions of future product iterations over three periods and then indicate their level of product interest. Following a product launch with smaller, less stimulating innovations and then larger, more stimulating innovations produces greater consumer interest than does the opposite sequence. Furthermore, Study 2 shows that a weaker-only innovation sequence produces enough habituation and diminishing negative returns that it generates more product interest in the last period than a stronger-weaker sequence. Finally, Study 3 supports the RICS framework with real-world sales data from the film industry and reconciles conflicting reports of the relative effectiveness of minor versus major film innovations (Hennig-Thurau et al. 2009; Sood and Drèze 2006). Minor innovations perform better earlier in franchises when novelty should be high and boredom low, whereas major innovations perform better later when novelty should be low and boredom high. With their diverse methods, these studies support the RICS framework while converging on the conclusion that iteration success hinges in part on how well managers sequence their innovations.

Balancing Processes Across Iterated Offerings

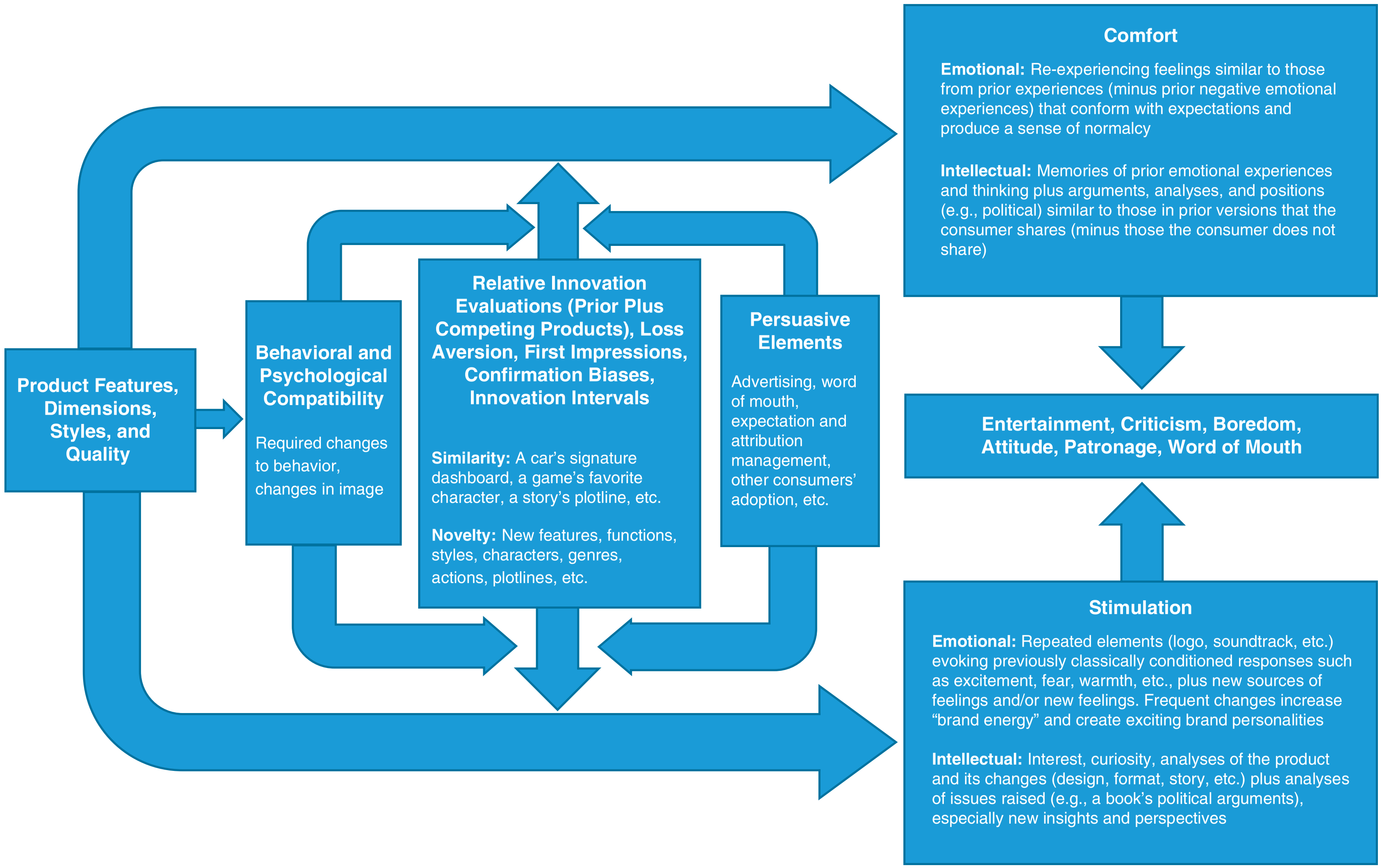
Successful management of product iterations requires sensitivity to numerous trade-offs and psychological processes. Iterations enable managers to leverage the original version's familiarity and brand equity (e.g., consumer trust), which helps reduce advertising costs and introduction risks (Keller 2002; Smith 2011); however, iterations also risk boring consumers while inviting criticisms of creative bankruptcy (Queenan 2010). Moreover, whereas highly innovative iterations benefit products in the current period, they may "train" consumers to expect such grand innovations in the future, thereby risking consumer disillusionment if innovations fall short. Even professional investors respond favorably to current innovations that are larger than prior innovations, leading some managers to delay innovation launches to create the appearance of escalating innovation quality (Moorman et al. 2012). Significant innovations thus risk "spoiling" constituents while sellers indirectly pressure themselves for more and better innovations in the future. Next, we capture many of these and related processes in a theoretical framework, closing with a discussion of how the processes may differ across product classes (though this study focuses on commonalities).

A RICS Framework

Consumer iteration responses hinge on iteration perceptions and evaluations and the comfort and stimulation they produce, relationships represented in the RICS framework (see Figure 1). Due to the considerable number of variables and causal influences potentially involved, the framework's paths highlight only some key dynamics.

Relative innovation effects. Innovation judgments should be at least partially relative to reference states or points of comparisons, such as a product's prior innovations. Reference state effects are pervasive and widely recognized in theories of economics (e.g., Bernoulli's [1738, 1954] diminishing marginal returns), psychophysics (e.g., just-noticeable differences, the Weber–Fechner law; Masin, Zudini, and Antonelli 2009), price perception (e.g., a $50 discount on a $300 watch vs. an $800 watch; e.g., Monroe 1973), customer satisfaction (e.g., expectation disconfirmation;

FIGURE 1
RICS Framework



Fornell 1992), and decision making (Kahneman and Tversky 1979). Reference states that remain unchanged over time, moreover, often produce the related phenomenon of habituation. This adaptation, which is helpful for survival, means that no matter how exciting (or horrible) a new experience is, it can become comfortable and perhaps even boring with repetition. In this process of habituation (Thompson 2009),[1] sensory, affective, and cognitive responses wane with repeated exposure (e.g., Berlyne 1971; Biswas et al. 2014). Thus, the first bite of chocolate is the best (e.g., Morewedge, Huh and Vosgerau 2010), and groundbreaking books and films regularly produce stronger "wow" reactions than their sequels (e.g., *Star Wars*, *The Matrix*; Dhar, Sun, and Weinberg 2012). Habituation is so widely recognized (e.g., in the popular maxim "variety is the spice of life") that consumers actively try to thwart it to perpetuate pleasure (Hasegawa, Terui, and Allenby 2012; McAlister 1982; Ratner, Kahn, and Kahneman 1999; Russell and Levy 2012). Habituation thus involves limited responses to states that often function as reference states or comparators for new and/or changing experiences.

In the context of product iterations, reference states include the features of, and experiences produced by, a product's earlier versions. For example, adding a new feature to a product helps a feature-poor product more than a feature-rich product because the latter's feature-rich reference state reduces the relative importance/impact of the added feature by way of diminishing marginal sensitivity (Nowlis and Simonson 1996). Hsee and Abelson (1991) report a similar effect among people observing changes in a stock's valuation over time. However, whereas such contrast effects from reference states are common, they sometimes fail in the context of purely hedonic experiences such as eating jelly beans or listening to music (see Novemsky and Ratner 2003; Ratner, Kahn, and Kahneman 1999). Nonetheless, we expect to obtain contrast effects in the context of innovations for the following reason: unlike the failed hedonic contrasts, which involved prefacing a person's experience with one product (e.g., a song) with an experience with another product (e.g., a different song liked more or less than the focal song), iteration innovations involve *changes* to a given product that are likely to stimulate more deliberate and more cognitive comparisons with the earlier version.

Although a product's prior innovations may serve as reference states, it is not clear how much prior innovations contribute to innovation reference states or how much other products and their innovations contribute. Research on pricing dynamics has shown that multiple prior periods affect reference prices/price expectations, with diminishing weights on periods further from the present, which are often modeled with exponential smoothing (see Briesch et al. 1997). It is not obvious, however, whether earlier periods play as large a role in innovation reference states given that the ambiguity in innovations (e.g., lack of precise numbers on all dimensions) may make them more difficult to remember and compare. As for comparisons with other brands and products within the current period, various potential moderators exist that encumber a priori specifications of impact (e.g., number of competitors, competitor similarity to the focal product, brand loyalty discouraging cross-product comparisons). For example, when switching costs are high (e.g., when having to adapt to a new operating or gaming system if switching), consumers may compare competitors minimally and instead focus on the performance of their current brand/product over time (Tschang 2007; Villas-Boas 2015).

Just as consumers habituate to innovation reference states at a given point in time, so too may they habituate to rates of change in innovation quality over time. Hsee, Salovey, and Abelson (1994; Experiment 2) test habituation to rates of change using a stock's price. Two groups of people saw modest growth in a stock over its closing periods, but one group had seen far greater growth earlier while the other had seen far less. The greater-growth-early group was less satisfied with the stock's performance than the smaller-growth-early group, revealing that habituation to earlier rates of change altered evaluations of the closing rate. Three elements of Hsee, Salovey, and Abelson's pioneering test nonetheless suggest the need to assess potential habituation to rates of change in innovation contexts. The test (1) assessed objective (numerical) changes to a price rather than product innovations, which are often more ambiguous and difficult to judge; (2) asked participants to focus on rates of change in the stock's price to help detect the phenomenon; and (3) tested large differences in rates of change (differing by factors of ten), all of which may have exaggerated effects relative to any that might arise with innovations.

We therefore test for innovation reference dependence and habituation to innovations and their rates of change largely without numerical dimensions. Relative to a stronger-weaker innovation sequence, we expect a weaker-stronger sequence to improve consumer evaluations of both innovations. The weaker-stronger sequence should make (1) the stronger innovation look better compared with the earlier weaker innovation and (2) the weaker innovation look better by avoiding comparisons to an earlier stronger innovation. However, these two effects are likely to differ in size owing to loss aversion, a widespread (e.g., cross-species; see Flaherty 1996) phenomenon in which the same event (e.g., a 10% salary change) carries more psychological value/impact when it is a loss (vs. a gain) from some current or expected level (Kahneman, Knetsch, and Thaler 1990). If consumers respond to shifts from stronger to weaker innovations as losses and to shifts from weaker to stronger innovations as gains, loss aversion suggests that the former's negative effects will be larger than the latter's positive effects.

These loss-aversion expectations are consistent with research on how people judge prior series of experiences (e.g., dental office procedures, art viewings): people tend to (1) prefer improving (gains) over declining (losses) sequences and (2) weight peak and closing (recency effects) experiences more (Ariely 1998; Fredrickson and Kahneman 1993). However, Bhargave and Montgomery (2013) report that sharing experiences with others produces a primacy effect in which earlier experiences play a prominent role, such that declining

[1]We refer to "habituation" rather than "satiation," a term that sometimes arises in marketing contexts, because habituation goes beyond need states and positive experiences (e.g., habituating to war; Schöner and Thelen 2006).

sequences are sometimes preferred over improving sequences, thereby reflecting a strong first-impression effect. Such primacy effects arise from a shift in a solo experiencer's more analytical processing to a joint experiencer's more holistic processing, which focuses on assimilating later experiences with early experiences. Indeed, inducing holistic processing within solo experiencers is sufficient to eliminate recency effects and produce equal preferences for declining and improving sequences. The implication is that first-impression effects may arise when consumers first encounter products, especially if they process experiences holistically.

Reference-state, habituation, and first-impression effects pose significant challenges to iteration managers: if management introduces a strong innovation in two successive iterations or follows a product launch (itself a major innovation) with a strong initial innovation, consumers are likely to expect major innovations regularly ("innovation habituation" hereinafter) and judge subsequent average innovations harshly. For example, some critics expressed disappointment at Apple's iPad Air innovations (Marshall 2013), changes that may have been valued more had they been introduced by a company less known for game-changing innovations. Similar effects can arise from the launch of a compelling new product that, either itself or together with its early iterations, produces a strong first impression. If any such first impressions/expectations are positive (e.g., expectations of highly innovative products), they are likely to be reinforced by confirmation biases in which consumers process information in a biased fashion to see what they want or hope to see (Ha and Hoch 1989; Rabin and Schrag 1999). The mix of innovation habituation, first-impression effects, and confirmation biases suggests that initial product impressions can quickly become entrenched and resistant to change (e.g., Mann and Ferguson 2015), though sufficient disconfirmation of expectations would then risk especially harsh reactions from consumers harboring inflated expectations.

To moderate such effects, managers might consider interspersing minor innovations among major innovations to "set up" later mediocre innovations and ultimately produce more excitement. Apple's practice of introducing more minor iPhone innovations designated with the letter "S" (e.g., iPhone 3GS) before introducing more major innovations with changed model numbers (e.g., iPhone 4G) may alter reference states and their effects by (1) reducing expectations for the "S" versions and thereby reducing consumer disappointment, (2) making the new-numbered versions seem more innovative by comparison with the "S" versions, but (3) tempering the latter effect over time by higher (learned) expectations for the new-numbered versions. Interspersed minor innovations also promise to create a positive, active brand personality (Aaker 1997) by associating the brand with change and newness, which helps signal what Y&R's Brand Asset Evaluator (BAV) refers to as high "brand energy" (Mizik and Jacobson 2008, 2009).

Just as innovation sequences promise to alter consumer responses to innovations, so too does the product's advertising. Innovation frames (e.g., "redefining how you do your taxes"), hyperbole (e.g., "you'll never wash your dishes the same way"), and "teasers" (e.g., movie trailers) can moderate consumer expectations and/or cast product innovations in a more positive and exciting light. Such effects should be especially strong later in product franchises when products and/or their innovations are at greater risk of appearing stale (Sood and Drèze 2006).

Consumer comfort and stimulation. People tend to desire a mix of comfort and stimulation. By "comfort," we mean feelings of safety, security, and/or "fitting in" socially, such that comfort is generally positive. Stimulation, the excitation of the nervous system and/or mind, can be negative or positive in both quality and quantity. Annoying behavioral changes required to adapt to a new product would constitute negative stimulation, whereas excitement from a new theme park ride would be positive stimulation (unless that excitement was so intense that it turned to terror). So prominent are desires for both comfort and stimulation that people commonly juxtapose them, such as when they go out Friday night for stimulation and stay in Saturday night for comfort. Consumers then reflect their competing comfort and stimulation needs in their homes, in which some rooms focus on comfort and relaxation whereas others foster stimulation and excitement (Graham, Gosling, and Travis 2015).

If, therefore, managers hope to maximize iteration appeal, they need to balance human desires for comfort (the old) and stimulation (the new). For example, exotic product designs that consumers find difficult to categorize reduce new product acceptance, seemingly by reducing comfort (Goode, Dahl, and Moreau 2013). Mugge and Dahl (2013) further illustrate the importance of balancing comfort and stimulation in their test of standard versus exotic designs (e.g., a hair dryer shaped like a cornucopia) for products that are functionally incremental or radical. They show that whereas product design did not affect evaluations of incremental innovations, standard designs improved evaluations of radical innovations by offsetting the radical innovations' stimulation with comfort (see also Rindova and Petkova 2007).

Consumer iteration responses therefore depend on two states that sometimes work at cross purposes: comfort, which is produced largely by safety and repetition-driven generalization, and stimulation, which is produced largely by novelty and thus threatened by repetition. Generalization is a broad process in which the thoughts, feelings, and memories produced by one stimulus (e.g., a new product) carry over to, become associated with, and/or are produced by another stimulus (e.g., a later product iteration), carryover that wanes over time (Nevin, McLean, and Grace 2001). Generalization is grounded in three more specific processes: (1) classical conditioning in which feelings and experiences encountered with the prior version become associated with that version and thereafter are evoked by subsequent versions similar to the prior version (Gorn 1982; Pavlov 1957; Shimp, Stuart, and Engle 1991), (2) instrumental learning (operant conditioning) in which positive experiences and feelings (rewards) following purchase of the prior version (e.g., a car purchased three years ago) become associated with that purchase and thus increase people's chances of purchasing that offering's next iteration (see Thorndike's [1911] law of effect; Carey et al. 1976), and, (3) in contrast to the first two largely automatic and unconscious conditioning processes, elements shared by a prior version and a subsequent iteration serve as memory cues that help consumers actively process, remember, and even relive earlier product experiences through incidental and intentional cognitive learning (Biehal and Chakravarti 1983; Lane 2000).

All three aforementioned processes share one common feature: the probability/strength of generalization increases as the similarity between a prior product version and its current iteration increases (e.g., Sood and Keller 2012; Völckner and Sattler 2006). However, the same predecessor–iteration similarity that increases generalization also increases habituation and boredom. One factor that helps manage these conflicting processes is the fact that whereas habituation should generally grow over the franchise (see, e.g., McAlister's [1982] dynamic attribute satiation model of variety seeking as well as Hasegawa, Terui, and Allenby's [2012] dynamic brand satiation model), generalization from one iteration to the next should remain steady or weaken as habituation erodes the intensity of current emotional and cognitive responses that might generalize to the future. Therefore, early in a franchise when habituation is its weakest, managers may want to consider smaller, less expensive innovations to maximize comfort and generalization while limiting production costs. This is tantamount to leveraging and harvesting brand equity as a substitute for investments in more costly innovations. However, neither consumers nor the market (competitive forces) will tolerate redundancy indefinitely as boredom increases and consumers come to resent sellers for limited investments in a product they would otherwise value. Later, therefore, as habituation grows and weakens responses that might generalize to the next iteration, managers should focus more on stimulation (major innovations) and less on comfort (minor innovations) to revitalize the franchise and combat boredom. For example, although critics generally liked *Ocean's Twelve*, the initial but somewhat redundant movie sequel to *Ocean's Eleven*, they were less forgiving of the following sequel, *Ocean's Thirteen*, for resurrecting a "stagnant antihero" with "interchangeable scenarios" (Catsoulis 2007). The point, therefore, is not to abandon comfort over iterations but to supplement it with boredom-mitigating excitement.

The Scope of the RICS Framework and Its Tests

Before turning to empirical tests, we address the RICS framework's relevance to different types of products, review the framework's scope relative to the tests reported, and address the conflation to this point of innovation magnitude and valence. First, we might ask whether consumer responses to more experiential iterations such as books, films, and video games parallel responses to less experiential, more functional iterations such as computers, cars, and refrigerators. We believe that the answer is largely *yes* when more basic processes are involved but sometimes *no* when dimensions are context specific. Reference dependence and preferences for comfort and stimulation involve such basic perceptual processes (relativity) and human needs (safety and excitement) that we expect them to transcend most contexts. Classical conditioning, instrumental learning, cognitive learning, habituation, reference-state effects, and loss aversion are ubiquitous and often present across species (Flaherty 1996; Webber et al. 2015). Moreover, although products are commonly classified as experiential or functional on objective grounds, subjective consumer experiences regularly violate such classifications with symbolic and experiential dimensions of functional products (e.g., the car used in someone's first road trip with friends). Consumers sometimes become attached to products and treat them as they would relationship partners, replete with experiential dimensions (Fournier and Alvarez 2012; Park, Eisingerich, and Park 2013). They name their vehicles, swear by their lucky pens, and remain emotionally attached to laundry detergents for decades (e.g., Fournier 1998).

However, differences in the natures of functional and experiential products threaten to produce different circumstances and some variations in processes and outcomes. Changes in stories should be more prominent in experiential contexts involving narratives (e.g., films) than in nonexperiential contexts (e.g., cars), whereas changes in functionality (e.g., safety) should be more prominent in the latter. And while changes to functional products usually involve what most people would agree are improvements or innovations, changes to experiential products may be at greater risk of alienating consumers, whose tastes may differ. For example, increasing a computer's processing speed would generally be considered a positive, whereas changing a film's genre to include an action/adventure dimension may or may not be considered a positive depending on the consumer's genre preferences.

Second, although the RICS framework involves a wide range of variables, outcomes, and potential moderators and mediators, herein we focus on basic effects across multiple product classes whose experiential natures differ and use experiments and empirical models of purchase data to assess those effects in different ways (as we outline next in the distinction between innovation magnitude and valence). Specifically, we test how a product's prior innovations moderate consumer receptiveness to its current innovations (e.g., through reference dependence, habituation), leaving various RICS framework factors to future research for consideration.

Third, to simplify, we have thus far conflated the concepts of innovation magnitude (amount of change) and innovation valence (how much consumers like the change). When addressing consumer comfort and stimulation, we focus on innovation magnitude and refer to "minor" (smaller) and "major" (larger) innovations, but when we address innovation valence, we refer to "weaker" (less liked) and "stronger" (more liked) innovations. Although innovation magnitude and valence should be somewhat correlated (minor = weaker/less liked, and major = stronger/more liked), they should also be somewhat independent because consumers may love a given minor innovation yet dislike a given major innovation. It is therefore important to distinguish between innovation magnitude and valence—valence being the more important concept because it should be more closely tied to product liking and purchase. Web Appendix A summarizes how Studies 1–3 address innovation magnitude and valence to varying degrees.

Study 1

Study 1 tests the RICS framework on consumer entertainment and habituation experienced while playing an online RPS game. We chose the game product class because games regularly iterate (e.g., *Grand Theft Auto 5*) and are wildly popular. In 2014 alone, U.S. consumers spent $22.4 billion on computer/video game content, accessories, and hardware, with 51% of U.S. households owning a dedicated game console while defying gamer demographic stereotypes. Of all gamers, 44% are female and 44% are older than 36 years of age (M = 35 years; *Entertainment Software Association* 2015). Although RPS lacks the cachet of the industry's many lifelike fantasy games, we chose it because it is nonetheless well known and/or easy to learn and because its outcomes could be rigged to hold the game's win-tie-loss results virtually identical across innovation sequences (see Web Appendix B; see also Hamerman and Johar 2013).

RPS Game Overview

We review the RPS game to map the framework's predictions onto it. The game offered one innovation in Period 2 and another in Period 3 (the focal innovations and periods). The innovations were liked similarly in the aggregate in prior tests but differently across participants. The stronger innovation was then the innovation that the participant liked more, and the weaker innovation was the one the participant liked less, resulting in two innovation sequences across Periods 2 and 3 among the majority of participants who liked one innovation more than the other: weaker-stronger and stronger-weaker, after which both sequences introduced the same moderately liked innovation in Period 4.

To emulate and test different market situations, we showed half the participants innovations that accumulated across periods, remaining in all periods after their introduction (cumulative innovations) and showed the other half innovations that remained for a single period and were replaced with another innovation in the next period (noncumulative innovations). The noncumulative innovations, with their single innovations per period that differ across innovation sequences, test the hypotheses more cleanly than do the cumulative innovations, whose innovations often overlap across sequences within a given period (e.g., Periods 3 and 4 offer the same accumulating innovations; see Appendix A). The game measured experienced entertainment after each period as well as post–Period 4 outcomes such as interest in the game's (alleged) future app.

Hypotheses

Evaluation relativity suggests that introducing the stronger innovation first at Period 2 will reduce the weaker innovation's appeal at Period 3 (compared with when the weaker innovation is introduced first at Period 2) and that introducing the weaker innovation at Period 2 will increase the stronger innovation's appeal at Period 3. These same predictions apply to entertainment levels, but with one qualification: when innovations accumulate over periods (cumulative conditions), the entertainment experienced at Period 3 is also a function of Period 2's innovation, which is carried forward to Period 3, such that there may be little perceived loss or gain of innovation appeal in these conditions. Therefore, the loss-aversion-based entertainment predictions are made for and tested in the noncumulative conditions.

> H_{1a}: Relative to the weaker-stronger sequence, the stronger-weaker sequence produces less weaker-innovation liking in general and less entertainment during the weaker innovation's introduction period in the noncumulative conditions.
>
> H_{1b}: Relative to the stronger-weaker sequence, the weaker-stronger sequence produces more stronger-innovation liking in general and more entertainment during the stronger innovation's introduction period in the noncumulative conditions.
>
> H_{1c}: The effects in H_{1a} are larger than the effects in H_{1b}.

H_1's predictions then imply that the weaker-stronger sequence will produce more entertainment than the stronger-weaker sequence when aggregating across Periods 2 and 3 in the noncumulative conditions and in Period 3 in the cumulative conditions. We test innovation-sequence effects on these periods across cumulativeness conditions because in these conditions, the two innovation sequences expose consumers to the same innovations and thus differ only in innovation order (see Appendix A).

> H_2: Relative to the stronger-weaker sequence, the weaker-stronger sequence produces more entertainment in Periods 2 and 3 in the noncumulative conditions and in Period 3 in the cumulative conditions, in which innovation exposure is constant across sequences.

Both innovation sequences introduce the same moderately liked Period 4 innovation such that they share the same innovation, which should blunt any innovation-sequence effects on that period as well as later outcomes. If effects arise, however, they could be influenced by Period 3 or Period 2 as well, thereby producing three possible hypothesized patterns. First, consumer memory and unconscious conditioning effects may persist across the relatively short interval between Periods 2, 3, and 4, such that Periods 2 and 3 influence Period 4 comparably, producing similar levels of entertainment.

Second, if only the proximal (prior period) reference states have an effect, the weaker-stronger sequence with the stronger proximal reference state should reduce Period 4 entertainment levels relative to the stronger-weaker sequence with its weaker proximal reference state. Innovation progressions also predict this pattern, whereby Period 4's moderate innovation is somewhat anticlimactic when it follows a weaker-stronger sequence but less so when it follows a stronger-weaker sequence (Bhargave and Montgomery 2013).

Third, the distal reference state (Period 2) may be particularly potent because it follows the game's introduction and may then produce innovation habituation (taking for granted major innovations) or because it creates the first impressions of what the product's innovations will look like and what sorts of product experiences should be expected (Bhargave and Montgomery 2013; Mann and Ferguson 2015). Any entrenchment of such inflated expectations may then carry over to Period 4, in which it reduces the entertainment experienced (an effect potentially exaggerated by any strong negative Period 3 affect carrying over to Period 4).

H_3: If Period 4's shared innovation does not swamp innovation-sequence effects, then relative to the stronger-weaker sequence, the weaker-stronger sequence (a) performs comparably in Period 4 and on downstream outcomes if both prior periods merely function as equally weighted reference states, (b) performs worse in Period 4 and on downstream outcomes if proximal-reference-state effects and/or innovation-progression effects prevail, but (c) performs better in Period 4 and on downstream outcomes if Period 1–3 dynamics prevail (early loss aversion effects, innovation habituation, and/or more global first impressions).

Method

RPS game details. An RPS game with four 28-play periods to help instill boredom was programmed in Qualtrics. Although players thought they were playing against a computer, the computer's choices were rigged to control win-tie-loss sequences so that everyone, regardless of condition, experienced the same game outcomes (Web Appendix B), with only minor variations in the "winning-streak" conditions (described next) to produce comparable intervals of participants being ahead and behind in the game.

The RPS game manipulated innovation sequence and innovation cumulativeness orthogonally, each at two levels. Period 1 consisted of the basic RPS game while Periods 2 and 3 introduced the two focal innovations whose sequence was randomized. The winning-streak innovation rewarded players for winning streaks and punished them for losing streaks (e.g., the second win in a row would count as two wins, not one; unbeknownst to players, the maximum streak was two). The other focal innovation consisted of the computer offering banter or "trash talk" (friendly teasing) after every 14 plays (e.g., "Amazingly, you managed to achieve a tie despite your obvious human limitations"). Each innovation sequence introduced the same innovation in Period 4, a history innovation that displayed the previous five plays and outcomes. One sequence across Periods 2–4 was then streak, banter, history, while the other was banter, streak, history (see Appendix B).

Study 1 also manipulated innovation cumulativeness (noncumulative and cumulative) to test a wider range of market situations. Noncumulative innovations were introduced in one period and then dropped in the next, whereas cumulative innovations remained throughout subsequent periods. Innovation accumulations increase the comparability of the two innovation sequences' innovations, whereby both sequences offer the same innovations at Periods 3 and 4, such that we expected cumulative conditions to temper innovation-sequence effects.

After each period, participants rated how entertained they were while playing the game on three items: game liking (1 = "disliked very much," and 7 = "liked very much"), entertainment (1 = "very bored," and 7 = "very entertained"), and fun (1 = "no fun at all," and 5 = "a great deal of fun"; converted to a 1–7 scale before analyses). Following Period 4's entertainment questions, participants were asked how likely they would be to download an app of the game for their smartphone or tablet if it were priced as \$.99, \$.50, \$.25, or free (1 = "strongly inclined not to download," and 7 = "strongly inclined to download"). They also indicated how interested they would be in receiving a link to the game's next version (1 = "very uninterested," and 7 = "very interested") and how likely they would be to recommend the game to a friend (1 = "very unlikely," and "very likely"). They finally indicated age, gender, and how much they liked each innovation (1 = "disliked greatly," and 7 = "liked greatly") and how innovative they thought each innovation was (1 = "not innovative," and 5 = "very innovative").

Participants, design, and analytical approach. Three hundred sixty-eight Amazon Mechanical Turk respondents participating for modest compensation (52.2% female; average age 33.6 years) were randomly assigned to four conditions defined by the crossing of innovation cumulativeness (noncumulative, cumulative) and innovation sequence (streak-banter-history, banter-streak-history) over Periods 2–4. To validly test sequences of weaker and stronger innovations, it was necessary to account for participant heterogeneity in innovation preferences: 56.2% (207) liked streak more than banter, 22.6% (83) liked banter more than streak, and 21.2% (78) liked the two equally. We then tested innovation-sequence effects using a continuous innovation-sequence index defined as the liking of Period 3's innovation minus the liking of Period 2's innovation (we did not use perceived innovativeness because it was not highly correlated with liking and is less indicative of consumer evaluations). As the innovation-sequence index moves from negative to positive values, participants move from liking Period 2's innovation more than Period 3's innovation to liking Period 3's innovation more than Period 2's, which we hypothesize to be positively correlated with experienced entertainment. To illustrate the effects in more managerially relevant terms, we segment respondents into (1) those who like Period 2's innovation more than Period 3's, the stronger-weaker respondents ($n = 148$), and (2) those who like Period 3's innovation more than Period 2's, the weaker-stronger respondents ($n = 142$). We then report the innovation-sequence index's mixed-model tests and illustrate effects using the segment means, ignoring (in the means) the minority segment that liked the innovations identically.

Results

Innovation evaluations. Table 1 summarizes the means from Periods 2–4, cross-period differences, and loss/gain ratios from Study 1's innovation-liking and entertainment measures as well as Study 2's product interest measure (for related raw data, see Web Appendix C). Loss/gain ratios can be quite large depending on risk tolerances but are commonly in the 2–3 range, reflecting the idea that losses generally carry at least twice the psychological value of comparable gains (Kahneman et al. 1990). We expect smaller loss/gain ratios here, however, because people are judging different innovations rather than changes to a single innovation and because they are assessing things in a "noisy" game environment with win-loss sequences, strategizing, and boredom over time.

TABLE 1
Studies 1 and 2: Period-by-Period Responses, Differences, and Loss-Aversion Coefficients

Study	Outcome, Condition	Period 2–3 Innovation Sequence	P2	D1	P3	D2	P4	Loss/Gain	Overall Evaluation
Study 1	Innovation liking, overall	Stronger-weaker	5.56	−2.49	*3.07*	**1.58**	4.65	D1: **1.09**	4.43
		Weaker-stronger	*3.60*	2.29	5.89	−1.32	4.57	D2: .84	4.69
	Innovation liking, noncumulative	Stronger-weaker	5.59	−2.63	*2.96*	1.60	4.56	D1: **1.10**	4.37
		Weaker-stronger	*3.42*	2.40	5.82	−1.62	4.20	D2: 1.01	4.48
	Innovation liking, cumulative	Stronger-weaker	5.53	−2.35	*3.18*	1.56	4.74	D1: **1.06**	4.48
		Weaker-stronger	*3.75*	2.21	5.96	−1.08	4.88	D2: .69	4.86
	Entertainment, overall	Stronger-weaker	.18	−.65	*−.47*	**.03**	−.44	D1: **1.20**	−.24
		Weaker-stronger	*−.31*	.54	.23	−.45	−.22	D2: 15.00	−.10
	Entertainment, noncumulative	Stronger-weaker	.09	−.85	*−.76*	.12	−.64	D1: **1.35**	−.44
		Weaker-stronger	*−.28*	.63	.35	−.79	−.44	D2: 6.58	−.12
	Entertainment, cumulative	Stronger-weaker	.27	−.43	*−.16*	−.07	−.23	D1: **.93**	−.04
		Weaker-stronger	*−.33*	.46	.13	−.16	−.03	D2: 2.29	−.08
Study 2	Product interest	Weaker-weaker	*3.76*	−.95	*2.81*	−.39	*2.42*		3.00
		Stronger-weaker	5.22	−2.27	*2.95*	−1.22	*1.73*	D1: **2.01**	3.30
		Weaker-stronger	*4.21*	1.13	5.34	−2.27	*3.07*		4.21

Notes: P2 = Period 2; P3 = Period 3; P4 = Period 4; D1 = Difference 1 (P3 – P2); D2 = Difference 2 (P4 – P3). Entertainment levels reflect differences from Period 1. Values in italics indicate responses to, or during, each study's weakest innovations (e.g., participants rated Study 1's weaker innovation at 3.60 when they saw it at Period 2 but rated it 3.07 at Period 3 after seeing the stronger innovation at Period 2). We calculate loss/gain ratios as the unsigned ratio of the change associated with introducing a weaker innovation over the change associated with introducing a stronger innovation—that is, D1's top row over bottom row, and D2's bottom row over top row in Study 1, whose Period 4 innovation was generally liked more than the weaker innovation and less than the stronger innovation. Boldfaced values in the D2 column highlight a Study 1 incongruity that may have arisen from innovation-habituation/first-impression effects at Periods 1 and 2. Boldfaced loss/gain ratios highlight values calculated for the focal introduction period, whose innovation loss/gain perceptions cannot be influenced by prior innovations.

We subjected innovation-liking ratings to an innovation sequence × innovation cumulativeness mixed general linear model whose results are consistent with the RICS framework. As Table 1's diagonal Period 2–3 comparisons show, and consistent with H_{1a}, the stronger-weaker sequence produced significantly less weaker-innovation liking than did the weaker-stronger sequence (M = 3.07 and M = 3.60, respectively; innovation sequence index F(1, 364) = 4.42, p = .036). However, contrary to H_{1b}, the weaker-stronger sequence produced only directionally more stronger-innovation liking than did the stronger-weaker sequence (M = 5.89 and M = 5.56, respectively; F(1, 364) = .57, p = .45). The finding that moving from a stronger to a weaker innovation produced a larger effect than moving from a weaker to a stronger innovation is consistent with loss aversion (H_{1c}), despite Table 1's small loss/gain ratios (overall = 1.09). A direct test of Period 2–3 differences (within Table 1's Rows 1 and 2) shows that moving from stronger to weaker innovations reduced innovation evaluations marginally more than moving from weaker to stronger innovations increased them (M = −2.49 and M = 2.29, respectively; F(1, 364) = 2.75, p = .098).

To assess possible effects of innovation sequences on later innovations, we turn to Period 4's history innovation in which, as expected, the innovation-sequence effect was relatively weak but stronger in the noncumulative conditions given their cleaner tests. Within those conditions, consumers in the stronger-weaker sequence (with a weaker Period 3 innovation) liked Period 4's history innovation more than those in the weaker-stronger sequence (with a stronger Period 3 innovation), though only directionally so (M = 4.56 and M = 4.20, respectively; F(1, 364) = 1.96, p = .16). This nonsignificance suggests that both (H_{3a}; or neither, which seems unlikely) of the prior periods influenced Period 4 by serving as comparably impactful reference states. However, the directionality and relatively low p-value consistent with impact from Period 3 implicate effects from both prior periods but with the proximal Period 3 exerting more influence than the distal and countervailing Period 2 (H_{3b}). This result would resonate with multiperiod reference-price formation in which multiple periods contribute but recent ones more so (Briesch et al. 1997).

Entertainment experienced. We created a composite entertainment score for each period by averaging the liking, bored/entertained, and fun measures (alphas from .93 to .95; see Web Appendix C). Consistent with H_1, the data again implicate loss aversion's influence, though, as we expected, innovation-sequence effects on periods associated with a given innovation (weaker or stronger) during Periods 2 and 3 surfaced only in the noncumulative conditions. Within the noncumulative conditions, and consistent with H_{1a}, the stronger-weaker (relative to the weaker-stronger) sequence produced significantly less entertainment during the weaker innovation's introduction period (M = −.76 and M = −.28, respectively; $F(1, 364) = 5.47$, $p = .02$); however, contrary to H_{1b}, the weaker-stronger sequence produced only directionally more entertainment during the stronger innovation's introduction period (M = .35 and M = .09, respectively; $F(1, 364) = 1.14$, $p = .29$). These asymmetric effects are consistent with the 1.35 loss/gain ratio (Table 1), though lost innovation appeal across Periods 2 and 3 (stronger-weaker) reduced entertainment (M = −.85) only directionally more than gained innovation appeal (weaker-stronger) increased it (M = .63); $F(1, 325) = 1.81$, $p = .18$).

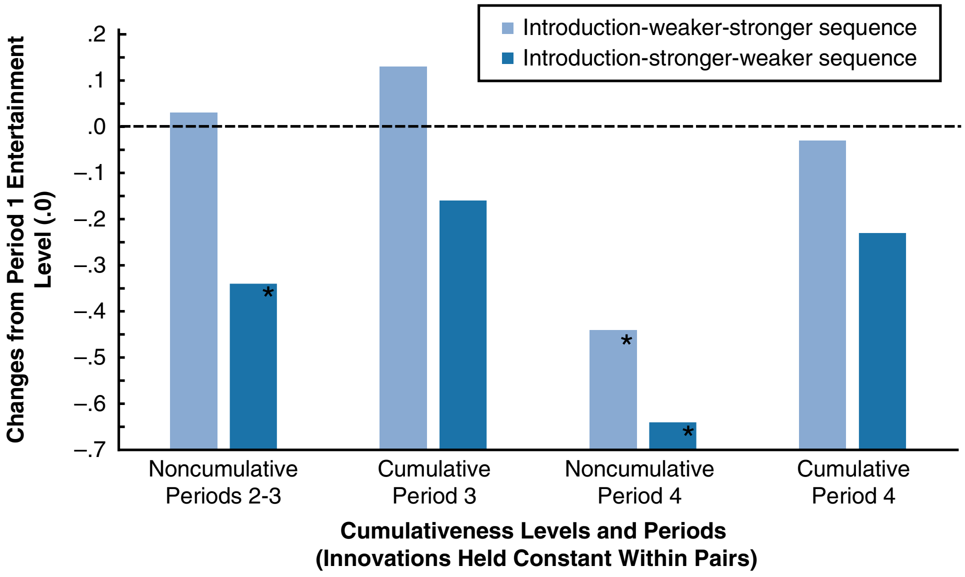
To test H_2, the focal period's entertainment differences from Period 1's baseline level were subjected to an innovation cumulativeness × innovation sequence mixed general linear model during the focal innovation periods when innovation exposure was constant across innovation sequences (noncumulative Periods 2 and 3 and cumulative Period 3; see Appendix A). Consistent with H_2, the only significant effect was that of the weaker-stronger sequence producing more entertainment than the stronger-weaker sequence (M = .09 and M = −.25, respectively; $F(1, 364) = 4.32$, $p = .038$; see Figure 2). Whereas the weaker-stronger sequence preserved (and slightly improved) Period 1's initial entertainment level, the stronger-weaker sequence sacrificed a significant portion of it ($t(148) = -3.21$, $p = .002$).

To assess potential innovation-sequence effects on the entertainment experienced from later (common) innovations (H_3), we turn to Period 4. The weaker-stronger sequence failed to produce significantly more Period 4 entertainment than the stronger-weaker sequence ($F(1, 364) = .95$, $p = .33$), though it did so directionally and regardless of innovation accumulations (M = −.22 vs. M = −.44). This nonsignificance may have arisen from the innovation shared across sequences or from the prior two innovations exerting similar influences (H_{3a}), which the study's single experimental session may have encouraged. Across Periods 3 and 4, therefore, and relative to the stronger-weaker sequence, the weaker-stronger sequence reduced (directionally) innovation liking (M = 4.56 and M = 4.20, respectively) while increasing (directionally) entertainment, a divergence that may merit future consideration.

Further examining these patterns reveals another potentially telling anomaly. When assessing the correspondence between innovation-liking changes and entertainment changes across sequential pairs of periods in Table 1, we find that sizable entertainment changes generally correspond to sizable innovation-liking changes, with one notable exception highlighted by the boldfaced values in Table 1's D2 column. Within the stronger-weaker sequence, moving from Period 3 to Period 4 significantly improved innovation liking (M = 3.07 and M = 4.65, respectively; $F(1, 146) = 76.91$, $p < .001$) but failed to improve the consumer's level of entertainment (M = −.47 and M = −.44, respectively; $F(1, 146) = .10$, $p < .75$). This incongruity implicates factors other than simple reference dependence, which would propose similar effects across measures. Such potential factors include innovation habituation and/or first-impression effects that carried over from Periods 2–4, effects that may have influenced (more affective) game experiences more so than (more cognitive) innovation judgments.

Downstream outcomes. We tested innovation-sequence effects on downstream outcomes with mixed linear models using Period 1's entertainment level as covariate. Innovation sequences failed to significantly alter purchase intentions at the \$.99, \$.50, or \$.25 price points (ps > .17). However, respondents exhibited a trio of downstream effects approaching statistical significance in which the weaker-stronger

FIGURE 2
Study 1: Innovation-Sequence Effects on Changes in Entertainment Level from Period 1



Notes: The asterisk denotes statistically significant entertainment loss relative to Period 1 (dashed line).

(relative to the stronger-weaker) participants were more interested in (1) acquiring the game's app when it was free (M = 5.02 vs. M = 4.68; F(1, 363) = 3.38, p = .067), (2) receiving a link to the game's next version (M = 4.49 vs. M = 4.16; F(1, 363) = 3.10, p = .079), and (3) recommending the game to a friend (M = 4.24 vs. M = 4.10; F(1, 363) = 2.66, p = .104), outcomes that collectively produced a significant innovation-sequence main effect (multivariate analysis of covariance F(1, 363) = 4.47, p = .035).

Discussion

Consistent with the RICS framework, the weaker-stronger sequence produced more innovation liking and entertainment across Periods 2–3 than did the stronger-weaker sequence. This finding provides direct evidence that earlier innovations create reference states against which subsequent innovations and experiences are judged while illustrating how managers can leverage innovation sequences as well as their reference dependence and loss aversion to improve product appeal.

Moreover, indirect evidence from Period 4 suggests that the expectations produced by offering two major innovations in a row (the game and initial strong innovation) or near the product's launch may be able to inflate product expectations, which then reduce the entertainment experienced from subsequent weaker innovations by swamping what would otherwise be expected from a given period's innovation and proximal (prior-period) reference state. Any such innovation-habituation and/or first-impression effects should caution managers about the downsides of unusually positive experiences offered repeatedly or early in a product's history, especially when there are no competitive pressures encouraging consistently outstanding innovations.

Innovation sequences may then help firms manage consumer expectations, product experiences, and possibly downstream outcomes such as word of mouth, even when the innovations introduced are identical across sequences. Although Study 1 assesses only innovation sequences over fixed time periods, the results imply potential benefits of interspersing weaker innovations between otherwise planned periods. For example, if managers anticipate introducing stronger innovations at Periods 2 and 3, they may be able to mitigate expectation inflation by introducing a weaker innovation midway through Period 2.

Study 2

Study 1 reports innovation-sequence effects on innovation evaluations and experienced entertainment while offering direct evidence of reference dependence and indirect evidence of potential innovation-habituation (to stronger innovations) and/or first-impression effects. However, in Study 1 we assess only a single product class and vary innovation appeal relatively little, which threatens generalizability and risks blunting innovation-sequence effects. Study 2, therefore, focuses on noncumulative innovations to simplify and addresses three product classes using a different (scenario-based) method with more dramatic innovation-quality differences while adding a weaker-innovations-only sequence to directly test habituation to such innovations. If introducing only weaker innovations produces habituation, that sequence will exhibit diminishing negative returns to the innovations and may ultimately produce as much, and perhaps even more, product interest than sequences with innovations.

> H_4: A weaker-weaker sequence (a) exhibits diminishing negative returns to the innovations over periods and (b) produces as much or more product interest as sequences offering innovations.

Method

Participants and design. Of 46 master's students who were e-mailed a survey in a business school, 30 participated (no compensation). Participants evaluated three scenarios, each involving an original product from one of three product classes (film, music, or tablet computer) and three iterations with noncumulative innovations (except in tablets, for which innovation accumulations were trivial and produced patterns comparable to film and music's noncumulative innovations). In the weaker-weaker sequence, products were largely repetitive across Periods 2–4, offering only trivial innovations. The stronger-weaker and weaker-stronger sequences deviated only by offering detailed substantive innovations at Periods 2 and 3, respectively (Web Appendix D). Period 4's innovation was then always trivial and less likely to eliminate innovation-sequence effects in that period (relative to Study 1's more novel Period 4 innovation). Each participant saw each product class and innovation sequence once in combination, with no repeats (e.g., a film with the weaker-weaker sequence, a tablet with the weaker-stronger sequence, and music with the stronger-weaker sequence). Innovation sequence, period, and product class were varied within subject, and sequence-product combinations (booklets) were varied between subjects.

Procedure. Using music as an example, participants read the following: "Imagine that you purchase a new band's album this summer and that you like it. The band has a unique sound, most songs have good rhythms and melodies, and the lyrics are not bad. When your friends ask you to rate the album, you rate it 5.5 out of 7." We used liking of the initial product offering to emulate marketplace conditions in which consumers would probably consider trying the product's iteration. Participants then imagined that two years had now passed and the band was releasing its second album, one said to be a quality album and described as similar or different on the dimensions of overall sound, melodies and rhythms, and lyrics (Web Appendix D). To increase task variety and realism of interproduct intervals, original liking was listed at 4.25/5.0 stars and the interproduct interval at 1.5 years for films and at 7.5/9.0 and 1 year for computer tablets. To enhance realism in the durable product scenario (tablet computer), participants were told that a respectable computer manufacturer was offering a new dual-screen computer tablet that was hinged in the middle and closed like a "clamshell" (a description of Sony's then-planned S2 tablet, which had been announced only a few weeks before this test and was thus still obscure). Participants then saw a product description and photo (Web Appendix D) without manufacturer identification.

Participants expressed product interest on two measures for each iteration. For the film and music product classes in which consumers commonly purchase multiple products, participants rated their likelihood of purchasing the iteration (1 = "very unlikely," and 7 = "very likely") and their expected level of boredom if consuming it (1 = "not bored," and 4 = "very bored"). The tablet computer, however, was different because consumers typically have only one at a time; thus, purchasing such a product depends on many factors, including current ownership of such a product, need for the product, how often a person is willing to replace a product that is functioning adequately, and the product's brand name (e.g., "the tablet is not made by Apple"). Purchase intention was then considered too noisy a measure for the tablet, such that participants rated each tablet iteration on two other measures thought to (1) reflect how consumers commonly evaluate product innovations, even those they do not purchase; (2) indicate product interest and boredom; and (3) provide variety in measures/tasks across the participants' scenarios to reduce carryover effects. The two measures were coolness (1 = "normal," and 5 = "very cool") and innovativeness (1 = "not innovative," and 5 = "very innovative"). To simplify and enhance readability, we made scales comparable across measures and experimental conditions, which did not alter the results. We put all scores on 1–7 scales, reverse-coded the boredom scales, created a product interest composite score by averaging each iteration's two scores, mean-centered those scores within each product category to equate product-category means (tablets had been slightly lower), and then returned means to positive values by adding 3.5.

Results

We subjected product interest scores to an innovation sequence × period × booklet mixed-model multivariate analysis of variance to provide an error term for the planned comparisons required to test hypotheses. The model returned the expected innovation sequence × period interaction ($F(4, 96) = 28.87$, $p < .001$). We then tested H_1–H_4 on Study 2's product-interest scores (the first three hypotheses having been originally specified for Study 1's entertainment levels).

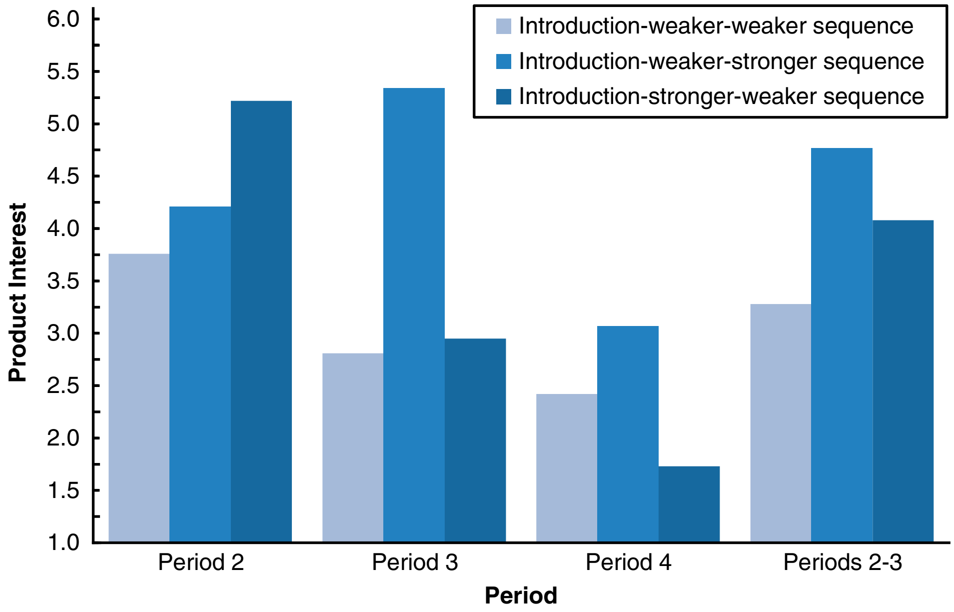
The product interest scores in Periods 2 and 3 replicate Study 1's innovation-liking pattern and again evidence loss aversion. As Table 1's diagonal Period 2–3 comparisons show, introducing the stronger innovation at Period 2 significantly reduced the weaker innovation's product interest from 4.21 (weaker-stronger) to 2.95 (stronger-weaker; $t(96) = 5.34$, $p < .001$), thereby supporting H_{1a}. However, introducing the weaker innovation at Period 2 had virtually no effect on the stronger innovation's product interest, increasing it from 5.22 to only 5.34 ($p = .61$), in contrast to H_{1b} but consistent with loss aversion. The loss/gain ratio of 2.01 is much larger than in Study 1, perhaps due to the greater variance in innovation quality, indicating that moving from a stronger to a weaker innovation reduced product interest 2.01 times more than moving from a weaker to stronger innovation improved it ($t(96) = 4.83$, $p < .001$; in support of H_{1c}).

To test H_2, we examined the aggregate product interest scores across Periods 2 and 3. As Figure 3 and Web Appendix C illustrate, the weaker-stronger sequence produced more product interest than did the stronger-weaker sequence across these periods (M = 4.77 vs. M = 4.08, respectively; $t(96) = 2.92$, $p = .004$). The results support H_2's prediction that weaker-stronger sequences benefit from distributing their stronger innovations across periods or from interspersing weaker innovations among their stronger innovations.

The weaker-stronger sequence had an even larger product-interest advantage over the stronger-weaker sequence in Period 4 (M = 3.07 vs. M = 1.73; $t(96) = 5.67$, $p < .001$). This finding supports H_{3c}'s prediction of weaker-stronger superiority arising from either (1) early loss aversion carrying over from the opening periods or (2) some mix of innovation-habituation/first-impression effects that, in the stronger-weaker sequence, produced inflated expectations that spanned periods and made subsequent innovations look bad by comparison, possibly producing strong negative affect along the way. The means, however, support loss-aversion carryover more than the other possibilities. Moving from the stronger to the weaker innovation across Periods 2 and 3 (stronger-weaker sequence) reduced product interest from 5.22 to 2.95, or 2.27 rating points. If innovation habituation holds, the stronger-to-weaker drop should be smaller across Periods 3 and 4 (in the weaker-stronger sequence), whereby Period 2's weaker innovation tempers what would otherwise be expectation inflation arising from the game's introduction and an initial stronger innovation (found in the stronger-weaker sequence). This, however, was not the case, as moving from stronger to weaker innovations across Periods 3 and 4 produced an identical product-interest drop of 2.27 points (from 5.34 to 3.07). In Study 2, therefore, the weaker-stronger sequence outperformed the stronger-weaker sequence in Period 4 due to a combination of early loss aversion and a weaker-stronger sequence that involved a gain and a loss relative to Period 2's initial innovation, whereas the stronger-weaker sequence involved two losses.

Finally, we test H_4's predicted habituation to rates of innovation by comparing Figure 3's slopes. In the stronger-weaker condition, the Period 3–4 product-interest drop of 1.22 (2.95 − 1.73) is 53.7% of the Period 2–3 drop of 2.27 (5.22 − 2.95). However, the reduction in negative returns was larger in the weaker-innovations-only condition, in which the Period 3–4 drop of .39 (2.81 − 2.42) was only 41.1% of the Period 2–3 drop of .95 (3.76 − 2.81), thereby evidencing diminishing marginal returns. Moreover, even though both of these sequences offered the same weaker innovations in Periods 3 and 4, and even though the two sequences produced comparable product-interest levels in Period 3 (stronger-weaker = 2.95, weaker-weaker = 2.81), the weaker-weaker .39 product-interest drop across Periods 3 and 4 (2.81 − 2.42; $t(96) = 1.65$, $p = .10$) was just 32% of the stronger-weaker sequence's drop of 1.22 points (2.95 − 1.73; $t(96) = 5.17$, $p < .001$). The upshot is that, consistent with H_{4a}, the weaker-weaker sequence exhibited habituation to weaker innovations, which, consistent with H_{4b}, enabled it to outperform the stronger-weaker sequence in Period 4 despite offering fewer innovations (M = 2.42 vs. M = 1.73, respectively; $t(96) = 2.92$, $p = .004$).

FIGURE 3
Study 2: Innovation-Sequence Effects on Product Interest by Period



For a more managerial perspective, we created sales estimates using the "top-box" (6s and 7s) proportions from the raw purchase intention measure in the film and music categories. Across Periods 2–4, respectively, the weaker-weaker sequence produced 50%, 17%, and 11% shares; the stronger-weaker sequence produced 85%, 35%, and 0% shares; and the weaker-stronger sequence produced 59%, 77%, and 23% shares. Relative to the stronger-weaker sequence, the weaker-stronger sequence's initial Period 2 disadvantage becomes an even larger Period 3 advantage, thereby producing a net positive effect. To illustrate further, when estimating sales from 100 consumers who have the chance to purchase the product over Periods 2–4 (300 possible purchases), introducing the stronger innovation first produces an estimated 110 purchases, whereas introducing the weaker innovation first produces 159 purchases—that is, 44% (49/110) more estimated sales from merely offering the same innovations in a different order.

Discussion

Study 2 extends Study 1 with three product classes and a scenario-based method that manipulates innovation magnitude more dramatically while testing innovation habituation with a weaker-innovations-only sequence. Across product classes, the weaker-stronger sequence produced more product interest than did the stronger-weaker sequence, largely due to loss aversion and because opening with the stronger innovation framed the subsequent periods as losses. The impact of reference states and habituation moderated by innovation sequences was evidenced further by the finding that a weaker-innovations-only sequence outperformed a more innovative stronger-weaker sequence in the closing period, in which both sequences offered weak innovations.

Two features of Study 2 fell short of expectations. First, introducing the weaker innovation at Period 2 failed to mitigate the product-interest drop when moving from the stronger to weaker innovation across Periods 3 and 4. Although this may reflect a general lack of effects of prior periods, another possibility is that features of the relatively constrained experiment impaired the test. For example, the weaker innovation was unusually weak, enough so that it may have been discounted and not then factored into the reference state as much as a more substantial innovation might have been (for a parallel process with large price discounts, see Gupta and Cooper 1992). In addition, the opening weaker-innovation reference state existed only momentarily rather than being consumed for some time, which again may have undermined an earlier period's reference-state contribution that might be larger in the marketplace.

Second, and consistent with Study 1, whereas we expected the weaker and stronger innovations to perform similarly at Period 2 given that this period consisted of the first iteration of something well liked, this was not the case, as the stronger innovation performed better ($M = 5.22$ vs. $M = 4.21$; $t(96) = 4.28$, $p < .001$). Although the difference in innovation quality doubtless explains much of this result, the experimental methods in Studies 1 and 2 also may have contributed. Using films as an example, whereas viewing a fairly redundant initial sequel at the theater might still be somewhat enjoyable, Study 2 described the sequel as making only a few minor adjustments to the original, which may have deflated evaluations relative to an actual product experience. In part to remedy this shortcoming while testing the RICS framework more broadly on real-world data, in Study 3 we assess sales data from film iterations/sequels.

Study 3

Study 3 extends Studies 1 and 2 by assessing movie box office sales, which we selected for three reasons. First, films are popular around the world. Second, films consist of numerous elements that producers and directors enlist to produce comfort and stimulation (e.g., genre, cast, screenplay). And third, films have recently become the subject of opposing prescriptions for how to maximize iteration success, a controversy to which the RICS framework speaks. Whereas Hennig-Thurau et al. (2009) prescribe minor innovations to leverage generalization and enhance comfort, Sood and Drèze (2006) prescribe major innovations to leverage stimulation and blunt habituation, with both studies supporting their prescriptions with empirical results.

According to RICS, however, both prescriptions may be correct, but at different points in a film's franchise sequence given that Hennig-Thurau (2009) assessed only initial sequels, whereas Sood and Drèze (2006) included both initial and downstream sequels. Early sequels should benefit from the franchise's novelty, brand equity (Keller 2002), and first-impression effects (Mann and Ferguson 2015) because consumers are excited about the franchise and try to relive their earlier experience, which provides comfort by way of being similar to the predecessor film. Here, major innovations threaten to interrupt those relived moments with unwanted changes to the cast, genre, and so on—changes that disconfirm sequel expectations and disrupt generalization from the predecessor to the current film due to cross-film dissimilarities. Later in the franchise, however, as novelty wanes and boredom grows (Thompson 2009), minor innovations may be unable to overcome boredom with the franchise, such that major innovations are needed to reinvigorate the franchise with stimulation, mystery, and excitement. The implication is that minor innovations should be more effective early in a franchise, when generalization implies little need for change, whereas major innovations should be more effective later in the franchise, when habituation implies significant need for change.

> H_5: Minor innovations (increasing comfort) benefit earlier films in a franchise more than later films, whereas major innovations (increasing stimulation) benefit later films more than earlier films.

Likewise, sequel patronage is more likely early in a franchise's history regardless of promotional efforts given the many other positive effects still at work in the early phases (e.g., generalization, first impressions, novelty, brand equity). However, as those positive effects wane and boredom grows later in the franchise, enticing sequel patronage should become more challenging, such that the impact of advertising, with its persuasive appeals and signals of quality, should be greater (Basuroy, Desai, and Talukdar 2006, Kirmani and Rao 2000).

> H_6: Advertising helps later film sequels more than earlier film sequels.

Finally, because time affects both habituation and generalization, it is likely to play a role in iteration success. Specifying the effect a priori, however, is difficult because it depends on time's relative impact on habituation and generalization effects, which is not obvious. For example, longer between-iteration intervals will improve iteration success if they erode negative habituation effects more than positive generalization effects, though the opposite could result as well. Likewise, it is not clear how the effect of longer between-iteration intervals might change across phases in the product franchise. We therefore test the main effect of time interval and its interaction with serial position (a film's position order within the franchise) on an exploratory basis.[2]

Data

Study 3 tests H_5–H_6 on sales data from parent films and their iterations/sequels. We identified 92 movie franchises from BoxOfficeMojo.com and collected information for the films in each franchise (up to five sequels). Because we are interested in earlier versus later iterations within a franchise, we included up to six films in a franchise but not more (very few franchises went beyond six such that those that did risked atypicality/nonrepresentativeness). We identified 341 films spanning 50 years, from *Psycho* (1960) to *X-Men 3* (2010). We created a large, enriched database by (1) purchasing (from BaselineResearch.com) information on the selected titles and (2) researching and integrating complementary information from various websites (IMDb.com, BoxOfficeMojo.com, The-Numbers.com, and RottenTomatoes.com). The data ultimately included information on each film's quality ratings (professional critics and the audience), budget, and advertising costs as well as dimensions such as the film's genre, cast, number of opening screens, studios, director, and so on (see Appendix C).

Dependent measures. The two dependent measures were U.S. box-office sales (Revenue) and return on investment (ROI) operationalized as sales divided by budget plus advertising expenses (Karniouchina, Carson, and Moore 2010). We adjusted all revenue, budget, and advertising numbers by the consumer price index (CPI) factor relative to 2010 dollars (the latest year in the sample).

Predictors. To test serial position effects (a film's position order within the franchise), films were numbered from 0 (original film) to as many as 5 (fifth sequel) within each franchise. Seven dimensions on which films made changes were coded: star cast, genre, Motion Picture Association of America (MPAA) rating, studio, storyline, director, and title. Each dimension was coded as 0 (no change relative to the predecessor film) or 1 (change; titles coded as 0 if only a number was added or increased), then summed to create the Innovation variable (Appendix C), which operationalized innovation magnitude ranging from minor (a few innovations) to major (many innovations). Robustness checks with different measures of changes in (and quality of) the star cast, genres, and studios produced the same results (Web Appendix E). We documented and tested Advertising expenditures and between-iteration time intervals measured in days (Time Interval).

[2]We are grateful to an anonymous reviewer for raising this issue.

Control variables. In keeping with prior film studies (e.g., Hennig-Thurau et al. 2009), we included several control variables to reduce error and improve estimates: the film's (1) screens (Screens), (2) CPI-adjusted production and advertising expenses (Budget), (3) quality (Professional Rating and Audience Rating), (4) metrics for Competition and Season, (5) MPAA rating (R, G/PG), (6) action-adventure genre (Action-Adventure),[3] and (7) year of release (Release Year).

Analyses

Regression model. Descriptive statistics appear in Web Appendix F, and correlations are in Web Appendix G. The unit of analysis is a movie (i) and franchise (f) combination. The revenue (or ROI) of movie i of franchise f is given by

$$\begin{aligned}
\text{Ln}(\text{Revenue}_{if}\,\text{or}\,\text{ROI}_{if}) = \alpha_0 &+ \beta_1(\text{Innovation}_{if}) \\
&+ \beta_2(\text{Advertising}_{if}) \\
&+ \beta_3(\text{Time Interval}_{if}) \\
&+ \beta_4(\text{Serial Position}_{if}) \\
&+ \beta_5(\text{Innovation}_{if}) \times (\text{Serial Position}_{if}) \\
&+ \beta_6(\text{Advertising}_{if}) \times (\text{Serial Position}_{if}) \\
&+ \beta_7(\text{Time Interval}_{if}) \times (\text{Serial Position}_{if}) \\
&+ \beta_8(\text{Screens}_{if}) + \beta_9(\text{Budget}_{if}) \\
&+ \beta_{10}(\text{Professional Rating}_{if}) \\
&+ \beta_{11}(\text{Audience Rating}_{if}) \\
&+ \beta_{12}(\text{Competition}_{if}) \\
&+ \beta_{13}(\text{Season}_{if}) \\
&+ \beta_{14}(\text{R-Rating}_{if}) \\
&+ \beta_{15}(\text{G/PG-Rating}_{if}) \\
&+ \beta_{16}(\text{Action-Adventure}_{if}) \\
&+ \beta_{17}(\text{Release-Year}_{if}) + \varepsilon_{if}
\end{aligned}$$

Endogeneity, estimation, and diagnostics. Web Appendix E describes the instrumental variable/generalized method of moments estimation techniques used to handle potential endogeneity of screens, innovations, and budget as well as the possibility of correlated error terms for each film across a franchise. It also reports diagnostic checks for heteroskedasticity, endogeneity, and the relevance of chosen instruments.

Results

Hypothesis tests. As Table 2 shows, the positive innovation × serial position interaction on revenues ($\beta = .16$, $p = .02$) and ROI ($\beta = .19$, $p = .01$) supports H_5's prediction that major innovations help later iterations more than earlier iterations, whereas minor innovations help earlier iterations more than later iterations. Moreover, the positive advertising × serial-position interaction ($\beta = .007$, $p = .003$) and ROI ($\beta = .006$, $p = .06$) support H_6's prediction that advertising helps later iterations more than earlier iterations. Finally, longer between-iteration time intervals improved iteration revenues significantly ($\beta = .0004$, $p < .0001$) and ROI directionally ($p = .14$), but their effects on revenues were reversed among later innovations (i.e., shorter intervals worked better for later than earlier iterations; serial-position interaction $\beta = -.00009$, $p = .06$).[4]

Simulation/scenario analyses. To illustrate Study 3's implications for film sequel performance in different situations, we enlisted Table 2's results to simulate sales of an average sequel changing its configuration (from zero to seven) over its lifetime (first to fifth sequel). The average or baseline sequel is defined as a PG-rated/action-adventure sequel released in the first week of September 2010 and one year after the predecessor film, distributed over 2,240 screens and competing with six films, with a $59 million budget and $23 million marketing expenses, and rated 3.25 and 3.52 by professional critics and the general audience, respectively (1–5 scale).

As Figure 4's simulation results illustrate, increasing innovation magnitude (lighter to darker bars) tends to hurt earlier sequels but help later sequels. For example, an average first sequel that makes no changes is predicted to earn approximately $25 million in revenues, whereas the same sequel offering seven innovations is predicted to earn roughly $3 million. For the third sequel, level of innovation has little effect, although the effect is large and positive on the fourth and fifth sequels. The fifth sequel with no changes is predicted to earn approximately $2 million at the box office, whereas the same sequel with seven innovations is predicted to earn approximately $26 million.

To illustrate, consider the *Alien* franchise and its first three sequels (*Aliens, Alien 3*, and *Alien Resurrected*). These sequels earned an inflation-adjusted $333 million in revenues after making five, four, and five changes, respectively, to their formulations. Table 2's model mirrors this occurrence by predicting $324 million in revenues from such changes. However, if the franchise had made one less innovation in the first sequel (for example, if it had made four, four, and five changes), the model predicts a $61 million revenue increase to $385 million. As another example, consider the *Free Willy* franchise and its first two sequels (*Free Willy 2: The Adventure Home* and *Free Willy 3: The Rescue*), which earned an inflation-adjusted $50 million at the box office after making six and five innovations, respectively. Consistent with this, Table 2's model predicts that the two sequels would have made $45 million at the box office with that innovation sequence but that they would have made $56 million had the filmmakers reversed that sequence (five followed by six innovations).

Control variables. An analysis of the control variables shows that most have the expected signs. For example, ratings from professional critics and the general audience positively affect revenues and ROI (e.g., Basuroy, Chatterjee, and Ravid 2003), and the screen coefficients are positive and significant as well (e.g., Basuroy et al. 2003; Eliashberg and Shugan 1997). Although the budget coefficient in the revenue

[3]We thank an anonymous reviewer for this suggestion, because action-adventure films are easier to serialize than others.

[4]Using logs for the dependent measures plus days for the time interval produces especially small coefficients that should not be taken to indicate small effects. For example, the –.00009 interaction coefficient means that delaying the first sequel's release by one year is predicted to increase its sales by 12%, whereas delaying the third sequel's release by one year is predicted to increase its sales by less than half that relative amount (roughly 5%).

TABLE 2
Study 3: Instrumental Variables (Generalized Method of Moments) Regression

	Revenue Model: DV = Log_e(Revenue)				ROI Model: DV = Log_e(ROI)			
Variable	Coefficient	Robust SE	z	p	Coefficient	Robust SE	z	p
Innovation	–.4389	.1529	–2.87	.00	–.5042	.1698	–2.97	.00
Advertising	–.0016	.0079	–.21	.84	–.0137	.0072	–1.90	.06
Time interval	.0004	.0001	2.86	.00	.0002	.0001	1.47	.14
Serial position (SP)	–.7176	.2702	–2.66	.00	–.9167	.3096	–2.96	.00
Innovation × SP	.1575	.0681	2.31	.02	.1934	.0782	2.47	.01
Advertising × SP	.0068	.0032	2.12	.03	.0065	.0034	1.88	.06
Time interval × SP	–.00009	.00004	–1.89	.06	–.0000	.0000	–1.12	.26
Screens	.0018	.0001	9.44	.00	.0014	.0002	7.28	.00
Budget	–.0097	.0046	–2.09	.04	–.0143	.0043	–3.31	.00
Professional rating	.4768	.2141	2.23	.03	.8162	.2108	3.87	.00
Audience rating	.6310	.2597	2.43	.01	.0893	.2780	.32	.74
Competition	–.0067	.0203	–.33	.74	.0256	.0228	1.12	.26
Season	.0928	.3109	.30	.76	.2875	.3185	.90	.37
R-rating	.0274	.1222	.22	.82	.0596	.1231	.48	.63
G/PG-rating	–.0054	.1227	–.04	.96	.0474	.1235	.38	.70
Action-adventure	.1794	.1492	1.20	.23	–.1486	.1396	–1.06	.29
Release year	–.1368	.0154	–8.88	.00	–.1427	.0179	–7.94	.00
Constant	271.25	30.59	8.87	.00	281.94	35.82	7.87	.00

Notes: DV = dependent variable. Italicized terms test H_5–H_6. The revenue model is estimated on 199 observations with 83 film franchises (Wald χ^2 = 856.78, R^2 = .77), and the ROI model is estimated on 192 observations with 83 film franchises (Wald χ^2 = 270.10, R^2 = .59).

model is negative and thus contrary to typical results (e.g., Ravid 1999), this may be due to our sample of only franchise films whose typical pattern over iterations is monotonically increasing costs with monotonically decreasing revenues. As the *Wall Street Journal* reports, "While audiences sometimes decline over several sequels, costs such as actors' salaries inevitably escalate" (Dodes 2012).

Discussion

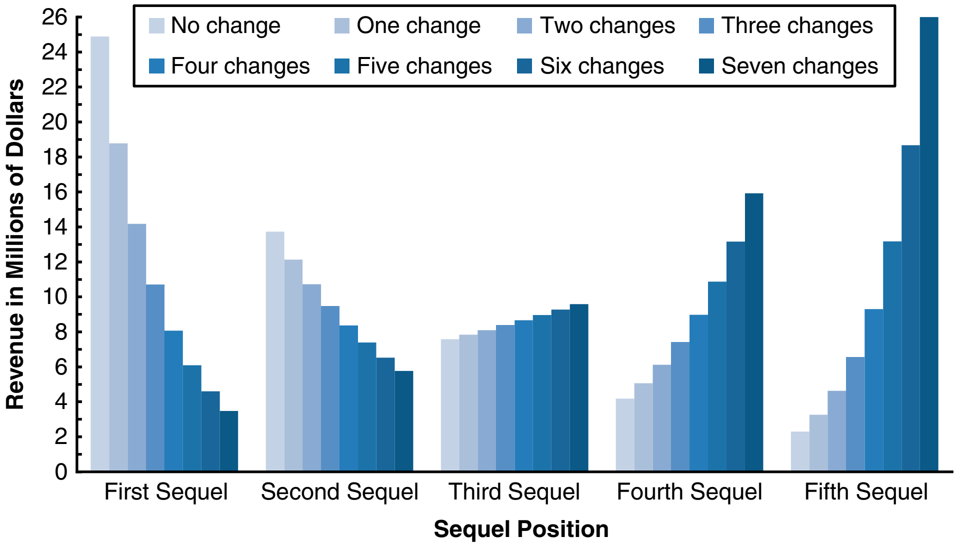
Study 3 shows that increasing innovation magnitude improves sales of later iterations more than earlier iterations. Early in the franchise, consumers seem to enjoy reliving the original experience, which implies that minor innovations preserve continuity and comfort. Later, however, such continuity risks audience boredom, which then requires grander innovations. This pattern reconciles conflicting prescriptions for minor (Hennig-Thurau et al. 2009) versus major (Sood and Drèze 2006) iteration innovations, suggesting that both are correct but at different spots in franchises (minor early, major late). Study 3 also shows that advertising improves the performance of later iterations more than earlier iterations. This is consistent with the idea that persuasion and quality signals help allay consumer fears of undue redundancy in later iterations, whereas earlier iterations remain relatively novel and more compelling on their own. Finally, the time between iterations matters. Longer between-iteration intervals generally improve iteration revenues, consistent with erosion in habituation, though the effect is the opposite among later iterations. One possibility is that habituation to later sequels weakens the cognitive and emotional responses that might generalize to the next iteration, such that shorter intervals enhance generalization, whereas another possibility is that shorter intervals indicate a great deal of brand energy (Mizik and Jacobson 2008, 2009) at a time when the franchise's age would otherwise suggest the opposite.

General Discussion

Iterated offerings are common across markets and include such varied platforms as next year's car models, new operating system versions, and installments in a book series. Iterations provide consumers with a sense of continuity and comfort that sellers leverage to encourage brand loyalty and repeat purchase. However, the same features that produce continuity and comfort also produce habituation and boredom, which, if unchecked, ultimately drive consumers away, a dynamic that competitor innovations can accelerate. This leaves iteration managers in the precarious position of navigating competitive landscapes while balancing comfort and stimulation to temper consumer and investor expectations, without which major innovations indirectly punish managers for their introduction by inflating expectations to unrealistic levels.

The RICS framework and its tests constitute an early step in assessing iteration dynamics over time. Study 1's online game provides support for reference dependence and loss aversion in iteration evaluations, with stronger innovations reducing evaluations of subsequent weaker innovations more than weaker innovations improve evaluations of subsequent stronger innovations. A weaker-stronger innovation sequence over Periods 2 and 3 then performed better than a stronger-weaker sequence (Studies 1 and 2), as did an even less innovative weaker-weaker sequence in Study 2's closing period. The effectiveness of the same innovations thus varies significantly depending on the innovations' sequence. Study 3 adds real-world corroboration from the film industry: major innovations and advertising help later sequels more than earlier sequels, and minor innovations do the opposite. In

FIGURE 4
Hypothetical Performance of an Average Sequel[a] When Varying Serial Position and Number of Innovations Relative to the Predecessor Film



[a]The average sequel is defined as a PG-rated/action-adventure sequel released in the first week of September 2010 and one year after the predecessor film, distributed over 2,240 screens and competing with six films, with a $59 million budget and $23 million in marketing expenses, and was rated 3.25 and 3.52 by professional critics and the general audience, respectively (1–5 scale).

general, longer between-iteration time intervals stimulated iteration revenues, though shorter time intervals seem to perform better for later iterations.

One implication of these findings is that interspersing minor/weaker innovations among major/stronger innovations may help. Sellers can then introduce less expensive, more comfort-oriented smaller innovations shortly after a major product introduction to leverage and harvest the product's relative novelty and brand equity. These smaller innovations also help temper consumer expectations for, and thus improve evaluations of, later iterations. Later iterations then require more stimulating innovations to revitalize the brand and restore the harvested brand equity. However, this suggestion derives from theory and research developed in well-controlled contexts such as those in Studies 1 and 2, such that potential moderation from real-world consumer and market factors must be considered.

Consumer Factors

Although we have made a case for mixing smaller and larger innovations across iterations to maximize consumer appeal, interspersing weaker innovations need not be universally best. For example, if a consumer segment is just now considering a given market, what is actually the manager's third iteration could be the segment's first-seen innovation. In addition, consumers may become so comfortable with their preferred brand franchises (e.g., games, movie franchises, cars) that they no longer prefer the major innovations that initially attracted them to the franchise but now prefer more incremental, easier-to-adapt-to innovations. This is likely when switching costs are high and consumers are predisposed to remain with their current brand of electronic game, bank, and so on. Moreover, a brand's equity might be so high that it increases consumer tolerance for minor innovations. Similar effects may arise from holistic consumer information processing, which can vary across consumers but is more likely when consumers experience the product jointly (Bhargave and Montgomery 2013). Joint experiences increase holistic processing, whose first impressions are likely to carry over to later iterations, where they can eclipse effects of more proximal reference states. Given such consumer factors, it is not surprising that firms employ different innovation sequences. Moorman et al. (2012) report, for example, that some firms offer all of their innovations early, whereas other firms offer all their innovations late, and still others offer innovations steadily.

Market Factors

The competition and innovation sequences. Moderating innovation sequences requires great care. For example, if a fledgling brand gets off to a slow start, its first innovation, in contrast to Studies 1 and 2, might be most effective if it is something grand to help establish brand credibility. Moreover, most markets include innovative competitors such that competitive pressures may punish sellers for delaying innovation introductions. For example, Moorman et al. (2012) find that, to impress investors, firms occasionally withhold some (of multiple) innovations from the market so they can offer a steady stream of improving innovations in the future, an approach referred to as an artificial "ratcheting strategy" designed to signal growing competence. Yet whereas the authors found that ratcheting did, indeed, improve short-term stock price performance, it also *reduced* product-market performance, which threatens long-term success, as might be expected when firms intentionally delay innovation introductions.

Although fear of falling behind may deter managers from delaying major innovations to intersperse minor innovations, switching costs should moderate that danger (Villas-Boas 2015). In markets with high switching costs, such as consumer technologies that require learning and adaptation (e.g., Apple vs. Microsoft operating systems, action/adventure video games) and ongoing services that require effortful transitions (e.g., banks, insurance), consumers may compare their current brand's performance primarily with its prior performance because switching to another company is generally out of the question. Even if consumers observe that their brand is performing worse than a competitor, they may remain with it in part with the hope that it catches up or surpasses the competitor in the near future (see the "Market Evolution, Segmentation, and Growing Incrementalism" subsection).

Instead of delaying major innovations to introduce minor innovations, managers might consider accelerating minor innovations to intersperse among major innovations introduced on their natural timetable. In new car markets, for example, the traditional one-year model cycle may ultimately give way to more aperiodic innovations with version updates such as those introduced in computer software (2.1, 2.3, etc.) or to periodic midyear model tweaks to entice midcycle buyers and inflate perceptions of next year's model changes, similar to Apple's iPhone sequences (3G, 3GS, 4G, 4GS, etc.).

Granted, accelerated and interspersed minor innovations would violate consumer and investor preferences for steady innovation improvements, though that threat may be limited for three reasons. First, it is unrealistic to expect each iteration's advantage to be larger than the prior innovation's advantage over its own prior iteration (i.e., exponentially improving quality; e.g., Moorman et al. [2012] operationalize ratcheting as improved innovations in only 67% of a firm's pairwise sequences). Second, although accelerated and interspersed minor innovations may be disappointing relative to expectations based on the prior iteration, they appeal to consumers and investors in another way by signaling brand activity. Shorter interinnovation intervals associate the brand with constant improvement and newness, thereby creating an exciting brand personality (Aaker 1997) and what Y&R's BAV refers to as "brand energy," which is only one of two BAV dimensions to explain stock return variance beyond standard accounting measures (Mizik and Jacobson 2008, 2009). Third, whereas consumers often delay purchases to wait for the "next big thing" (Holak, Lehmann, and Sultan 1987), continuous improvements should discourage such delays as consumers realize that the product will be improved shortly after purchase no matter when they buy. Therefore, whereas delaying innovations to feign steady improvements may increase stock returns, minor innovation interspersions promise similar steady-stream (brand energy) and reference-state benefits while (1) reducing delayed-innovation risks and (2) reducing consumer purchase delays.

Market evolution, segmentation, and growing incrementalism. As markets evolve, various factors increase the likelihood of more minor or incremental innovations at the expense of more major or radical innovations. The first and most obvious factor consists of ceiling effects on product quality such that most, or all, of any remaining innovations in a given category are necessarily incremental. Consider wooden pencils, for example: innovations have long since stagnated or revolved around minor changes such as product color and eraser style.

Second, as markets evolve, they often produce oligopolies that consist of only a few competitors that may find it relatively easy to jointly determine innovation rates. Competitors may, for example, use preannouncements to tacitly collude with one another to set norms favorable to the industry (Axelrod 1984). Just as airlines sometimes preannounce fare reductions and then drop their plans if competitors signal potential retaliation, firms can use preannouncements to moderate innovation progress.

Third, over time, consumers may become so comfortable with a product that they remain with the franchise despite it offering only incremental innovations, even if it was a radical innovation that initially attracted them to the franchise. Tschang (2007) documents this phenomenon in the game industry, in which consumers often become attached to a given game and platform and prefer to stay with them, which helps firms justify spending only moderately on innovations and thereby not intensifying competition. Tschang notes, however, that consumer heterogeneity within a given game may, for some providers, imply that they should use a mix of minor and major innovations to appease a diverse consumer base.

The film industry's embrace of franchises, which now dominate many markets, constitutes another movement toward incrementalism. For example, *The Fast and the Furious* series is one of the most lucrative franchises in film history, with its seventh film approaching $1 billion in revenues (Fritz 2015). Harris (2014) notes that Warner Brothers announced (in 2014) that it would introduce ten movies between 2016 and 2020 based on DC Comics characters, after which Marvel Studios announced that it would introduce nine films during that same period based on Marvel characters. In 2014, 25 sequels were slated for launch in 2015, and 22 for 2016, though the latter number is likely to grow significantly. Harris argues that studio executives, who are increasingly businesspeople lacking movie industry experience, can no longer indulge in one-off films because profits are so much higher from franchises cloned for consumers who want similar experiences with familiar characters. This process appeals to the industry's business side because it reduces risk relative to more artistic endeavors, though it compromises the industry's artistic side because higher-quality films are left to survive by the good graces of angel capital, a fate also faced elsewhere in the arts (e.g., classical music):

> No studio could find the $8.5 million it cost Dan Gilroy to make *Nightcrawler*. *Birdman* cost a mere $18 million and still had to scrape that together at the last minute. Imagine American movie culture for the last few years without *Her* or *Foxcatcher* or *American Hustle* or *The Master* or *Zero Dark Thirty* and it suddenly looks markedly more frail — and those movies exist only because of the fairy godmothership of independent producer Megan Ellison. The grace of billionaires is not a great business model on which to hang the hopes of an art form. (Harris 2014)

Finally, as markets evolve and power consolidates, competition increasingly involves new product announcements and advertising, in which sequences may again play a role. In an announcement sequence related to the innovation sequences of Studies 1 and 2, for example, Disney announced the sequel *Avengers: Age of Ultron* and then later announced future sequels *Avengers: Infinity War Part 1*, and *Avengers: Infinity War Part 2*, both of which seem more interesting relative to the previously announced *Avengers: Age of Ultron*, which viewers must still see if they want continuity across all three films (Harris 2014). Advertising, moreover, promises to heighten consumer interest and to define the focus of that interest, which can alter the movie-viewing experience through expectations that are at least partially confirmed (Hoch and Ha 1986).

Stimulation Perceptions: Another Path to Balancing Comfort and Stimulation

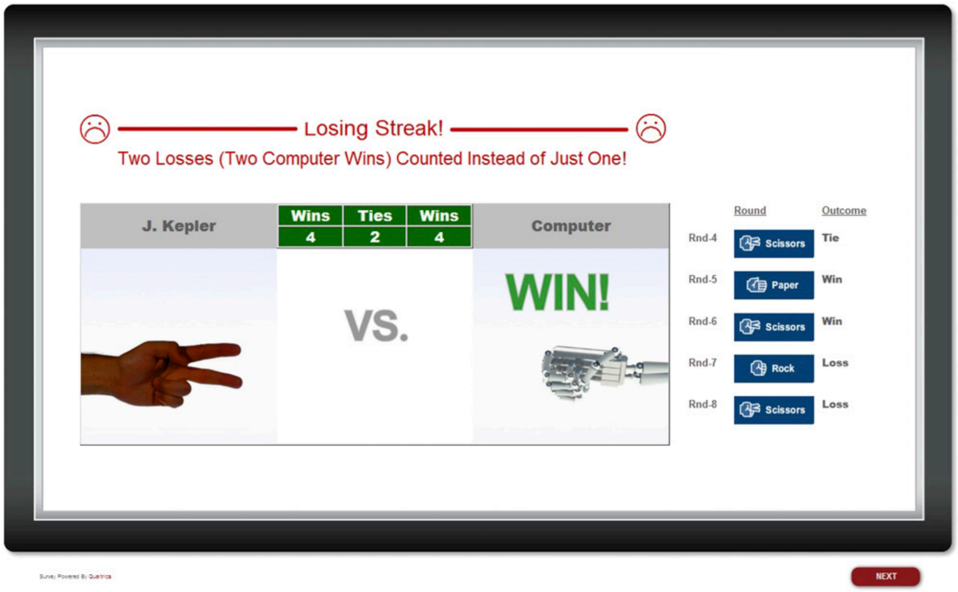
To this point, researchers have generally looked to comfort as the means for balancing negative sources of stimulation. For example, one study shows that consumers accept radical innovations more when presented in a standard product design than in an exotic design, thereby indicating that the standard design's comfort balances the innovation's stimulation (Mugge and Dahl 2013). Another way to balance comfort and stimulation, however, is to increase perceptions of the iteration's positive stimulation (e.g., benefits) or reduce perceptions of its negative stimulation, thereby reducing the amount of comfort needed for balance. For example, Zhao, Hoeffler, and Dahl (2009) find that future-oriented product visualization improved evaluations of major innovations by increasing the perceived value of the new benefits (though not by reducing expected adaptation costs). Moreover, advertisements with everyday people or respected spokespeople recommending the iteration may help reduce perceptions of the time and effort required to adapt to the new product or increase perceived benefits. Savvy managers, therefore, have various ways of balancing comfort and stimulation that include increasing perceived positive stimulation, reducing perceived negative stimulation, and enriching sources and/or perceived sources of comfort.

APPENDIX A
Study 1: Innovations Offered by Experimental Condition and Period

Innovation Cumulativeness	Innovation Sequence	Period 2	Period 3	Period 4
Noncumulative	Weaker-stronger	*Weaker*	*Stronger*	**History**
	Stronger-weaker	*Stronger*	*Weaker*	**History**
Cumulative	Weaker-stronger	Weaker	**Weaker, stronger**	**Weaker, stronger, history**
	Stronger-weaker	Stronger	**Stronger, weaker**	**Stronger, weaker, history**

Notes: Weaker and stronger innovations are Period 2 and 3 innovations that are liked less and more, respectively, whereas "history" is an innovation common to both sequences in Period 4. We made entertainment comparisons within a given period or periods when the two innovation sequences offered the same innovations. Italics indicate multiple periods across which the two innovation sequences offered the same innovations in the noncumulative conditions, such that we compared innovation sequences within these periods. Boldface indicates single periods per level of innovation cumulativeness in which the two innovation sequences offered the same innovations, such that we compared innovation sequences within these periods.

APPENDIX B
Study 1: Example Game Screen from the Cumulative Condition (Period 4, Round 8): Demonstrating the Winning-Streak and History Innovations in Combination



APPENDIX C
Study 3: Variables

Variables	Source/Computation	Description/Coding
Revenue	Baseline research	Total box office sales adjusted by the CPI (or ticket price) factor relative to 2010 dollars; we report results using the CPI factor
Budget	Baseline research	Production budget (negative costs) adjusted by the CPI (or ticket price) factor relative to 2010 dollars; we report results using the CPI factor
Advertising	Baseline research	Print and advertising expenses adjusted by the CPI (or ticket price) factor relative to 2010 dollars; we report results using the CPI factor
ROI	Computed	$\frac{\text{Revenue}}{(\text{Budget} + \text{Advertising})}$
Screens	Baseline research	Number of screens on the opening week/the maximum number of screens in a week during the run; we report results using the maximum number of screens
Audience rating	www.netflix.com	Movie ratings from the general audience on a 1–5 scale
Professional ratings	www.rottentomatoes.com	Movie ratings from professional critics on a 1–5 scale
Season	Vogel (2011, p. 82, Figure 3.4)	Normalized weekly fluctuations in movie attendance (ranging from 0 to 1.0)
Competition	Computed (www.the-numbers.com)	Number of films (or new releases) running in theaters during the week; we report results using the total number of films
R-rating	Baseline research	MPAA film rating; dummy variable (1 if R-rated, 0 otherwise)
G/PG-rating	Baseline research	MPAA film rating; dummy variable (1 if G- or PG-rated, and 0 otherwise)
Action-adventure	www.netflix.com	Film genre; dummy variable (1 if genre description includes action-adventure, and 0 otherwise)
Release year	boxofficemojo.com	The year of release of the film (from 1960 to 2010)
Time interval	boxofficemojo.com	The time interval (in days) between any two successive films in the franchise
Serial position	boxofficemojo.com	Numerical variable (0, 1, 2, 3, 4, and 5) indicating position in the franchise (original = 0, first sequel = 1, second sequel = 2, etc.)
Change—star	www.imdb.com	The sequel duplicates (0) or changes (1) the predecessor film's star cast if the top two stars are the same or either one changes, or if only the top star remains the same or changes; we report results using the top star measure
Change—genre	www.imdb.com, www.netflix.com	The sequel duplicates (0) or changes (1) the predecessor film's genres based on Netflix genres or IMDb genres; we report results using Netflix
Change—MPAA	www.imdb.com	The sequel duplicates (0) or changes (1) the predecessor film's MPAA rating
Change—studio	www.netflix.com	The sequel's studios duplicate (0) or change (1) relative to the predecessor film if the original studio remains or is changed or the top-billed studio remains or is changed; we report results using the top-billed studio measure
Change—director	www.imdb.com	The sequel duplicates (0) or changes (1) the predecessor film's director
Change—storyline	www.netflix.com	The sequel duplicates (0) or changes (1) the predecessor film's storyline based on Netflix's plot description
Change—title	www.imdb.com	The sequel duplicates (0) or changes descriptively (1) the predecessor film's title
Innovation	Computed	Sum of star, genre, MPAA rating, studio, director, story, and title changes

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