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Surprise, Recipes for Surprise, and Social Influence

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Abstract

Surprising people can provide an opening for influencing them. Surprises garner attention, are arousing, are memorable, and can prompt shifts in understanding. Less noted is that, as a result, surprises can serve to persuade others by leading them to shifts in attitudes. Furthermore, because stories, pictures, and music can generate surprises and those can be widely shared, surprise can have broad social influence. People also tend to share surprising items with others, as anyone on social media has discovered. This means that in addition to broadcasting surprising information, surprising items can also spread through networks. The joint result is that surprise not only has individual effects on beliefs and attitudes but also collective effects on the content of culture. Items that generate surprise need not be random or accidental. There are predictable methods or recipes for generating surprise. One such recipe is discussed, the repetition-break plot structure, to explore the psychological and social possibilities of examining surprise. Recipes for surprise offer a useful means for understanding how surprise works and offer prospects for harnessing surprise to a wide array of ends.

Keywords: Surprise; Social influence; Repetition-break plot structure

1. Introduction

Surprises are opportunities for learning (Louis, 1980; Pezzo, 2003). When we experience something startling or incongruous, often a low probability, salient event that is

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inconsistent with our expectations or requires explanation, we are surprised (Derbaix & Vanhamme, 2003; Foster & Keane, 2015; Meyer, Reisenzein, & Schützwohl, 1997). Sometimes these opportunities pass us by of course—there is no guarantee that people will notice startling information or take it into consideration (Chinn & Brewer, 1993; Simons & Chabris, 1999). Still, if we are surprised, then the process of forming explanations to make sense of the surprising event can open us up to changing our beliefs and attitudes. For this reason, leading others to experience surprises could prompt those others to change their beliefs and attitudes. Surprise has the potential to be a tool for social influence.

Surprise can even be a tool for social influence on a large scale. A story that surprises one person could be told to many people and so surprise and influence many individuals' attitudes (e.g., Loewenstein, Raghunathan, & Heath, 2011a). In addition, people appear to be particularly likely to share surprising stories or experiences with others (e.g., Hutter & Hoffmann, 2014). Consequently, as surprise appears to contribute to what information gets retold and passed along, it can shape what seemingly everyone hears about, discusses, and acts upon (e.g., Sinaceur, Heath, & Cole, 2005). Surprise becomes a tool for shaping the content of culture.

Furthermore, there appear to be general methods or recipes for generating surprises. That there could be recipes for surprise might seem odd at first. Surprises seem to be the result of not following a recipe. However, if we recognize the possibility of recipes at several levels of abstraction, we might devise general methods for creating surprising experiences. For example, the habituation paradigm widely used in psychological research rests on the premise that repeated exposure to a stimulus lessens attention and that a changed stimulus, due to novelty or violation of expectation, revives attention. This is a core method in, for example, developmental psychology (Schoner & Thelen, 2006): Seeing someone place a toy hedgehog behind a screen and then when the screen is removed viewing the hedgehog might gather a infant's attention for 10–15 s the first time, but by the third time the infant might just look for 4 s (Dunn & Bremner, 2016). If the fourth time arrives and the screen drops and there is a toy snail rather than the hedgehog, infants are likely to once again look for 10–15 s and turn to their caregivers a couple of times as well. Thus, not only can surprises be individually and collectively influential, we can craft surprising experiences systematically (e.g., Ludden, Schifferstein, & Hekkert, 2008) so as to reliably generate those social influences. Learning recipes for generating surprise would then mean learning a general method for influencing what members of cultural communities know.

2. On surprise

The description of surprise given initially was complex and suggestive rather than precise and definitive. For surprise scholars, it may have seemed muddled. There are simpler definitions of surprise based on, for example, distinctive emotional experiences (Ekman

& Friesen, 1971), violations of expectations or schema incongruity (Schützwohl, 1998), low–probability events (Itti & Baldi, 2009), and explanatory need (Foster & Keane, 2015). One approach is to split these off from one another, provide empirical bases for deciding that some are correct and others are incorrect, and treat the correct ones as distinct subtypes of surprise or simply as distinct concerns. The lay use of the word "surprise" may simply be hopelessly vague or misleading and so should be discarded by surprise scholars and replaced with clearly defined theoretical proposals. In this case, the breadth of the original description of surprise is simply a hedging of bets, as for the purposes of the current paper, every approach to surprise could be made consistent with the claims about surprise and social influence that follow.

There is a positive reason to incorporate several approaches, beyond just a hedging of bets. Each approach to surprise may be useful. There is no need to claim that only one approach captures the "real" surprise or that we can only study one aspect of surprise at a time. We might be wise to lump the approaches together because the different approaches characterizing distinct psychological processes that have a family resemblance are likely to be confounded in practice and may well have similar antecedents and consequents. It might not be muddled thinking but folk wisdom that lay beliefs about the word "surprise" cover a range of theoretically distinguishable psychological processes. To be clear, the point is not that scholars of surprise should resist making theoretical distinctions. It is helpful to separate lay beliefs about "surprise" from particular psychological processes such as reactions to violations of expectation (Noordewier & Breugelmans, 2013). However, surprise is a commonly used word—about as commonly used as "dog" and "cat" according to Google Books Ngram Viewer. Lay beliefs about "surprise" might be indicating something about the value of lumping distinct concerns together because in practice they often go together.

Lumping together distinct concerns has proven useful elsewhere. For example, lay beliefs about "cooperation" in the United States often incorporate the effort that group members provide, the alignment of group members' goals, coordinating with group members, and sharing knowledge with group members (Keller & Loewenstein, 2011). These distinct concerns seem to cluster together as we navigate complex social interactions, and being able to exchange between these concerns and look for configurations of these concerns in a larger syndrome of cooperation is beneficial (Keller, Loewenstein, & Yan, 2017). As a second example, lay beliefs about "creativity" in the United States often incorporate whether an item is a breakthrough, whether it is rare, whether it exhibits potential, and whether it represents a change in thinking, and once again these often co-occur (Loewenstein & Mueller, 2016). We could say that our lay beliefs lump together a hodge-podge of distinct concerns, or we could say that our lay beliefs integrate related concerns that often have similar origins and similar consequences. Taking a broad view of surprise may appear at first to be a sloppy lumping together of different approaches to surprise. However, it might actually be a useful and appropriate degree of lumping, an "optimal level of fuzz" (Markman, Beer, Grimm, Rein, & Maddox, 2009) given the current goal of examining surprise and social influence.

3. Surprise as a tool for social influence

There are several reasons to link surprise to social influence. One reason is that surprises tend to garner attention (Browning & Harmer, 2012; Horstmann, 2002; Itti & Baldi, 2009; Schützwohl, 1998). We form expectations about what might occur and these expectations then guide our perceptions. We might form precise expectations, in the sense of actively expecting something to arrive or something to occur. But we might also form generalized expectations, such as an expectation that a toy hedgehog will not suddenly transform into a toy snail. We are not constantly predicting stasis or continuity, but rather we take for granted our interpretations of past experience and the resulting indications about the way the world works. Accordingly, over and above sheer novelty or discrepancy detection, surprises indicate that there is something we did not expect or that we are unable to readily interpret (Foster & Keane, 2015; Vachon, Hughes, & Jones, 2012). For this reason, surprise indicates we should take note. Getting people's attention is one starting point for influencing them.

Paying attention is only a first step. If surprises typically indicate that our models of what would or could happen did not include what actually occurred, then it follows that we might want to form an explanation, update our models, or otherwise learn to make more accurate predictions. Many theories of learning take failed predictions as a prompt to update or change what we believe (Glimcher, 2011). As what we believe is a major influence on our behavior (Ajzen, 1991), durable social influence comes from prompting others to change their beliefs and attitudes (Petty & Cacioppo, 1986). Accordingly, if we can surprise others, we might not only get their attention but also prompt them to change their beliefs and so influence them.

Surprise has a further reason to be linked to learning and social influence, which is that surprises are memorable emotional experiences. Surprises are linked to engagement or arousal (e.g., Russell & Barrett, 1999). The result is that the same positive event is felt to be more positive and the same negative event is felt to be more negative the more of a surprise each is experienced to be (Mellers, Schwartz, & Ritov, 1999). The $20 you expected to receive is less thrilling than the $20 you found on the sidewalk. Surprises not only get attention and indicate that we might have something to learn or explain; they are also likely to be high arousal experiences. That in itself promotes memory for the event (Bradley, Greenwald, Petry, & Lang, 1992). In addition, engagement and arousal often encourage elaboration, explanation, and other efforts at making sense of the situation, which are also likely to foster remembering the event (albeit in potentially biased ways; Ash, 2009). You are likely to remember finding $20 on the sidewalk. If that positive surprise was generated intentionally, say, by a friend with a surprise gift or a store with a surprise service, then our delight can have lasting effects due to improving our attitudes toward the friend or store and increasing our intentions to engage with them again (Oliver, Rust, & Varki, 1997). For example, if a restaurant was better than expected (i.e., a positive surprise), people tend to increase their appraisals of the restaurant and their desire to return (Yi & La, 2004). The effect of surprise on arousal and memory can then have lasting effects on individuals' attitudes and behavior.

4. Surprise and large-scale social influence

Surprises not only influence individuals' attention, learning, memory, attitudes, and behavior; they can also have larger scale social influences. This is because people seem to be interested in sharing surprises with others (Heath, Bell, & Sternberg, 2001). You are not likely to tell someone else that you received $20 that you expected to get, but you are likely to tell someone else that you found $20 on the sidewalk. For example, in a study of recollections of either a recent shopping experience or a surprising recent shopping experience, 78% of those who had a surprising experience reported telling someone else about it, whereas only 28% reported telling someone else about their (ordinary) recent shopping experience (Derbaix & Vanhamme, 2003). Or an increase in one standard deviation in rated surprise for *New York Times* articles predicted a 14% increase in the likelihood of the articles appearing on the *New York Times* most emailed article list (Berger & Milkman, 2012). Thus, surprise can generate large-scale social influence because people often pass surprises along.

The effect of surprise on spurring people to share the surprise with others is in part because surprises are emotionally intense. There are widespread tendencies to want to share such experiences, whether they are surprising, disgusting, awe inspiring, or some other form of high–arousal emotional experience (Berger, 2011; Cappella, Kim, & Albarracín, 2015). Surprise is not unique in having the potential for generating large-scale social influence. Surprise is distinct from other strong emotional reactions in that surprises can take on a positive or negative valence. As a result, surprises can arise in a variety of ways and for a variety of purposes. Furthermore, surprise is closely connected to learning and memory, as noted earlier, and so not only can it propagate but it can also influence. Of the different reactions that stories might generate (e.g., anger, disgust, amusement), surprise is one of the most likely to lead individuals to choose to pass along a story to others (Eriksson & Coultas, 2014). Stories with surprising elements tend to degrade and change less as they are passed along than stories without surprising elements (Norenzayan & Atran, 2004). Thus, surprising experiences appear to be disproportionately likely to spread, to continue spreading, and to influence people along the way.

Taken together, surprises appear to have direct social influence on the person being surprised and also broader, indirect social influences through influencing what stories are shared in communities. Communications can be broadcast widely, as news outlets demonstrate. Organizations can generate specific experiences that many people can experience, whether elaborate theme parks or store displays. Many individuals can then encounter them. These experiences can then spread by word of mouth through social networks (Goldenberg, Libai, & Muller, 2001). The resulting effects can be substantial. For example, a study examined the effect of placing advertisements outside of a retail store that varied in the level of surprise they generated (Hutter & Hoffmann, 2014). Observations of about 2,500 consumers found that the most surprising advertisement doubled the rate of entry into the store relative to control levels when no advertisement was in place. The most surprising advertisement was noticed by 43% of passersby, as

compared with 11% in response to the least surprising advertisement. Another 300 consumers were surveyed. Their degree of surprise in response to the advertisement predicted their attitudes toward the advertisement and toward the store brand. These in turn influenced purchase intentions as well as intentions to tell others about the advertisement. The effect of the surprising advertisements was a 45% increase in store sales. This is just one indication of the connection between individual-level social influence and larger scale social influence due to surprise. Part of the reason to study surprise is that surprises can be influential.

5. Recipes for surprise

Not all surprises are accidents. There are professions that appear to rely heavily on surprising others, such as comedians, talk radio hosts, and social media writers. It is possible that these people simply generate many communications and stumble into surprising ones. But it is also possible that there are formulae, methods, templates, or recipes for producing surprise in others. It is possible to design experiences that surprise others (Ludden et al., 2008).

The tools of rhetoric offer some ingredients for recipes for surprise. By being incongruous or deviating from conventional beliefs, rhetorical tropes such as hyperbole, metaphor, and paradoxes can generate surprises for audiences to interpret (McQuarrie & Mick, 1996). Interpreting or elaborating on rhetorical tropes to make sense of them is then a route to generating influence, provided audiences have sufficient understanding to decode them (McQuarrie & Mick, 1999). Taking this general approach one step further toward recipes, it is possible to describe and train people to use templates for generating hyperbole, analogy, counterfactuals, conceptual combinations, and the like, which do seem to result in producing more creative communications (Goldenberg, Mazursky, & Solomon, 1999). The research on rhetorical tropes and templates just noted (and similar work in these lines) does not always assess surprise directly, but it is likely that new rhetorical figures are leveraging surprise as a component of their efficacy.

A better defined recipe for surprise is to identify minimally counterintuitive entities (Boyer & Ramble, 2001). These are items for which a key dimension or property that seems to define an ontological kind is altered to generate surprise, such as a talking hedgehog or a ghost (Norenzayan, Atran, Faulkner, & Schaller, 2006; Upal, Gonce, Tweney, & Slone, 2007). Minimally counterintuitive items seem to be particularly memorable and particularly frequent in cultural narratives. As planting a memorable idea in another's mind is a form of influence and as fostering the spread of a narrative in a community is a form of social influence, introducing minimally counterintuitive elements provides a recipe for surprise and influencing others.

The minimal counterintuitive element recipe has both limits and promise as a recipe for generating surprise. It has limits insofar as it requires violating an existing expectation (e.g., hedgehogs do not talk). It also has limits in that it primarily yields fictions, which raises issues around credibility (Willard, Henrich, & Norenzayan, 2016). In addition,

there is not yet conclusive direct evidence of minimally counterintuitive elements generating changes in attitudes due to generating surprise. It awaits further research to detail the specific links between these kinds of surprises and social influence in the sense of changes in beliefs or attitudes about a target.

6. The repetition-break plot structure

To examine recipes for surprise and social influence in greater depth, a useful case study is the repetition-break plot structure (Loewenstein & Heath, 2009). The repetition-break plot structure consists of at least two obviously similar events (repetition) such that audiences note the trend, allowing a final, contrasting event (break) to generate surprise. This is a recipe for surprise that is specific like templates, well explained by cognitive science research like rhetorical tropes, and linked to both individual and collective outcomes like minimally counterintuitive elements (Loewenstein et al., 2011a,b). The repetition-break plot structure is likely already familiar in broad outlines, as it is fairly culturally pervasive and similar to the habituation paradigm mentioned earlier.

The repetition-break plot structure is a method for forming narratives. For example, the classic children's story of the three little pigs revolves around a repetition-break sequence: a pig builds a house of straw that a wolf blows down, a second pig builds a house of sticks that a wolf blows down, a third pig builds a house of bricks that a wolf fails to blow down. At least for young listeners, the initial repetition enables a wolf failing to blow down a house to become surprising.

As a second example, a classic joke concerns a taxi driver, a bus driver (although we can make it an Uber driver to stay current), and a priest waiting at the gates of heaven. The taxi driver enters, is given garlands and strands of silver amidst cheering angels, and is led off surrounded by angels radiant and smiling. The Uber driver enters to great applause and enthusiasm, decorated with gold and rubies, and is too led off in a crowd of angels happy as can be. The priest, however, is handed a welcome card and pointed on his way. Unable to help himself, the priest asks why he was treated so differently than the taxi and Uber drivers. An angel replies: "Up here, we care about results. Down there, in your pews, people slept. But in their cars, people prayed." The plot structure is just like the three little pigs story: event, nearly similar event (i.e., repetition), dissimilar event (break). The repetition-break plot structure is quite common in jokes (Rozin, Rozin, Appel, & Wachtel, 2006).

The repetition-break plot structure appears in many forms. It is, as Rozin and colleagues noted, a structure that is quite common in music, as illustrated by Beethoven's fifth symphony, for example (da da da dum...). It is used in advertising campaigns, such as MasterCard's Priceless campaign, such as: 18 speed bike, $1,225. Shipping bike to Italy, $235. Map of Tuscany, 9,000 Lira. 7 days without email: Priceless. It is also used in political cartoons, folktales, and all manner of other narratives.

The repetition-break plot structure is a recipe that relies on well-understood psychological processes. The repetition part of the plot structure is leveraging the process of

comparison (Gentner, 1983) among obviously similar items (Kotovsky & Gentner, 1996). If items do not have similar surface features, then people might fail to notice the similarity and so fail to draw comparisons (Loewenstein & Gentner, 2001). If items do have similar surface features, then people are likely to draw comparisons and as a result form a generalization (Gentner, Loewenstein, & Hung, 2007). For example, in the three little pigs' story, the generalization is: "pigs build flimsy houses that wolves blow down." In the taxi driver and priest joke, the generalization is: "people enter heaven and are richly rewarded and recognized." The generalization then yields a prediction or expectation about upcoming events.

The break part of the repetition-break plot is what generates the surprise. This aspect of the structure also relies on comparison. One kind of break—the wolf blows but fails, the priest enters but the greeting is perfunctory—is an event that contrasts with the generalization formed from the similarities of the earlier events. Presumably (although this awaits testing) the break will produce the strongest surprise reactions when the break event contrasts with the earlier events by being an alignable difference (Markman & Gentner, 1993). A break that is unrelated to the prior events (a non-alignable difference) might produce surprise but might fail to be interpretable, and so be taken as bizarre or surreal rather than comprehensible and influential.

The second kind of break that can generate surprise is to an unexpectedly similar event. This kind of break event seems dissimilar on the surface and so appears to be a contrasting event, but upon elaboration and consideration, it turns out to fit the generalization formed from the initial events. For example, a Ben Sargent political cartoon (published January 30, 2004, in the Austin-American Statesman) showed a sign by an alarm bell reading: 1 bell: fire; 2 bells: tornado; 3 bells: terrorist attack; 4 bells: legislature coming. Here, the break is that the legislature coming is (surprisingly) equated with fires, tornados, and terrorist attacks. In a learning context, this has been described as a progressive alignment sequence (Kotovsky & Gentner, 1996). The initial surface similarity examples foster comparison and the formation of a generalization that then enables the leap to forming an analogy with the final event.

The account just given of the psychological processes explaining why the repetition-break plot structure generates surprise is helpful for clarifying the recipe for producing communications with repetition-break plot structures. The plot structure is not concerned just with repetition alone. There have long been discussions of the power of repetition for influencing learning and memory (e.g., Hintzman, 1976; Rubin, 1995). The repetition-break plot structure is not just about learning and memory through repetition though. It is also about generating an expectation that can then be violated to yield surprise. Repetition alone does not produce a clear moment at which a surprise arrives.

Just as the repetition-break plot structure is not solely concerned with repetition, neither is it solely concerned with contrast. Presenting oppositions is another common rhetorical trope, whether it is pitting the good against the bad, the old against the new, or us against them (McQuarrie & Mick, 1996). While contrasts can engage people to consider the commonalities and differences between two items, they are not necessarily surprising. Even if they are surprising, contrasts have to rely on an audience's existing

knowledge to lead them to notice the surprise. The repetition-break plot structure teaches the expectation it then violates.

The psychological process account of the repetition-break plot structure indicates that it is about generating an expectation and then violating that expectation. It can involve but is not critically concerned with there being three events. The plot structure requires at least three events, but it can involve more than three events. For example, the MasterCard Priceless advertising campaign relied on a repetition-break plot structure with four events. There is another rhetorical device, often called tricolon, that involves three events and indicates completeness. For example, "it's as easy as A, B, C" or "as simple as 1, 2, 3" are examples of tricolon. These might just be lists of three separate items. Some instances of tricolon are just repetitions, as in the line from the Wizard of Oz: "You are talking to a man who has laughed in the face of death, sneered at doom, and chuckled at catastrophe." And some can be repetition-break plot structures, as in "when in Rome, do as the Romans do. When in Athens, do as the Greeks do. When in Paris, do as the Germans do" (Veale, 2012). The number three is not critical to the repetition-break plot structure recipe for generating surprise; it is just the minimal number of required events to make use of the plot structure.

A further clarification is that the repetition-break plot structure is not specifically about generating humor. As it is so common in comedy, this notion is understandable. But there are plenty of examples that have little to do with humor, including Beethoven's fifth symphony. For example, one television advertisement paired operatic singing with slow-motion video of a bullet exploding various objects, like an egg, a bottle, an apple, and a watermelon, one after another. When a young African American boy's head appears on the screen, just where each object had been moments earlier, it is common to hear gasps as people anticipate a bullet about to make the child's head explode. Instead, the words "Stop the bullets. Kill the gun." appear on screen along the bullet's path. It is a powerful anti-violence statement, often audibly surprising, a repetition-break plot structure, and not at all funny. There are numerous other examples showing that the plot structure is about generating surprise, which may, but need not, be in the service of generating humor.

With these clarifications, we have a fairly detailed account of the repetition-break plot structure as a recipe for surprise. We can now turn to an examination of it as a tool for social influence. First and foremost, we would expect communications using the repetition-break plot structure to be perceived to be surprising, interesting, engaging, and the like. The evidence suggests that they do tend to be (Loewenstein & Heath, 2009; Loewenstein et al., 2011a). For example, television advertisements sometimes use the repetition-break plot structure. Accordingly, people can watch and evaluate an ad that uses the repetition-break plot structure, and their ratings can be compared with people who watch an edited version of the ad that removes the second (third, ...) event so that the repetition-break plot structure becomes simply a contrast structure. In addition, television ads are often generated as part of a campaign for the same brand, with the same tagline, style, and even the same music, actors, and types of scenes. In this case, people's ratings of an ad that uses the repetition-break plot structure can be compared with ratings of an ad from the same campaign that does not use the repetition-break plot structure.

Repetition-break plot structure ads tend to attain higher ratings of surprise than either edited versions of the same ad or ads drawn from the same campaign (Loewenstein et al., 2011a).

A second form of social influence is whether people prefer communications that use the repetition-break plot structure. That is, do people tend to say that they like, enjoy, say they are interested in sharing, select as their favorite from a collection a communication that uses the repetition-break plot structure. Here too there is support. For example, a randomly drawn sample of 220 jokes taken from jokes.com showed that visitors to the website tended to give higher ratings, on a scale from 1 = blows to 5 = hysterical, to the 71 jokes that used a repetition-break plot structure than the remainder not using that structure (Loewenstein & Heath, 2009). In the advertisements study just described, ads with the repetition-break plot structure were rated as being liked more than edited ads and other ads from the same campaign. Surprise ratings mediated the liking ratings. Thus, there is a variety of evidence consistent with the conclusion that repetition-break plot structures promote the experience of surprise, increase liking for communications, and that surprise and liking are linked.

A further form of social influence is whether individuals can be encouraged to like the target of a communication. For example, it is one thing for a repetition-break plot structure to promote liking an advertisement, but another thing for it to lead people to form positive impressions of the brand and an interest in purchasing the advertised product. That is the kind of social influence we are often thinking about when we consider whether a communication is having an influence on others. A series of studies showed that repetition-break plot structure advertisements produced such effects on brand attitudes and purchase intentions (Loewenstein et al., 2011a). This result held whether the ad was presented individually or as part of a series of ads (as in a commercial break), in the laboratory with student raters or online with a broader sample of viewers. The ads were drawn from countries around the globe and the effects held across ads for different brands, familiar and novel brands, and brands for different kinds of products. It appears that the key issue is the recipe for surprise at play.

There are some limits on the effectiveness of the repetition-break plot structure on whether people like communications that use it and whether they form positive attitudes about the intended target of the communication. One is that familiarity diminishes its effects. For example, in a joke rating study using conventional American jokes (greedy lawyers, dumb blondes, and other stale atrocities), not only did native speakers (a proxy for cultural familiarity in a university setting) dislike the jokes overall, they showed no preference for repetition-break plot structure jokes over contrast structure jokes. Non-native speakers (and so cultural newcomers in a university setting, as the vast majority are foreign students) liked the jokes and clearly preferred the jokes when in the repetition-break plot structure form (Loewenstein & Heath, 2005). A second limit found in the same study just noted is that, perhaps due to structural priming, seeing repetition-break plot structure jokes one after another led to order effects such that the liking advantage diminished over time as the break stopped being surprising but instead expected. A third limit is that surprise requires some processing effort to engage, resolve, and appreciate

the puzzle presented by the break event. For example, a cognitive load manipulation of having to remember an eight-digit number while watching advertisements erased the effect of the plot structure on brand attitudes (Loewenstein et al., 2011b). There were still brand effects, so there was an overall effect of the brand, the music, the scenery, and the actors. But the erasure of the plot structure effect indicated that people likely failed to process the break event and so were not surprised by it. The repetition-break plot structure is a recipe for generating surprising communications, but it requires that people have the wherewithal to form the expectation such that the break is a surprise rather than something expected.

In addition to individual influence, there is also evidence that the repetition-break plot structure is related to large-scale social selection and elite selection. If the repetition-break plot structure helps communications to be surprising and surprise in turn fosters liking for the communication and the target message, then it is important to know whether this effect spreads and appeals broadly. There are some reasons to believe that it might, over and above the reasons already mentioned about surprise. This is that the repetition-break plot structure teaches the expectation with the repeated events that it then violates with the break event. Consequently, communications that use it are self-contained, rather than relying on audiences to have particular background knowledge or expectations. As just noted, if audiences already have the expectation, this reduces their surprise. Consequently, narratives using the repetition-break plot structure to form novel expectations with the initial repetition are likely to be most effective. They should also, due to teaching the expectation needed to set up the surprise, have the potential to be effective with a wide array of audiences because little prior knowledge is required. As one indicator, the repetition-break plot structure is quite prevalent in stories told to children. For example, in a sample of 60 folktales from cultures spanning the globe (e.g., English, Russian, Native American, Burmese, and Afghani folktales), 38% used the repetition-break plot structure (Loewenstein & Heath, 2009).

Consistent with these discussions, there is evidence that communications with repetition-break plot structures do have an advantage at the broader social level. A study of a random sample of 88 of the 210 Grimm folktales found that stories with repetition-break plot structures tended to have more Google hits than those without that structure (Loewenstein & Heath, 2009). A study of a random sample of 300 advertisements from Adforum's Creative Library found that those with repetition-break plot structures, relative to those with other structures, tended to have more views on YouTube and were more likely to have been posted to YouTube more than once (Loewenstein et al., 2011a). Finally, an analysis of 957 ads found that, while ads with repetition-break plot structures are about 4% of what is shown on daytime and primetime television, they comprise about 25% of award-winning ads. In contrast, ads with repetition structures and ads with contrast structures win awards in proportion to their base rates shown on television (Loewenstein et al., 2011a). Consequently, there is evidence that the repetition-break plot structure is a recipe for surprise that has individual psychological effects on beliefs and attitudes as well as social effects on social selection and elite selection.

7. Discussion

Surprise stimulates us to pay attention, engage, elaborate, and explain. As a result, if you can craft communications that generate surprise, you can produce an opening that might lead your audience to change their thinking and attitudes. This is not idiosyncratic, as recipes for surprise exist, such as the repetition-break plot structure, that enable communicators to reliably produce surprise in others. This in turn allows people to generate messages that audiences are inclined to like and that shift audiences' attitudes. Furthermore, surprising communications are particularly likely to spread. The social influence generated by surprising communications can spread widely to the point of shaping store sales, industry awards, and even the content of enduring aspects of culture such as stories widely told to children generation after generation. Surprise is not just a laughing matter.

The current discussion of surprise and social influence is in part intended to emphasize the importance of studying what surprise is and the cognition involved in surprise. The social effects of surprise are notable. Much of the discussion and research on the social effects of surprise are about individuals' beliefs and attitudes and collectively what spreads and becomes widely known. There are opportunities to stretch surprise in other directions. For example, another recipe for surprise might be asking for predictions and then supplying accurate answers. This is becoming common in research on norm and belief change. For example, one study asked people to estimate the proportion of scientists agreeing that human activity is causing global warming and then provided them with accurate information. When the researchers later asked for people's views, they tended to move closer to the accurate number (Lewandowsky, Gignac, & Vaughan, 2013). It is possible that this is simply an updating of beliefs in response to new information. It is also possible that this is a means for generating surprise and that surprise plays a role in the process. There has long been a connection between expectation failures (one way to conceptualize surprise) and learning (e.g., Schank, 1982) and perhaps increasing how surprising the information is that people receive after they generate predictions would have an effect on belief change.

The exploration of surprise, and in particular recipes for surprise, raises questions not just for social influence but also for other aspects of surprise. A recipe for surprise provides a ready tool for examining other aspects of surprise. For example, it would be useful to examine the time course of surprise in more detail. That would be easier if we could predict just when it would arrive, which recipes can help to provide in an array of communication contexts. A further question is when and why people are open to being surprised. After all, we might fail to notice or process information that others see as surprising. We might be confused instead of surprised. We might be incurious. Are we ever particularly susceptible to being surprised, and with what consequences? Are we ever resistant to being surprised? Again, recipes for surprise make such questions easier to address. As a final example, is it clear what interpretations people form as they reconcile what occurred in a surprising event? The process account of the repetition-break plot structure yields predictions about this and all the prior questions. Other recipes for surprise might yield similar or distinct effects—a worthwhile consideration for future research.

A further opportunity for research would be to consider different understandings of surprise. For example, negative and positive surprises may work in distinct ways. There is a literature in marketing and hospitality on positive surprises, or "delight" (from at least Westbook & Oliver, 1991 forward), fit to the goals of trying to foster positive consumer experiences. That could be extended to any form of social research, including team research, workplace research, and relationship research. Negative surprises are also important. They could be disheartening of course. But they could also be motivating in important ways, such as overcoming our blindness to our own shortcomings (Kruger & Dunning, 1999) and so stimulating learning.

Finally, there is value in returning to one of the caveats made at the start, which is that the provisional account of surprise was fuzzy, for complex reasons. It is possible that scholars are lumping together different phenomena due to a messy lay category of surprise. It is possible that different cultural accounts of surprise will reveal facets that researchers are overlooking or thinking about differently. And it is possible that surprise has further surprises for us in store.

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