



Why schema-violations are sometimes preferable to schema-consistencies: The role of interest and openness to experience



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ABSTRACT

We investigated the appraisal processes and personality antecedents that regulate people's attraction to schema-violations - targets and objects that disconfirm schema- and stereotype-based expectancies. In two studies a preference for schema-violations (vs. consistencies) correlated positively with openness to experience, and negatively with the need for structure. In the second study, schema-violations were seen as more surprising (by all individuals), decreasing intentions to approach schema-violations, but were also seen as more interesting (by those higher in openness to experience), increasing intentions to approach and accept schema-violations. This suggests that two opposing processes - appraisals of surprise and appraisals of interest - regulate reactions to schema-violations, and that these processes are bounded by individual differences in openness to experience.

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1. Introduction

In an increasingly complex world, people's ability to successfully respond to novel and unexpected situations holds the key to personal and professional success (IBM, 2010). A popular view is that people are "wired" to dislike and avoid the novel and unexpected, because such events and situations signal potential threat and danger (Jonas et al., 2014; Noordewier & Breugelmans, 2013; Proulx, Heine, & Vohs, 2010). But at many points in history, and in many contexts, an ability to approach and explore unexpectedness has also proven functional and highly desirable. For instance, in prehistoric times our ancestors' preference for novelty and surprise pushed them to explore the world, and discover new habitats and foods (Chen, Burton, Greenberger, & Dmitrieva, 1999; Ebstein et al., 1996). And in more modern contexts, seeking and embracing unexpected and unusual ideas has led to the development of groundbreaking innovations. Inventing ATMs, solar-powered generators, and robotic-surgery required the creators to violate their own assumptions about the world: That money and medical procedures need to be handled by people, or that energy can only be har-

nessed from fossil fuels. Additionally, once these inventions were open to the public, popularizing them required help from early adopters - individuals who like new and unexpected products, and tend to put them to use early on (Noppers, Keizer, Bockarjova, & Steg, 2015). That some people like, value and approach the unexpected is also apparent in people's fascination with surrealist art (Swami, Pietschnig, Stieger, Nader, & Voracek, 2012), foreign lands and cultures (Brandt, Chambers, Crawford, Wetherell, & Reyna, 2015; Crisp & Turner, 2011; Pittinsky & Montoya, 2009), and the curiosity of scientists who follow up on inconsistent research results, or overthrow existing theories about the workings of the universe or the human mind (Popper, 1959).

From a psychological point of view, things novel and unexpected, such as ATMs and robotic surgery when they were introduced, were instances of schema-violations: Objects or situations that disconfirm our schema- and stereotype-based expectancies (Gocłowska, Baas, Crisp, & De Dreu, 2014b). But, despite anecdotal evidence that schema-violations are sometimes attractive and desirable, few psychologists have studied people's attraction to schema-violations. Instead, most psychological research focuses on people's aversion to schema-violations (Kruglanski, 2004; Schimmel et al., 1999). For instance, researchers have found that ideas that violate expectations (i.e. novel ideas) and people who violate expectations (i.e. creative students; people violating gender

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or group norms) are often treated with suspicion and discouraged (Karwowski, 2010; Mueller, Melwani, & Goncalo, 2012; Okimoto & Brescoll, 2010; Rubin, Paolini, & Crisp, 2010). By focusing only on such negative attitudes, research on schema-violations overlooks other important mechanisms behind people's reactions to schema-violating stimuli. Among those mechanisms, positive appraisals, such as appraising schema-violations as interesting, have not yet been studied. Thus, in order to gain a broader and more complete understanding of why people sometimes reject and avoid, and sometimes accept and approach, schema-violations, our investigation will focus on people's appraisals of schema-violating stimuli as interesting and/or surprising, their preference for schema-violating (vs. schema-consistent) stimuli, and what individual differences may determine those reactions.

1.1. Appraisal processes

Considering how people evaluate schema-violations may help us understand reactions to these stimuli, and some insight into how these evaluations work can be garnered from the study of experimental aesthetics. Aesthetics research examines how emotions like interest and surprise (Silvia, 2010) arise in reaction to “collative variables” – abstract but highly arousing qualities of information, such as novelty, complexity, uncertainty, and conflict (Berlyne, 1970). The study of people's reactions to collative properties can inform research on schema-violations, because the type of cognitive conflict that is characteristic of schema-violating information is thought to be the central collative property (Silvia, 2007). Two types of affective reactions in particular – surprise and interest – may lend themselves well to explaining reactions to schema-violations.

1.1.1. Surprise

The function of surprise is to interrupt an on-going action, and reorient attention to a new, possibly significant stimulus. Even though, once the *meaning* of the surprising event is decoded, surprise can be experienced as both positive and negative, recent studies suggest that at its core, and especially in the early stages of surprise reaction, this emotion involves a mildly negative psychological state (Noordewier & Breugelmans, 2013; Noordewier, Topolinski, & Van Dijk, 2016). When people are surprised this activates the anterior cingulate cortex (ACC; a brain circuitry that monitors for errors, and serves as a general precursor of aversive defense responses Botvinick, Cohen, & Carter, 2004; Egner, 2011), and prompts aversive bodily responses such as the startle reflex and freezing (Reisenzein, Bördgen, Holtbernd, & Matz, 2006; Scherer, Zentner, & Stern, 2004). Once the *meaning* of the surprising event is decoded (e.g., this startling event is a surprise birthday party), the valence of surprise can change in line with this meaning.

This dynamic property of surprise is well illustrated in the studies of Noordewier and Breugelmans (2013). The authors made screenshots, at 1 s intervals, of individuals confronted with a surprising event, and asked research participants to rate the valence of the faces in those screenshots. Facial expressions from the initial stages of the surprise reaction were rated as mildly negative. At this early stage of surprise, the valence of the emotion did not differ between positive (vs. negative) surprise conditions. But once research participants realized the source of surprise, this led to both positive and negative facial expressions, depending on the actual *meaning* of the surprising event (Noordewier & Breugelmans, 2013; Noordewier et al., 2016).

In line with this view of a slightly negative flavor of surprising events, in some studies, expectancy violations themselves have been evaluated negatively. In one line of research experimenters exposed research participants to facial morphs that were surpris-

ing (made up of faces of known individuals), or unsurprising (made up of faces of unknown individuals) to research participants. A classic effect of facial morphing is that morphed faces are perceived as more attractive, because they represent the “average” facial features of many individual faces. However, this “beauty in the averages” effect was reversed for surprising facial morphs. Morphs made up of well-known faces were evaluated more negatively relative to morphs made up of unknown faces. In addition, the more knowledge research participants had of the faces that were used in the morphs, the more negative was their evaluation of their morphs (Halberstadt, Pecher, Zeelenberg, Ip Wai, & Winkielman, 2013). This last result suggests that surprise (that stems from having one's expectancies violated) can lead to negative evaluations of an otherwise positive stimulus which, in the context of the present investigation, means that surprise may decrease people's preference for schema-violating stimuli.

1.1.2. Interest

But while most people are likely to feel surprise in reaction to schema-violations, research findings also suggest that some people may, in addition, perceive schema-violating stimuli as interesting. Interest arises in reaction to collative properties, and can motivate the exploration of one's environment, and the learning of new knowledge, skills, and experiences (Silvia, 2008b). Interest arises when people appraise a stimulus as novel and complex (and schema-violations may be perceived as such; Berlyne, 1970), and when they perceive that they have sufficient resources to cope with (i.e., understand) that stimulus (Silvia, 2008a). This means that interest arises as a function of both the stimulus type, and the unique constellation of traits and assumptions that a particular person brings into a situation (Lazarus & Folkman, 1984). In line with this idea, researchers uncovered that only some people find novel and complex stimuli interesting.

Using within-person correlations and multilevel mixture models, Silvia, Henson, and Templin (2009) demonstrated that for some individuals (68% of his sample), novelty-complexity appraisals played a chief role in determining interest, while for others (32%) appraisals of coping potential were more important. Important to our present argument, the study also found that openness to experience was significantly higher in those whose interest depended on appraisals of novelty and complexity, relative to those whose interest depended on appraisals of coping potential (Fayn, MacCann, Tiliopoulos, & Silvia, 2015; Silvia et al., 2009). We argue that because schema-violations are high in collative properties (Berlyne, 1970), interest in schema-violations may arise as a function of openness to experience. And because interest is associated with greater engagement and approach tendencies (Deci & Ryan, 1985), a greater preference for schema-violations may arise in reaction to interest appraisals.

Of note is that although surprise and interest could both arise in reaction to schema-violations, these processes may oppose one-another when influencing the ultimate response to the schema-violation (see Fig. 1 for an illustration of this moderated mediation model). At high levels of openness, people should have a greater interest in, and a greater preference for schema-violations, but, simultaneously (and regardless of openness to experience levels), schema-violations should also be perceived as more surprising, leading to their rejection. Such a set of relations would be very interesting, as it would suggest that interest prompts people (who are high in openness to experience) to approach and explore things that are novel and complex, even if the object of interest is in some way considered aversive. And since the predicted mediators are pitted against one-another, a mediation may emerge even in the absence of an overall (direct) relation between schema-violation and preference (MacKinnon, Fairchild, & Fritz, 2007; for a recent example of such a model see Murayama & Elliot, 2012).

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