FROM DOUBT TO FUNCTIONALITY: AN IMAGERY STORY

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ABSTRACT
Mental imagery and mental simulations play an important role in any consumption experience. For decades, however, the famed “imagery debate” stymied research on how imagery impacts consumption. As researchers debated whether a picture-like component was part of the underlying mental representation or not, a researcher’s inability to produce concrete evidence that people had indeed formed mental images was often used to challenge imagery-based explanations. Despite this, the last decade has witnessed burgeoning research on how consumers use imagery in a myriad of ways – often in the service of some larger goal. The current article views imagery through this functional lens and reviews and organizes these findings.

This review provides a historical perspective on imagery research and then uses evidence from past research to lay down a conceptual foundation for new work that will undoubtedly emerge in the coming decades. Questions such as “What triggers imagery?” “Are there differences between perception and imagery?” “How do we use imagery to create simulations and imagine what we do not see?” “How does imagery exert an influence?” and “Are there individual and cultural differences in the ability to image?” are addressed. Then, to unify the somewhat diverse findings from imagery research conducted on consumers, the article organizes the research using two dimensions: The extent to which imagery is spontaneous or deliberate and whether it has cognitive or motivational antecedents. This framework is used to discuss existing research and to pose questions that remain to be answered.
Philosophers have often wondered about the inward eye that Wordsworth notes in his poem, and its ability to generate images from past input. Debates about it have existed since the time of Aristotle who described its working in terms of phantasia (the ability to generate an image) and phantasma (the image). Believing that these images were an essential part of human thought, he wrote, "The soul never thinks without a phantasma" (Aristotle 1984, 431a). In Aristotle’s view, all concepts originated from the experience of perceiving sensations and that this imprint of the sensation on the mind (the phantasma) was very much like the impression of something on molten wax. Thus, in his view, phantasma was akin to perception and considered central to human thought. Phantasia, on the other hand, referred to the human ability to perceive or see something. In early discussions, the mere act of perceiving was often conflated with imagery. The idea that this imprint or image could be retrieved without the physical presence of the object, and the interpretation that imagery involved generating something that was picture-like in the absence of the stimulus, emerged much later.

1. What is imagery? Definitions and clarification of key terms

Mental imagery, as it is defined today, is the ability to form an image of something in one’s mind even though that object is not physically present. Colloquial expressions referring to imagery often include references to “picturing” or “visualizing”. As Wordsworth notes, an image of what he has seen in the past flashes upon that “inward eye”. These colloquial expressions invariably refer to visual mental imagery and neglect other types of mental imagery experiences that might exist. Most cognitive psychologists acknowledge the existence of other forms of mental imagery such as auditory (Reisberg, 1992), olfactory (e.g., Bensafi et al., 2003; Djordjevic et al., 2004, 2005), haptic (Klatzky, Lederman, and Matula 1991; Yoo et al., 2003) and kinaesthetic mental imagery (Jeannerod, 1994). Yet, a bulk of the research that has been conducted still falls into the visual mental imagery domain. Further, some researchers have argued for the existence of a picture-like representation (e.g., Kosslyn 1975). It is precisely this claim of the existence of a “mental picture” like representation that has led to animated debates about the very existence of imagery.

Although philosophers and scientists had long acknowledged humans’ ability to generate images, the ability to imagine something and the existence of a picture-like representation in memory to store information were often discussed together and the denial of one was typically accompanied by the denial of the other. Given that the word “image” is suggestive of a picture, early theories often implied the existence of a representations or brain states that contained pictures (Kosslyn 1975, 1980). This led to extensive critiques that were focused on the utility of these forms of representations and on whether the same knowledge could be represented in other ways (e.g., Pylyshyn 1973, 1978, 2002a, 2003a) and rebuttals as well as counter rebuttals (e.g., Hannay, 1971; Kosslyn, 1980, 1983,1994; von Eckardt, 1988, 1993; Tye, 1988, 1991; Cohen, 1996). What was, however, lost in the process was the distinction between the process of imagining (a phenomenon that is very familiar to most humans and a part their everyday experience) and the nature of the representational system that allowed one to generate this experience.

What appears to have emerged is the view that mental representations (image-like or otherwise) can elicit quasi-perceptual experiences that are conscious (Thomas 2003). Thus, one can have a quasi-perceptual picture-like experience (i.e., one can generate the image of a “purple cow”) without necessarily assuming that such a picture-like representation is actually stored in memory.

2. A Historical Perspective

Although early Greek philosophers like Socrates, Plato and Aristotle debated about mental imagery and these debates continued in the centuries that followed, it was only in the 19th century that this issue was addressed by psychologists. Wilhelm Wundt, often considered the father of cognitive and social psychology, raised the possibility that sensations, imagery and feelings form the foundations of consciousness and often accompany thought. However, the advent of Behaviorism in the early 20th century put this idea to rest temporarily; the major zeitgeist at that time was that there was no visible evidence of images in human brains and therefore the value of studying imagery was questionable. Yet, the intuitive appeal of mental imagery and its prevalence in our daily lives continued to fascinate researchers: How could one ignore a phenomenon that is so familiar and part of everyday experience? It was only with the arrival of cognitive psychology in the 1950s that research on imagery began in earnest (see Mackisack et al. 2016 for an extensive review on the prehistory of imagery).

2.1 The early debates

The 1970s saw a large number of important studies that focused on how knowledge was represented. Dominant among the different theories that were postulated were the theories of propositional representation (Pylyshyn 1973) and spatial representation (Kosslyn 1975). The critical difference between these theories was the fact that the former suggested that scenes and relationships between objects were represented by symbols and propositions and not by spatial mental images whereas the latter invoked the use of representational forms that had spatial properties. The propositional perspective emerged from linguistics and
was used to represent verbal information through a series of propositions. Thus, information such as, "Tom gave Mary an expensive gift for her birthday," could be represented through propositions such as "Tom gave Mary a gift," "It was an expensive gift," "It was Mary’s birthday." If one of the component propositions were found to be untrue, it rendered the entire proposition false. Such a propositional theory was later elaborated in order to accommodate the representation of not only simple scenes but also more complex ones. For example, a plant sitting on the windowsill could be represented through formulae made up of symbols such as ABOVE (PLANT, WINDOWSILL). More complex scenes (e.g., ships or houses) could be represented through propositional networks or schemes that had content about its features, its composition and even information about its structure. This led to a category-based view of knowledge, in which images could be reduced to a set of detailed propositions and could emerge from such propositions.

In direct contrast to the propositional theories, Kosslyn proposed a spatial representation theory that preserved the spatial relationships amongst objects. Information was represented in a form that provided information about relative locations of objects in coordinate space, indicated the relative salience of objects and included the perceiver as part of this representation. Thus, scenes could be easily represented and recreated. Further, such representational forms could be accessed by linguistic and perceptual mechanisms. There were several advantages of this theory but the primary one was that it was analogous to real world scenes and most, if not all, relationships between objects in a scene could be accurately captured and drawn upon.

The experimental evidence that was provided to support this theory identified some fascinating phenomena about the human mind. Early experiments by Kosslyn involved asking participants to move their mental focus from one part of the ship to another. Interestingly, the reaction time of subjects increased as the distance between the two parts increased. This suggested that people were, in the course of completing this cognitive task, generating mental pictures so that they could simulate walking from one point to another. The fact that this was also observed in people who were congenitally blind (Marmor and Zaback 1976) suggested that information was encoded at some deeper level and that visual input was simply one type of input that fed into this system.

Shepard and Metzler’s (1971) mental rotation experiments further corroborated aspects of this theory. In their experiments, participants were shown two objects that were placed at different angles and participants had to determine if the objects were identical or not. Results showed that the reaction time to make this judgment increased linearly with the rotation angle, lending support to the conclusion that participants were mentally rotating the objects to make the decision. These mental chronometry experiments showed that imagery was very closely related to processes underlying perception. Further evidence to show the similarity between what one sees and the mental images that are generated was provided through experiments on size. Kosslyn, for example, asked participants to imagine objects that were near versus far away. Objects that are near typically fill one’s visual field and more details are apparent. Thus, an elephant and a rabbit pictured next to each other will have the elephant occupying more of the visual frame. It turned out that participants were able to answer questions about the elephant’s physical features faster than those about the rabbit. However, when the rabbit was pictured next to something even smaller (e.g., a fly), participants were able to answer questions about the rabbit faster. Although alternative accounts can explain some of these results, the empirical evidence that accumulated during this period showed remarkable similarities between perception and imagery. The processes that underlie the two, however, are quite different as will be elaborated later.

2.2 Recent neuroscience evidence and its implications

With the advent of newer techniques (ERP, fMRI, PET), it became possible to glean further insights into the workings of the brain. Most of the brain imaging studies that were conducted in the 1990s, suggested that similar areas of the brain were activated when people were generating mental images of an object and simply perceived the object. The region that became active was called the striate cortex and was the primary area associated with visual perception (Bartolomeo 2002; Farah 1989). Although not all brain imaging studies show activation of the striate cortex, it is true that when people are called upon to generate detailed mental images, this region does get active suggesting some commonality between visual perception and visual imagery.

Evidence from brain-damaged patients also provides supportive evidence of the closeness between visual perception and visual imagery. For example, when patients have perceptual problems, they also find it difficult to generate images. Patients with unilateral neglect (inability to see objects on one side due to damage to the parietal lobes) are not only unable to see objects on one side of their visual field but interestingly are also unable to imagine objects on that side. Consequently, when asked to name objects on the side of the mental image that they generate, they are unable to do so (Bisiach and Luzzati 1978). Both of these sets of studies suggest commonalities between visual perception and imagery. However, other studies suggest that there are differences (Guariglia et al. 1993).

The primary evidence for differences comes from studies on double dissociation. The basic logic behind these studies is that if there are patients in whom visual perception is impaired but imagery ability is not or those in whom imagery is impaired but visual perception is not, then these two processes might be relying on different brain regions and physiological mechanisms. Such types of double dissociations have been observed in patients and conflict with the results of brain imaging studies (Behrmann, Winocur and Moscovitch 1992; Moro et al. 2008).

Given these differences, it has been generally acknowledged that visual perception and visual imagery are not exactly the same. Although they do share some overlap, the mechanisms that give rise to imagery are
located at higher visual centers. Visual perception, on the other hand, is seen as a more bottoms-up process whereby images that are processed by the retina are sent to the lateral geniculate nucleus, the striate cortex and finally to the higher regions of the cortex that are involved in imagery. In their review of the evidence, Bartolomeo et al. (2013) suggest that the overlap between imagery and visual perception appears to be in motor imagery rather than visual mental imagery. Thus, it appears that imagery and visual perception share features but also differ along some key dimensions.

2.3 Current challenges

Although the above discussion has focused on similarities between visual perception and visual imagery, the larger question about what mental imagery is remains somewhat unclear. Thomas (2003) suggests that it could be a "quasi-perceptual conscious experience" or ii) "a hypothetical picture-like representations in the mind and/or brain" that in turn can give rise to the quasi-perceptual conscious experience or iii) "a hypothetical inner representations of any sort (picture-like or otherwise)" that can elicit the quasi-perceptual conscious experience. Although these are often not distinguished, it appears that what is common to all three is the fact that imagery involves a quasi-perceptual experience. Discussions of the underlying representational form have often produced fractious debates and the assumption that the representations are in some sense picture-like often draws criticism and several alternative accounts have been developed to account for the data (e.g., Skinner, 1974; Dennett, 1969; Sarbin and Juhasz, 1970; Sarbin, 1972; Pylyshyn, 1973, 1978, 1981, 2002a, 2003a, 2005; Neisser, 1976; Hinton, 1979; Slezak, 1991, 1995; Thomas, 1999b, 2009). There have been others who have defended such an account or attempted to come up with a compromise (e.g., Hannay, 1971; Kieras 1978; Kosslyn, 1980, 1983,1994; von Eckardt, 1988, 1993; Tye, 1988, 1991; Cohen, 1996).

To avoid this debate and yet understand the power of imagery, particularly in an area like consumer psychology, it might be worthwhile to adopt the more functional approach to imagery suggested by Kosslyn, Thompson and Ganis (2003; see also Kosslyn, Ganis and Thompson 2003 and Moulton and Kosslyn). Such an approach builds on the notion that we all have such quasi-perceptual conscious experiences that sometimes involve the generation of mental images. What is perhaps more interesting is the role this plays in everyday life and how it affects our responses, helps us make decisions and solve problems. Such a functional view sidesteps the representational debate and starts with the basic premise of imagery and one that is fairly incontrovertible: *Imagery is a quasi-perceptual experience involving one or more sensory modalities that can be generated either spontaneously or at will.* This premise allows us to examine the implications that imagery has for an array of phenomena in consumer behavior and the many ways in which it can enter into the cognitive processes in which consumers engage.

Consumer psychologists, for example, are typically interested in how consumers make choices. What role can imagery play in this process? In early studies on imagery in the consumer domain, Keller and McGill (1994) pointed out that although consumer preferences had been studied by examining the utilities that consumers attach to different attributes, when consumers employed imagery to evaluate alternatives, the relative importance of the attributes was not a very good predictor of preferences. Rather, the ease with which one could generate images was a better predictor. Their studies were important because they suggested that consumers use different rules when they make decisions about products. Some might follow analytical rule based methods (Bettman 1979; Wright and Rip 1980) whereas others might use very different strategies involving imagery. Our understanding of these different decision rules and when they come into play is still relatively rudimentary.

To provide a systematic approach to address the role imagery plays in guiding consumer behavior, it makes sense to first consider the conditions that elicit imagery, then to examine how people use it, and finally to explore avenues whereby this use of imagery can help to understand a host of consumption related phenomena. The objective of this article is to build on an early review by MacInnis and Price (1987) and provide an integrative framework for looking at conditions that elicit imagery and the many effects it has. The functional view of imagery suggested by Kosslyn, Thompson and Ganis (2006) is perhaps best suited for this purpose.

3. What elicits imagery?

Several theories of information processing (see Wyer, Adaval and Colcombe, 2002; Wyer 2004) suggest that the information we encounter in everyday life is stored in a form that preserves the spatial and temporal relationships of different elements. For example, when recalling a dinner with colleagues, one might remember the set up of the dining area, where people were sitting and the sequence of events that occurred at dinner. Although people might differ in their ability to recall such details, the fact that some sort of representation that preserves the spatial and temporal features is retrieved appears clear.

Wyer and Radvansky (1999) spell out conditions when these types of representations might be created spontaneously. They suggest that “situation models” are formed spontaneously in the course of comprehending events and that these models have an image-like or perceptual component. They further suggest that for these situation models to form, the events must occur within a spatial-temporal framework (i.e., they must be localized in space and time). For example, according to their conceptualization, the sentence, “Joe threw the book” is more likely to elicit a mental image than the sentence, “Joe owns a book” because the former occurs at a specific time whereas the latter is more general with respect to its temporality. When images are not generated, the information might be stored linguistically. However, in most
It is worth noting, however, that although one can generate an image based on a phrase, “Joe threw the book” or can generate an image of a “purple cow” without ever having seen it before, the number of images formed in most everyday communications (e.g., while reading or watching television) is unclear. In the course of comprehending information, do we form one image or several? Do they hang together like a movie or are they independent? Does every form of mental images or are there individual differences in not only the extent to which one forms images but also the types of images one forms?

### 3.1 The generation of one or more mental images

Radvansky and colleagues (see Radvansky, Wyer, Curiel, and Lutz 1997; Radvansky and Zacks 1991) present a fascinating approach to answering some of these questions. To assess whether one or more image-based representations are formed, Radvansky and Zacks (1991) presented participants with sets of one, two or three statements that described different objects in a particular location (e.g., “The book is on the table;” “The cup is on the table;” “The pen is on the table.”). They reasoned that in this case it should be easy for participants to form an image since one could imagine a table with one or more objects on it. Other participants were given an object in one, two or three different locations (e.g., “The book is on the table;” “The book is on the chair;” “The book is on the floor.”). In this case, they speculated that it is difficult for participants to form a single image based representation since the same object cannot be found in three locations at the same time. Consequently, participants are more likely to form multiple representations. To test if this was indeed the case, they used a retrieval-based paradigm that examined how easy it was for participants to identify the information in memory (i.e., the time it took them to do so). If a single image-based representation is formed (i.e., one to three objects on a table), it should take people less time to identify where the object is located. Thus, the time taken to verify that they had seen the object before should be the same regardless of the number of objects. However, if multiple images are formed, then their identification might be harder and should take more time as the number of objects increases. Results not only validated their assumptions but also provided a useful tool (i.e., set size effects described by Anderson, 1974; Rundus, 1971) to detect whether people form one image-based representation or several.

A similar approach was used by Radvansky, Wyer, Curiel, and Lutz (1997) to detect if people form multiple representations when they encounter everyday information (e.g. shopping situations). In their studies, participants were given statements to learn. These statements were about a single person or several persons purchasing single or multiple objects at either one location or different locations. When the statements described a single person making multiple purchases in a single location, response times for verification of the information did not vary with the number of statements presented. When the objects were found in different locations, however, or when several persons were associated with the same object, the time taken to respond varied with the number of statements presented.

These studies provide researchers who are interested in imagery with a useful paradigm for testing the existence of an imageable component. One could use similar techniques to see if these image-like components are linked together thematically to form a larger episodic representation (Wyer and Radvansky 1999) by presenting pictures with verbal information that is either in narrative order or in scrambled sentence order. Recognition response times to images that are part of a narrative should be facilitated if it is preceded by an image or verbal content that comes before it than if it is preceded by an image or verbal content that is not in temporal order (see Adaval, Isbell, and Wyer 2007 for examples of how this might be assessed. See also Jiang, Adaval, Steinhart, and Wyer 2014). It appears that multiply coded representations of larger episodes (of the sort encountered in everyday life) clearly have the image associated with the verbal content.

### 3.2 Imagery in response to prose comprehension

Communication that is received often consists of verbal and pictorial elements and sometimes a combination of both. It is worthwhile reexamining past work on how verbal or prose information elicits imagery. In a classic study, Glenberg, Meyer, and Lindem (1987) asked participants to read a story comprising of a series of statements in which a protagonist (John) went through a series of experiences. Of interest was memory for a sweatshirt that was either associated with him at the outset (e.g., “John put on his sweatshirt before going jogging”) or alternately was separated from him (e.g., “John took off his sweatshirt before going jogging”). After participants had read the passage, recognition memory of items in the passage was assessed. This included the target object “sweatshirt”. The results showed that participants were quicker at recognizing the target object in the first condition than in the second because they had presumably formed a mental image of John wearing the sweatshirt and they used this image in picturing the entire sequence of events that occurred later. In the second condition, however, the sweatshirt was separated from him and the image did not persist while he was going through the other experiences. Thus, simple framing of sentences (whether they are in ads or in other forms of communication) can affect the mental images that are formed and memory for information contained in them.

One notable aspect of the story used by Glenberg, Meyer, and Lindem (1987) is that it has relatively concrete cues. Imagery is, in general, facilitated when such cues are provided (Pavio and Csapo 1973; Richardson 1985; Wright and Rip 1980). Ways in which information can be made more concrete or vivid has often been through the use of pictures, concrete descriptions and narrative text (Babin, and Burns 1997; Bone and Ellen 1992; Keller and Block 1997; Kiseilius and Sterntahl 1984; Mitchell and Olson 1981; Adaval and Wyer 1998; Keller and Block 1997;
Petrova and Cialdini 2005; Thompson and Hamilton 2006). In general, such vivid information facilitates imagery and has been shown to affect evaluations as well (Childers and Houston 1984; Lutz and Lutz 1977, 1978; Mitchell 1986).

Prose or verbal communication can also affect the perspective from which an image is formed. In an early study, Black, Turner, and Bower (1979) suggested that mental images are typically generated from a visual perspective. They found, for example, that people took less time to comprehend the sentence “While Mary was reading a book in her room, John came in to talk to her” than when they were given the sentence “While Mary was reading a book in her room, John went in to talk to her.” The explanation was that in the former case people read the first part of the sentence and constructed an image of Mary from the perspective of someone who was inside the room with her, and this perspective was used to comprehend the second part of the sentence. In the latter case, it was harder to comprehend the last part of the sentence (John went in to talk to her) because it elicited an image of John from the perspective of someone outside the room. This change in visual perspective increased the time required to comprehend the second sentence.

In a related set of studies, Jiang and Wyer (2009) suggested that this difficulty in comprehension caused by perspective shifts extends to verbal statements and pictures of an event especially if the event is described from an unfamiliar perspective for most readers. Thus, the statement, “The man came into the prison” is unfamiliar to most readers who might not have seen the inside of a prison. However, the statement, “The man went into the prison” is something one often reads about. The latter should, therefore, be easier to comprehend. Although this could simply be a familiarity effect, what makes it interesting is that this tendency is noted particularly among those who have a disposition to form mental images suggesting that imagery is used to take the perspective suggested in the verbal statements. Jiang and Wyer (2009) also find that when comprehension is made easy because of the absence of such perspective shifts, emotional reactions to communications become more intense. These studies indicate the importance of examining the structure of communications that are in prose form particularly when they are intended for persuasion purposes.

### 3.3 Imagery in response to pictures in communications

Much of the work in marketing has focused on the effects of pictures on memory for the content and has assessed their persuasive impact under different conditions (Childers and Houston 1984; Costley and Brucks 1992; Edell and Staelin 1983; Houston, Childers and Heckler 1987; Lee, Deng, Unnava and Fujita 2014; Miniard et al. 1991; Perrachio and Meyers-Levy 1997; Pracejus, Olsen and O’Guinn 2006). Pictures have been useful in increasing the vividness of persuasive communications. Studies that have manipulated this either through the presence or absence of pictures (Keller and Block 1997; Kiseilius and Sternthal 1984) or the relative abstractness of pictures (Babin and Burns 1997) have found that these manipulations pictures do influence attitudinal judgments. In the study by Babin and Burns (1997), for example, participants were shown an ad containing a picture of a product in use, an ad containing a less concrete picture or one without a picture. The concrete picture was more effective in stimulating visual imagery and had a positive effect on attitudes. Petrova and Cialdini (2005) made the important link to behavior by pointing out that consumers typically base purchase intent on the ease with which they can imagine product experiences. Thus, when they were asked to imagine a product experience in which the stimulus was not conducive to the generation of imagery (e.g., a vacation ad that was a modified abstract painting rather than an actual picture), it reduced the persuasiveness of the ad and the likelihood of engaging in the behavior. Thus, imagery can be induced by concrete visual images and not just concrete verbal descriptions.

Interestingly, the inferences that people make on the basis of visual cues can also be affected by imagery. Jiang, Gorn, Galli and Chattopadhyay (2016), for instance, show how people’s inferences about visual cues such as logo shapes occur because of imagery based processing. Specifically, circular versus angular shaped logos activate associations of softness and hardness and this influences judgments about the product and its attributes. The effect of these inferences dissipates when people engage in irrelevant imagery, suggesting that imagery-based visual processing was responsible for the effect.

These studies, in conjunction, raise further questions about whether all pictures automatically elicit imagery to a greater or lesser extent and whether providing a picture has the same effect as images that are self-generated. Consider, for example, a situation where one has read a book and formed an image of the principal character on the basis of the verbal description. What happens when one sees a movie with a famous actor playing the role of this character soon after? Clearly, the self-generated image will be different from the ones that are subsequently generated after viewing the film. Which of these might be more impactful? Would the inconsistency between self-generated images and images that are provided create some degree of disfluency?

The extent to which pictures actually evoke imagery and whether they have the same effect as self-generated images has received relatively less attention in the literature. The issue is complicated by the fact that in the communication domain, pictures are often accompanied by text or verbal information and imagery could be elicited by either the pictures or the text and could also have interactive effects. In a series of studies, Adaval and Wyer (1998) examined how the format of the text information influenced the impact of the visual images that were provided. They showed that the effect of pictures or self-generated images might depend on how the information is conveyed (i.e., whether it was in the form of a narrative or as a list). Specifically, when information about a vacation destination was conveyed in the form of a narrative, pictures increased the impact of this information. However,
Pictures interfered when the information was conveyed as a list of things to do. Interestingly, this effect was evident both when pictures accompanied the text or when the images were self-generated (i.e., pictures were not provided) suggesting that the effects that pictures or self-generated images had on the processing of verbal information in these two formats was the same. To summarize, pictures and self-generated images might have a similar impact on attitudes and behavior if they are created in the service of an episodic event representation that has a story-like structure. However, self-generated images (or pictures) could hurt when the information is more likely to be examined in an item-by-item piecemeal way.

It might be premature, however, to conclude that the effect of pictures and self-generated images are always the same. Self-generated images typically lack the detail of pictures and are constructed from a perspective that might differ from that shown in a picture. Thus, in situations where one imagines something and then receives a picture of the imagined object, some degree of disfluency might be experienced (as in the example noted earlier about forming an image of a character based on a book versus a movie). Research by Unnava and Burnkrant (1991) is suggestive of this point as well albeit with a contingency. These authors found that when pictures were used to show attribute information (i.e., verbal content) in an ad, they enhanced recall if the attribute information was low in imagery. However, when the attribute information was easy to imagine, self-generated images minimized the effect of externally provided pictures on recall.

The interference between self-generated images and externally provided pictures could arise from the fact that perception and imagery activate similar regions of the brain and might use similar resources (Unnava, Agarwal and Haugtvedt 1996). This could lead to interference when verbal information has to be read and pictures are present because both use the same visual resources. Of course, if the information being read is in a form that is facilitated by pictures (e.g., narratives as in the Adaval and Wyer 1998 studies; see also Adaval, Isbell and Wyer 2007), these interference effects are not likely to be observed. A consideration of how the verbal and visual information in a persuasive message is presented could shed light on the mixed findings on the effects of pictures and imagery in persuasion (see Petrova and Cialdini 2008 and Mani and MacInnis 2001 for reviews on the effects of imagery on persuasion).

3.4 Other sensory triggers of imagery

Although a bulk of the research has focused on visual imagery, other forms of imagery are possible. These forms, however, have only recently been investigated in the consumer domain. Triggers could be smells (olfactory imagery), tastes (gustatory imagery), sounds (auditory imagery) and tactile inputs (tactile imagery). Past research has shown that when participants are asked to imagine a smell, they spontaneously sniff less when they are imagining a negative smell like rotten eggs relative to a positive smell like roses (Bensafi et al. 2003). Likewise, when asked to imagine a taste, Eardley and Pring (2011) showed that participants’ images became less vivid and memorable if they were sucking on a sweet candy (versus not). Evidence of haptic imagery also exists as imagined touching leads to similar levels of perceived ownership as physical touching (Peck et al. 2013) and imagined tactile experiences of going against the flow produce the same effects on choice as the actual experience (Kwon and Adaval 2017). Evidence of auditory imagery is also available. For example, Kosslyn, Ganis and Thompson (2001) note that people are able to determine if the initial notes of a popular tune (“Three Blind Mice”) go up or down, suggesting that they imagine the sounds. Given the evidence for many forms of imagery, an issue that often arises in considering these different types of imagery processes is the extent to which they are reliant on the existence of a visual trace. Thus, for example, do olfactory, gustatory imagery and tactile imagery require a visual trigger?

Some research bears on this issue. In a series of studies, Krishna, Morrin and Sayin (2014) examined how olfactory imagery affected consumer responses such as the extent to which they salivated, their self-reported desire to eat as well as their actual food consumption. Imagining an odor was shown to increase all of these responses but only when a vivid visual mental representation of the odor referent could be created. This was typically accomplished through the presentation of a picture. Put simply, imagining the smell of rain or the smell of cut grass does not appear possible without the visual referent or image. The same might be true of other types of sensory images. In work on multisensory ads, Elder and Krishna (2009) suggest that these types of vivid ads result in higher taste perceptions relative to ads that are focused on only one sensory input (taste). However, if participants are placed under cognitive load, the effect of multisensory ads gets weaker. It is conceivable that multisensory ads (which often have a visual referent) are more conducive to imagery and people spontaneously imagine the sensations. The cognitive load imposed by a different task might impair their ability to do so.

Although, olfactory, gustatory and visual imagery appear to be closely associated as suggested by Elder and Krishna’s work, less is known about auditory imagery. Research on this topic in marketing is surprisingly scant particularly given the ubiquity of musical scores and jingles in mass media communications. Auditory imagery is distinct from visual imagery and is often used to organize and anticipate sounds when no auditory input is present. The closest approximation of what auditory imagery entails is the recollection of a popular tune in one’s mind or alternately someone’s voice. Individual differences exist in the extent to which these images are vivid and clear. Those who are high on this ability (as measured by the Bucknell Auditory Imagery Score) are able to provide fairly precise information about tempo, pitch, harmony etc. Although research on auditory imagery is still in its infancy, the advent of PET and fMRI techniques have allowed researchers to examine how different areas of the brain are
involved during auditory imagery. An excellent review by Hubbard (2010) provides details of what has been done in this area and reviews data on imagery of auditory features (such as pitch, timbre and loudness), imagery of other complex aspects of auditory stimuli (e.g., harmony), imagery for verbal stimuli (e.g., speech) and how auditory imagery is related to perception and memory.

In marketing and consumer psychology, a bulk of the work that currently exists examines the effects of music on various outcomes such as product evaluations (Peck and Childers 2008), behavior (Milliman 1986), time perception (Kellaris and Kent 1992; Mantel and Kellaris 2003; Yalch and Spangenberg 2000) and feelings (Gorn, Goldberg and Basu 1993). However, most of this work is not focused on auditory imagery – a consideration of which would require some sort of retrieval of sound (e.g., speech or music). Given the dearth of research on this topic, some potential avenues of research are elucidated in the following section on cultural triggers.

### 3.5 Cultural triggers in the generation of imagery

Research on cultural triggers of imagery is also scant. Past research does suggest that East Asians are more likely to notice background cues and European Americans are more likely to focus on foreground cues (Masuda and Nisbett 2001). Further, the former are more likely than the latter to react negatively to semantic incongruities between target objects and background scenes (Goto, Ando, Huang, Yee and Lewis 2010). These differences are often attributed to differences in self-construal (Markus and Kitayama 1991). That is, East Asians tend to be interdependent and consequently more sensitive to context than European Americans are. This tendency to be more sensitive to the context affects how members from different cultures perceive products (Moorey, Oyserman and Yoon 2013) ad appeals (Aaker and Lee 2001; Agrawal and Maheswaran 2005; Han and Shavitt 1994; Wang, Bristol, Mowen and Chakraborty 2000) as well as depicted behaviors (Kwon, Saluja and Adaval 2015; Saluja, Adaval and Wyer 2017). However, little is known about how these differences in information processing could trigger imagery or affect the extent of imagery in which people engage.

If, for instance, East Asians are more likely to think of things in relation to one another, then pictures of a scene might provoke further elaboration and inferences as they spontaneously attempt to relate different aspects of the scene. In fact, simpler and more abstract pictures with fewer elements might then be deemed unappealing to these individuals (see Oyserman, Sorensen, Reber and Chen 2009 for a description of how these cultural mindsets might affect information processing tendencies). Interestingly, a study by Liang and Cherian (2010) provides some support of this claim. They suggest that although concrete stimuli are generally more likely to elicit imagery than abstract stimuli, this finding is not universal. Specifically, Chinese and Americans differ in their preference for concrete versus abstract stimuli with Chinese showing a marked preference for concrete stimuli over abstract stimuli and Americans holding similar attitudes toward the two. As a result when Chinese encounter abstract stimuli, they are more likely to generate imagery as they attempt to comprehend this abstract information using the tools that they find familiar.

Additional research on differences in the processing of information suggests that there might be less reliance on auditory imagery in some countries. For example, several languages such as Chinese, Korean and Japanese use logographic characters that convey meaning rather than sound. In contrast, English and many European languages use alphabets to represent sound. Reading the latter obviously involves sub-vocalization of the sound and uses a phonological code whereas the logographic characters in many Asian languages do not require this and follow a more visual process (Schmitt, Pan, and Tavassoli 1994; Tavassoli 1999, 2001, 2002). This difference has significant implications in the area of branding and auditory imagery.

Tavassoli and Han (2001) suggest that because Chinese has a large number of homophones (words that sound similar but mean something very different such as “so” and “swa”), sounds are often ambiguous in communication. In contrast, the logographic representations offer a more precise mode of communication. Processing Chinese characters, therefore, relies on a visual process to a greater degree than reading English (Hung and Tzeng 1981; Schmitt, Pan, and Tavassoli 1994; Zhou and Marslen-Wilson 1999). Thus, when brand recall is assessed, Chinese speakers perform better when writing down the answers because it primes the visual memory code, whereas English speakers tend to do better when speaking aloud because it primes the phonological code. Chinese readers also tend to be more sensitive to aspects of a script that is being read whereas English speakers are more sensitive to the tone of the speaker’s voice. When Mandarin and English speakers were assessed to see if they relied differently on visual brand identifiers or auditory brand identifiers, Tavassoli and Han (2002) found that Mandarin speakers had better memory of a brand paired with a visual identifier than an auditory one. Likewise, English speakers appeared to do better with auditory identifiers. These results suggest that in the absence of a stimulus cue, English speakers might be better than Asians at auditory imagery and might be able to retrieve brand auditory elements (e.g., jingles, sonic brand elements) more easily. Additional research is clearly needed to further confirm or disconfirm such language-based differences.

### 3.6 Imagery fluency and individual differences in the tendency to engage in imagery

An issue that arises frequently is whether people differ in their tendency to engage in imagery and how fluent the experience of generating images might be. The accessibility and ease with which people generate images might affect their response to visual information. Past research by Pham, Meyvis and Zhou (2001), for instance, has demonstrated that individuals who differ in their
Imagery abilities are differentially impacted by vivid information. Individual differences in the ability to image are also well known (Bartlett 1932; Paivio 1971; A. Richardson 1977) and people were initially classified as visualizers or verbalizers. Paivio (1977) came up with the first scale to assess these differences through an individual differences questionnaire. This scale included items such as “I often use metal pictures to solve problems.” The scale was revised by A. Richardson (1977) to include a set of 15 items that had the best discriminant validity. This Verbalizer-Visualizer Questionnaire (VVQ) formed the basis of numerous early studies of individual differences in imagery ability. However, there have been several criticisms of this scale because although it was related to verbal abilities, it was only weakly related to vividness of imagery (Green and Schroeder, 1990) and was unrelated to scores on visual-spatial tasks (Alesandrini 1981). This led to the conjecture that visualizers might not all fall into the same group.

More recently, Kozhevnikov, Kosslyn and Shephard (2005) have suggested that the visual system might process properties of objects (such as shape and color) differently than other spatial properties (e.g., location, movement etc.). Their findings suggest that visualizers might be of two sorts. When spatial and object imagery tasks were examined in conjunction with scores on the visualizer-verbalizer scale, some visualizers scored high on spatial imagery but poorly on object imagery and others scored low on spatial imagery and high on object imagery. It appeared that object visualizers processed images holistically as a single unit whereas spatial visualizers examined images analytically in different parts. Further, engineers appeared to be better at spatial imagery whereas artists were better at object imagery. The conclusion of this research was that it might be useful to categorize people into three groups (verbalizers, spatial imagers and object imagers). Other research, conducted by Kosslyn and colleagues (Borst and Kosslyn 2008; 2010), appears to corroborate the assumption that more than one ability might be involved in the generation of visual imagery.

Imagery can be studied from various perspectives not merely through individual differences in the ability to image as discussed above. First, people may differ in their disposition to favor a visual information processing style when examining information as well as in the vividness of images that are formed. Childers, Houston, and Heckler’s (1985) style of processing scale makes a distinction between the ability to engage in visual imagery and a preference for a particular information processing style. That is, in assessing imagery style, Childers et al. (1985) defined it as “the individual’s willingness to habitually engage in imaginally versus verbal oriented processing”. Using an adapted Richardson’s scale, they came up with a 22-item style of processing scale with two sub-scales that capture the disposition to engage in visual processing. This scale is uncorrelated with ability but provides a useful tool to examine its relationship to preferences for products, media, shopping and self-consciousness (Gould 1990). Although there have been criticisms of the scale (Bagozzi 2008; but see Wyer, Hung and Jiang 2008a and Wyer, Jiang and Hung 2008b), it reflects the dominance of a processing style (Childers and Jiang 2008) and one that can also be primed (Jiang et al. 2007).

Second, the vividness of images that are formed can be assessed using the Vividness of Visual Imagery Scale (Marks 1973). Petrova and Cialdini (2005) examined both the vividness of mental images people formed as well as accessibility of imagery. They found that when products were not presented in a vivid way (e.g., a degraded picture), imagery appeals were ineffective and had negative effects on the evaluations of the product depicted. This was true even when participants were low in their disposition to generate vivid mental images, suggesting that the accessibility (or inaccessibility) of mental images made the experience less fluent and affected people who were more attuned to their internal experiences (i.e., people high in private self-consciousness; see Fenigstein, Scheier, and Buss 1975).

It is worth noting that the disposition to use imagery-based strategies and chronic individual differences in ability to do so might lead to different effects. For example, Lee and Qiu (2009) found that when although uncertainty is generally considered undesirable, consumers who were asked to imagine an uncertain positive event (e.g., winning a lucky draw) were more likely to experience longer lasting positive feelings relative to those who did not engage in such imagery. An instructional manipulation to imagine, therefore, led to a positive effect of imagery. However, Cohen, Belyavsky and Silk (2008) found that asking research participants to form visual images of a series of steps involved in obtaining a sizeable rebate for a product, decreased the attractiveness of the product for those who were visualizers but had no effect on those who were verbalizers. Their results appear to suggest that generating visual images is not likely to lead to positive effects as an end in itself. Rather, the results might depend on the outcome of the visual images generated (e.g., imagining something unpleasant should reduce liking) as well as their ability to generate these images (an individual difference variable).

The research covered thus far has outlined when mental images might be formed, the number of images that might be formed, how prose, pictures and other triggers might facilitate the generation of mental images and individual differences in people’s propensity to use imagery based processes. These conditions are important for understanding the next step, which is based on the idea that imagery is largely used to create simulations of “what if” scenarios (e.g., imagine what would it be like to go on a vacation to the Greek isles). These simulations require a dynamic aspect of imagery that enables us to manipulate these perceptual representations in a way that serves our goals.
4. Dynamic Aspects of Imagery

4.1 Simulations and dynamic imagery

Early research on the dynamics of motion showed that people had the ability to imagine and forecast where an object or stimulus went even when the motion had stopped (Anderson, Howe, and Tolmie 1996). This was shown with both line drawings and actual objects. The results suggest that we often retrieve similar past experiences of motion from memory to complete the action (McCloskey 1983). Such forecasting presumably requires holding the object or stimulus in mind and manipulating an image of it. Work on dynamic imagery has typically been studied under a paradigm known as “representational momentum” (Freyd and Finke 1984). In studies that demonstrate representational momentum, participants see objects move and disappear on a computer screen. They are then asked to identify where the object disappeared. Interestingly, participants report the object as having disappeared further along the axis of motion than the actual spot where it disappeared (see Hubbard and Bharucha 1988). Freyd (1983) showed that even still photographs of people and objects in motion were visualized as having moved and people often completed the motion that was depicted in the still picture. Although one could argue that this forecast is not based on visual imagery, neurological evidence is in line with the idea that people visualize motion in order to complete the act. Imagining movement and observing action (whether it is dynamic or depicted in a picture) appear to activate the same brain regions (Goebel et al. 1998; Kourtzi and Kanwisher 2000; O’Craven and Kanwisher 1997).

Because of this generative ability, imagery has some intriguing effects that have been documented in the marketing literature. Research has shown that people can imbue dynamism to relatively static objects such as products in ads, logos and warning signs. A set of interesting studies by Elder and Krishna (2012) shows that subtle manipulations of a product so that it is close to the research participant’s dominant hand can facilitate mental simulation and elicit a motor response. Thus, a cup that is oriented in a way that makes the handle closer to the viewer’s dominant hand is more likely to lead to embodied mental simulation and a motor response to pick it up. This tendency, in turn, heightens purchase intentions. If, however, the product is one that has negative associations, purchase intentions are lower. Elder and Krishna (2012) also find that if an additional task takes up the perceptual resources needed for this simulation, the effect is attenuated, suggesting that this mental simulation is effortful and requires resources.

In another set of studies, Cian, Krishna and Elder (2015) examine how static visuals, when varied subtly, can elicit dynamic imagery and perceived movement, preparing an individual for action. They show how making small changes (e.g., showing school children running versus walking) on a warning sign near a school zone can make drivers slow down earlier in a simulated driving test because of the increased risk they perceive. Using a variety of warning signs (such as signs showing wet floors, shopping cart crossings, children playing, falling rocks etc.) and multiple methodologies, they find that signs that evoke more perceived movement increase attentional vigilance because of greater risk perceptions to oneself and others.

Dynamism has also been perceived in something as mundane as brand logos (Cian, Krishna and Elder 2014). In their studies, Cian et al. (2014) show that movement perceived in a brand logo leads to greater engagement and can impact brand attitudes. Thus, for example, when the logo for a modern product is more dynamic and suggestive of motion, people are more engaged with it and reveal more positive brand attitudes compared to logos that are not as dynamic. However, if the logos pertain to a more traditional product, dynamism has the opposite effect on brand attitudes because of the incongruence between dynamism and what is perceived to be traditional and, therefore, “unchanging”.

4.2 Dynamic imagery with a focus on the self

The above studies imply that the imagery in which one engages is typically from the perspective of the individual self. This might indeed be true of many situations as people are likely to manipulate symbols and use imagery in the service of some active goal. For example, they might use imagery while trying to decide on a product purchase. They might use it to feel good about themselves. Aydinoglu and Krishna (2012) showed this in the context of “vanity sizing” where companies (especially clothing manufacturers) use smaller size labels on clothes that are actually larger in size. This is often done to sell more clothes because women presumably prefer to think of themselves as a size 6 than a size 8. In their investigation, Aydinoglu and Krishna find that such “vanity sizing” elicits positive self-imagery as consumers imagine themselves as thinner. This is true of people regardless of whether they are high or low in appearance self-esteem. However, the effect on preferences is only evident for those who are low in appearance self-esteem, suggesting that positive self-related imagery might actually change preferences for a certain group of individuals.

In another series of studies, Si and Jiang (2017) examine situations in which people might decide whether to have a dessert after a meal. In such situations, would the type of food one has eaten (e.g., pizza) affect the imagined experience of the dessert (a brownie)? They show that eating a salty food item increased judgments of the sweetness of a subsequent sweet item regardless of whether it was actually tasted or mentally imagined. Interestingly, this contrast effect was only evident when people used an imagery-based processing style and did not occur when they were processing information analytically. In their experiments, imagined taste was also found to exert an impact on actual taste. Although, in these studies, preference was not examined, judgments of sensory aspects of the stimuli could undoubtedly guide the decision
of whether to consume or not, as suggested by prior research by Huh, Vosgerau and Morewedge (2016).

Imagery experiences involving the self might seem either proximal or distal. A particularly intriguing set of studies by Elder, Schlosser, Poor and Xu (2017) suggests that the physical distance between the individual and the sensations that are imagined might impact how psychologically proximal or distal they seem. They suggest, for instance, that imagining taste and touch requires that the stimulus being imagined be close to oneself. However, imagining a sound or seeing something does not require that the imagined stimulus be close by. Thus, imagery involving these different sensory modalities is seen as more or less proximal. For example, if participants were asked to imagine a new coffee house, serving unique coffees, a full menu of food and beverages and live music using primarily their senses of taste and touch (as opposed to sound and vision), they reported the coffee house to be closer to them physically. Congruency between sensory and temporal distance (e.g., “you will taste amazing flavors” and “this weekend”) versus incongruency (e.g., “you will taste amazing flavors” and “next year”) was also examined. Congruency between senses and time had a positive effect on evaluations. These studies suggest that most imagery experiences are grounded in one’s own bodily states and from the perspective of the individual; how vivid or close the experience seems can depend on whether the sensations one uses to imagine the experience are typically used to perceive stimuli close to oneself or further away.

4.3 Perspective shifts: The role of the individual as an actor or observer

Although imagery experiences are often from the perspective of the self, the individual could be either an actor or an observer in the simulation that is generated. An interesting avenue of research has emerged based on the idea of perspective shifts that might be communicated through verbal statements or visual images. As noted earlier, if people spontaneously form mental images in the course of comprehending verbal statements, then a statement, “The man went into the room” is imagined from the perspective of someone observing this act from outside the room whereas the statement “The man came into the room” is imagined from the perspective of someone inside the room. If the perspective is an unfamiliar one, it interferes with comprehension (Jiang and Wyer 2009). These effects are typically stronger when people have an apriori disposition to process information visually (i.e., use mental images).

Lack of familiarity with products is a common phenomenon in marketing and consumers often encounter new products of which they have little knowledge. To understand them, they might engage in visual imagery of different sorts. For example, one might imagine what a vacation destination will be like. Or, one might imagine how to operate a new gadget like a food processor. Jiang, Adaval, Steinhart and Wyer (2014) suggest that imagery is often used to satisfy a particular objective (e.g., to solve a problem, construct a story etc.). They make an important distinction between self-imagery and a more general sort of imagery, and suggest that when people engage in self-imagery (i.e., imagery that involves the self as an actor) with the objective of collecting information about a product experience (e.g., imagine themselves interfacing with different aspects of the product), ads that show the product from different visual perspectives are easier to process and seem informative because there is no need to integrate them into a whole. However, when people engage in self-imagery with the objective of forming a narrative or story (as they often do when they daydream about an experience), information has to be integrated into a whole. As a result, ads that show the product from different visual perspectives can decrease fluency and lead to lower evaluations. Such decrements are only observed when people engage in self-imagery as an actor. In this case, they have to switch visual perspectives to integrate information into an overall narrative or story – a task that becomes difficult if one is imagining oneself in the scene (e.g., walking into a hotel room) and must shift one’s visual perspective (e.g., lounge by a pool). This difficulty in processing leads to lower evaluations. The authors document these perspective shifts using both judgment and eye tracking data. Interestingly, memory data also showed that the underlying mental representations are altered when people have these different self-imagery goals (of information acquisition and story construction) and receive information from similar or different visual perspectives.

The aforementioned research is important because it suggests that people might engage in imagery for functional reasons. Goal driven imagery can be used for a multitude of purposes that include not only the desire to form a vivid impression but also the need to enjoy a particular experience and transport oneself, to calm oneself down, to self-regulate etc. The use of imagery in the service of these goals can yield interesting findings. Some of these are summarized in the following sections along with possible avenues for further research. However, before they are discussed, it might be worthwhile to briefly consider the various mechanisms by which imagery has an impact on judgments and behavior.

5. Possible mechanisms by which imagery might impact judgments and behavior

The above discussion about the dynamic nature of imagery suggests that people are able to manipulate the images they form of others or themselves in different ways. Thus, imagining a behavior is something that is not only common but also easy. A growing body of evidence suggests that imagining an action activates similar regions of the brain as the actual performance of the act (Decety, Jeannerod, Germain and Pastene, 1991; Jeannerod, 1994, 1997). Paus, Petrides, Evans and Myer (1993) for example, showed that the anterior cingulated cortex was activated when participants were asked to think of a word or gesture or actually uttered the word and made the gesture (see also Michelon, Vettel and Zacks 2005;
Pulvermuller, Harle and Hummel, 2001; Rizzolatti and Arbib, 1998). These findings suggest that imagining an action and the actual behavior share common neural substrates. This might be indicative of imagery serving as a preparatory tool; a mechanism that probably develops from childhood as we watch others perform tasks that we might not ourselves be able to do. Simulating a behavior might have the potential of making the performance of unfamiliar tasks easy. Levav and Fitzsimons (2006), for instance, show that the likelihood of people engaging in a behavior typically increases when they are asked about it. However, this effect is moderated by the ease with which a representation can be generated, presumably because it becomes more fluent and accessible (Schwarz 2004). If this is indeed the case, then one would expect imagery processes to be relatively automatic and serve a functional role in behavior. In fact, some of the research cited earlier (Wyer and Radvansky 1999) suggests that people form mental images spontaneously in the course of comprehension. Other research exploring the perception-behavior link suggests that activating a perceptual representation can lead to corresponding behavior (Chartrand, Maddus and Lakin 2005; Dijksterius and Bargh 2001). It would therefore not be a stretch to speculate that imagining something also might facilitate that behavior later on.

Work by Cian, Krishna and Elder (2015) on dynamic iconography corroborates this and suggests that imagining the completion of movement (shown in icons) leads to greater alertness and quicker preparatory responses, lending some credibility to this possibility.

Another possible explanation of imagery effects has emerged from perspectives that focus on characteristics of the image-like representations that are generated. First, images are more complex than semantic descriptors and tend to provide more vivid and detailed information. Thus, the image of a warm chocolate chip cookie with gooey chocolate chips is perhaps more influential that a semantic description of it because images convey more information. For this reason alone, it could have a greater impact on judgments and decisions. A second possibility is that imagery, because of its vividness and closeness to real experience, is likely to elicit more affect. However, Mani and MacInnis (2001) suggest that imagery has an effect even after controlling for affect. Third, past research on imagery has explained these effects by suggesting that images provide multiple linkages in memory (Childers and Houston 1984) because they have not only a sensory code but also a semantic one. Thus, they can be easier to retrieve than information that is stored using only one code. Other explanations, such as the availability valence hypothesis (Kisielius and Sternthal, 1984, 1986), suggest that images can increase elaboration and thus might bring to mind positively-valenced information about the product. To summarize, the second perspective focuses on the characteristics of the images and what they might do (i.e., provide more information, elicit affect, increase elaboration etc.). Some of the processes underlying imagery effects (e.g., the elicitation of affect) could be spontaneous and relatively automatic whereas others (e.g., cognitive elaboration) might be more deliberative.

A third perspective derives from research on narrative transportation (Green and Brock 2000; Escalas 2007; 2013; van Laer, De Ruyter, Visconti and Wetzels 2013). Transportation is defined as "being lost" in a story or as being immersed in text (Green and Brock, 2000, p 702). Such immersion in stories is often deliberate and people engage in it for different reasons (entertainment, news etc.). Immersion requires suspension of one's current reality and beliefs and an openness to enter a different world. It is conceivable that imagery is employed in the process as it might facilitate entering a different reality. When people imagine these scenarios, they are less likely to notice information that is inconsistent or generate counterarguments. Adaval and Wyer (1998), for instance, showed that when people were reading information in a narrative format, they were less likely to notice negative information embedded in it than they were when this information was in the form of a list. Escalas (2007; 2013) shows that argument strength does not have an impact on evaluations when people are asked to imagine an experience with the product relative conditions in which they do not engage in such imagery.

In understanding the possible mechanisms by which imagery can exert an influence, it might be beneficial to think of these alternate mechanisms as falling along an automatic-deliberative continuum. Some of the effects showing that imagery facilitates comprehension might be relatively automatic whereas others, which are engaged in to serve a particular purpose (or to assist with a goal), might be more deliberative. The former might also be more likely to be cognitively based whereas the latter might have motivational antecedents. A simple 2x2 matrix with these two dimensions (automatic-deliberative on one axis and cognitive-motivational antecedents on the other) could help categorize which process might be more applicable in different types of situations. Figure 1 provides a simple illustration of how various imagery effects might be categorized.
For example, some of the studies suggesting that different mental models are formed from prose information would clearly fall into the automatic-cognitively determined quadrant. Other work, in which people are asked to use imagery to comprehend information about a product or service (e.g., Adaval and Wyer 1998; Cian, Elder and Krishna 2014; Jiang, Adaval, Steinhardt and Wyer 2014), suggest that some deliberation is required and that the effects presumably result from this additional work. The lower two quadrants pertain to research in which imagery is either engaged in spontaneously or deliberately in the pursuit of some goal or underlying need. Research by Aydinoglu and Krishna (2012) and Si and Jiang (2017), for example, falls into the deliberative-motivationally determined quadrant, as people engage in imagery-based processes to determine either what to wear or what to eat. The spontaneous use of imagery to satisfy an underlying need is relatively underrepresented. It is perhaps more likely to consist of work in which people spontaneously image objects and scenes because of an emotional need (e.g., in the domain of conditioned responses to emotion-elicitng stimuli) or when people might spontaneously take the perspective of a victim (Hung and Wyer 2009). Regardless of how imagery works, however, it is worth reiterating the broad point that its role in our cognitive and emotional life is one of serving a purpose; be it an attempt to understand something better or to achieve a higher purpose or goal. The following section articulates some of the ways in which consumers use imagery.

6. Using imagery in the service of “something”

In the consumption domain, imagery has been used to study a variety of different phenomena and oftentimes, individual studies are loosely connected, giving the impression of a somewhat scattered and disorganized literature. However, when examined through a different lens (i.e., the functionality of imagery), themes and trends that emerge can be liberating and can perhaps foster additional work in each of these diverse areas. Some interesting themes that can help us understand a host of consumption issues are summarized below.

6.1 Using imagery to preserve memories

One of the most useful aspects about mental images is the amount of information that they contain. The oft-repeated phrase, “a picture is worth a thousand words” generates the question: Do mental images serve a similar purpose as photographs? Although mental images are not as detailed as real pictures, they do communicate useful information about the spatial and temporal locations of objects and events. One of the implications of having such a “packet of information” available is that it might facilitate the retrieval of “past experiences” that one can savor at a later point in time.

As our experiences get more virtual (i.e., we vicariously experience vacation destinations, restaurants etc.), the role of picture taking and consumption imagery on memory for experiences and their enjoyment has taken on greater importance. A relatively new stream of research has investigated why people take pictures. Diehl, Zauberman and Barasch (2016) suggest that people take pictures in order to increase engagement with an experience. Thus, when the experience is not terribly engaging, people might be more likely to take pictures. If, however, the experience is already engaging or if taking pictures is likely to interfere with the enjoyment of the experience, then people are less likely to engage in this practice. One of the interesting aspects of this research is that photo-taking appears to focus visual attention on aspects that the individual wants to remember. In a different set of studies, Barasch, Diehl, Silverman and Gauberman (2017) show that people who take photographs (either with cameras or mentally) tend to recognize what they see more than those who do not take such pictures. Thus, it appears that picture-taking (real or imagined) directs attention to aspects that the person wishes to remember and has facilitative effects on memory. This act of preserving memories for oneself appears motivated by a goal of future enjoyment that is personal. Interestingly, when people take pictures with the goal of sharing, enjoyment derived from the experience decreases (Barasch, Zauberman and Diehl, forthcoming).

6.2 Imagery and Pre-consumption impression formation

In some early ground breaking work, McGill and Anand (1989a) showed that when people engage in mental imagery, vivid attributes that are easy to visualize receive more attentional resources. The implications for choice are clear: If people use mental imagery, then vivid attributes should receive a disproportionate weight in the choice process. In fact, not only should these vivid attributes affect what people choose but they could also guide preference change. Shiv and Huber (2000) followed up on this work and shifted the focus from the study of what people choose to the study of anticipated satisfaction with choice. They showed that anticipated satisfaction was a key factor in preference change. Anticipated satisfaction exerted this influence on preference change because people typically used a mental imaging strategy in gauging how satisfied they would be with their choice. Thus, in a situation where one had to choose between a cheaper apartment with a dreary view versus a more expensive one with a great view, people were more likely to shift away from the default cheaper apartment and choose the expensive apartment if they had the opportunity to imagine what it would be like. Mental imagery, although effort-intensive, provides output that is qualitatively different and when it is discouraged, the effects on preference shifts are not evident.

The study of anticipated satisfaction opened the door to the study of pre-choice and pre-consumption processes drawing attention to what goes on prior to purchase. Given the amount of information available online, Schlosser (2003) examined the effect of this type of information on people who were merely browsing versus looking for information. Using the term “object interactivity” to describe virtual interaction with a product on the web by potential consumers, she found that the congruency between users’ goals and the delivery of product information (i.e., how the
product information is shown) led to more discursive processing, and impacted attitudes more favorably, when they were congruent than when they were not. Although web design features improved attitudes depending on the goals of the user, the more interesting finding was that object interactivity on its own evoked a mental simulation of the individual performing the behavior and, regardless of goals (browsing or information search), led to greater purchase intent. Thus, proximity of the sensory experience through virtual interaction does appear to influence behavior.

An intriguing question arises about virtual interaction with products on the web or more broadly by attempts to imagine an experience. Advertisers typically encourage people to imagine various types of experiences and assume that this might actually be beneficial. Although some positive effects have been noted, it might be useful to consider a different possibility. Schlosser (2006) finds evidence that interacting with a virtual object leads to the creation of vivid, internally generated recollections that then pose as true memories. As a result, people are more likely to recognize non-presented features as having been presented and this effect occurs regardless of individuals’ learning goal. Lakshmanan and Krishnan (2009) provide an account of how interactive consumption imagery might lead to false memories. They propose that imagery processing by itself can increase the likelihood of false memories being generated. That is, imagery processing does not have to pertain to the misinformation. When people engage in theme unrelated imagery (e.g., when they generate a narrative), the misleading theme is more likely to be included in the recollected experience. However, when people engage in theme related imagery that is focused on the consumption experience, additional source monitoring actually decreases the incidence of false memories.

The above research raises the question: When might mental simulations actually facilitate purchase intent and when might they not? Although Schlosser’s (2003) research suggests that virtual interaction with a product might actually increase purchase intent, work on false memory (Schlosser 2006; Lakshmanan and Krishnan 2009) suggests that high levels of imagery might lead to the generation of false memories. These could pertain to the consumption experience itself. For example, Rajagopal and Montgomery (2011) show that an imagery-evoking ad can lead to the belief that one has already experienced the brand. These beliefs of false experience have effects that are similar to actual experience beliefs in that they impact attitude strength favorably. For such false experiences to have an effect on attitude strength, however, the experience has to be plausible (or likely) and the timing of the evaluation matters (time delays increase the likelihood of getting the effect). If people believe that they have already had the product experience, what further implications would this have for repeat purchase? When might one choose to actually purchase again versus walk away given that the experience has already satisfied a consumption goal? Virtual interaction is undeniably more vivid, dynamic and requires one to manipulate the object. Will such a vivid experience lead to the belief that one has already interacted with the product and future interaction is not necessary? Or, will purchase intent increase because of familiarity with the experience? These questions remain unanswered.

6.3 Imagining consumption and satiety

Imagining consumption has implications for a number of substantive domains such as cravings, addictions, phobias etc. Sensory imagery, for example, has been shown to lead to an increased appetite for cigarette and drugs. Tiffany and Hackeneworth (1991) showed that when cigarette smokers were asked to vividly imagine situations in audiotapes that had descriptions of smoking situations, their physiological responses such as heart rate and skin conductance levels as well as their reported desire to smoke increased. In contrast those who imagined relatively neutral scripts did not show such an increase. Similar findings exist with regard to the consumption of alcohol. Alcohol craving can be induced by asking participants to imagine holding and tasting their favorite beer and sometimes this technique is more effective than showing people a picture of their favorite beer (Litt and Cooney 1999). It is therefore not surprising that many ads often provide the visual referent along with explicit instructions to “imagine”.

In their work, Andrade, May and Kavanagh (2012) point to the link between imagery and craving and suggest that sensory imagery is a powerful tool to induce cravings largely because it conveys the emotional qualities of what is desired. People are able to get a sense of the anticipated pleasure or relief and the continual elaboration of imagery keeps the object that the individual is craving in mind. An intriguing question pertains to the continual elaboration on the craved for object: What leads to this continual elaboration? Andrade et al (2012) suggest that it is the anticipatory pleasurable response that leads one to plan for its fulfillment and that at some point, the discrepancy between one’s current state and the desired state triggers behavioral action.

However, other work suggests that repeatedly imagining the consumption of something is likely to lead to satiation and reduced consumption (Morewedge, Huh and Vosgerau 2010). In their experiments, participants imagined performing an action 33 times. One group imagined inserting 33 quarters into a laundry machine, a second imagined inserting 30 quarters and then imagined eating 3 M&Ms while a third group imagined inserting 3 quarters and then imagined eating 30 M&Ms. After they had completed this sequential imagery task, they were given a bowl of M&Ms that they could consume if they wanted to. Those who had imagined eating 30 M&Ms were likely to consume fewer of these M&Ms than those in the other two groups suggesting that repeated sequential imagining of the act could lead to habituation.

The contrast between the two bodies of research is apparent: In one case, imagining increased the desire to consume whereas in the other case, it reduced the desire. It is conceivable that the repeated instructions to imagine led to boredom and a desire to move on to something else.
The same authors (Huh, Vosgerau and Morewedge 2016) found, however, that imagined (and actual) consumption of a food sensitizes participants to complementary foods such that they consume more of these foods than of unrelated or semantically associated foods. If boredom were responsible, then one would expect people to gravitate towards any new consumption item. Another possibility is that the difference in imagery instructions could have contributed to different results. In the research on craving (Andrade, May and Kavanagh 2012), the instructions to imagine are not restricted to the act of consuming and allow people to elaborate on the consumption situation (i.e., make plans and come up with details of what type of food they would like). In the studies by Morewedge et al. (2010), the instructions explicitly indicated that participants had to imagine the consumption act. The former elaborative process could have led to increases in consumption whereas the latter might have led to satiety. Huh et al. (2016), however, point out that this increase for complements could also be driven by procedural knowledge. If people spontaneously form episode or situation models (as suggested by Wyer and Radvansky 1999), then things that are consumed together in a particular situation (e.g., cookies and milk) might become more accessible when a situational cue (repeated imagining of cookies) is provided and could activate a desire to consume the complement (milk). What is particularly intriguing about this work is the fact that satiety happens without actual consumption (just via imagination of consumption). The implications of this finding are worth exploring because they suggest that although imagery can lead to craving, guided imagery might also lead to satiety, providing one with a potential tool to self-regulate.

Satiety of other experiences can also be studied. For example, research is scant when it comes to the retrieval of auditory experiences. Can people tire of jingles? Hearing or imagining the jingle or song can have both positive effects (as when a catchy tune keeps the product in memory) or negative ones (e.g., people tire of the same sounds or songs). Several areas related to auditory imagery are worth investigating particularly in the area of branding. Brands consist of not only the visual logo but also a phonetic identifier (e.g., the roar of the MGM lion). The mnemonic efficacy of visual and auditory elements of a brand during the retrieval process is worth examining (Henderson and Cote 1998; Yalch 1991; Miller and Marks 1992) and several questions remain unanswered. For example, visual elements might be relatively easy to image (e.g., the giant arches for McDonald’s) when compared to auditory elements. However, do people spontaneously retrieve the auditory element when one is exposed to the brand image? Does this auditory component elicit an action tendency given how familiar verbal directives are to most people and make people want to engage in the behavior? And, if the consumer is only exposed to the auditory element, does it elicit different expectations (e.g., greater anticipation) given that musical notes have some sort of temporal character relative to a relatively static visual depiction of the brand? Can repeat exposure to these jingles and auditory devices actually lead to satiety and reactance?

6.4 Using imagery to create and establish new products

The link between imagery and creativity is an old one. Artists (e.g., painters and musicians) were presumably high in imagery and emotionality. Yet, over the years, there has been a growing realization that creativity can be of different types. Creating a symphony or a work of art is as creative as coming up with the idea of a double helix to capture the structure of DNA. Studies examining the imagery capabilities of scientists and artists have revealed different types of imagery skills. Kozhevnikov, Kosslyn and Shepard’s (2005) distinction between spatial visualizers and object visualizers is timely and suggests that imagery abilities could include more than one skill, for example, the ability to come up with more detailed images (a skill that many visual artists have) as well as the ability to visualize things spatially and move them around (a skill more common among scientists and engineers). How might these skills be applicable in the marketing domain? An emerging body of work focuses on the creation and establishment of new products where the role of imagery in the generation of new ideas, the introduction of new products and how consumers respond to them provides a useful avenue for research.

Dahl, Chattopadhyay and Gorn (1999), for example, suggest that visual mental imagery can influence the new product design process. Focusing on the process by which a product is improved functionally, they examine two types of imagery that they call memory imagery (the retrieval of past images and experiences) and imagination imagery (involving novel objects and experiences). They show that imagination imagery leads to more original designs because of its creative and unconstrained nature. However, thinking of the consumer during the creative process leads to some different effects. They find that because memory imagery is already constrained, keeping an image of the customer using the product in mind actually reduces the appeal of the design created. However, imagination imagery (which is fairly unconstrained) actually benefits from having the customer in focus. Their distinction between the images used and the constraints set by instructions to imagine provide a fertile ground for additional work on creativity. This link between imagery and the creative process is one that can be explored further to understand different aspects of the design process. Some designs focus on creating a more attractive looking product whereas other design processes might attempt to put together new ways of doing things. Object visualizers and spatial visualizers might respond differently to these tasks.

Different types of imagination-focused visualizations have also been used to understand how people react to really new products. Zhao, Hoeffler and Dahl (2012) find that when the products are radically different and new, imagination-focused visualization (as opposed to memory-focused visualization) helps understand the new benefits and usefulness of these new products. Memory-focused visualization, in turn, appears to be more useful when evaluating incrementally new products that have minor improvements on the older ones. The differences emerge
because imagination focused visualization allows people to explore new ways of product usage whereas memory-focused visualization draws on past knowledge and experience with the product.

In follow up work, Zhao, Dahl and Hoefflter (2014) examine how to communicate the benefits of new products to consumers. They suggest that although the assumption is that consumers should be given concrete and detailed information of new products so as to enable them to visualize the product, this might not always be true. When consumers are attempting to visualize the new product, the value of concrete versus abstract information is dependent on the temporal perspective they take. Concrete information is useful when the product visualization is retrospective in nature and features prior usage of the product whereas abstract information is more useful when the usage is anticipatory (in the future). The congruency between temporal construal tendencies and the visualization cues facilitates imagery and enhances product evaluation. These effects are weakened when the product is an existing one with which consumers are highly familiar.

The link between temporal construal and imagery has been examined and discussed earlier (Elder et al. 2017) and there appear to be synergies between this work and work by Zhao and colleagues. New products can be of different types (a new flavor of ice cream, a new gadget; a different sound system) and the manner in which information about them is conveyed could elicit different types of imagery if they are new products or existing ones. Research could further unravel the link between imagery and cue type in this context.

6.5 Using imagery to encourage charitable giving

One of the common techniques used to encourage charitable giving is to get donors to imagine the plight of the person needing assistance. Past research suggests that helping decisions are often influenced by the empathy people feel for the person in need or through the identification they establish with the person. Thus, for example, a donor might vicariously experience what the victim is going through (e.g., losing one’s home in a disaster) or might establish some sort of connection with the person (thus having a hard time separating oneself from the individual). Although these factors have been studied (Aron and Aron 1986; Batson, Early and Salvarani 1997; Batson and Shaw 1991; Cialdini et al. 1997; Hornstein 1982), the role that imagery plays in the process is unclear and has produced mixed results.

Imagery could, for instance, elicit greater empathy. In an early study by Fiske and colleagues (Fiske, Taylor, Etcoff and Lauffer 1979), however, no such evidence was found in the context of attributions made in a social situation. In two studies, they showed that subjects who were asked to imagine a story from the perspective of a particular character had differential recall of story details depending on the role they imagined. However, no differences in attributions were observed, suggesting that the recall of perspective-relevant details did not mediate attributions of causality. In a third study, empathy and imagery role-taking instructions were shown to have independent effects. That is, imagers did show perspective-relevant recall. However, this difference in recall was not evident for empathizers. Neither group showed vicarious attributions and recall was uncorrelated with attributions made. The studies suggest that taking the perspective of an individual in need, might affect memory but is unlikely to affect attributions of causality (such as whether they were responsible for their situation or not). Further, imagery and empathy seem to produce independent effects.

In other neuroscientific research, however, researchers have consistently found that perception of affective states in others activates the observer's own neural substrates for the corresponding state (in other words, elicits an empathetic response). Making a distinction between this sort of empathy and “cognitive empathy” (a state where one actively projects oneself into the shoes of another person and imagines their personal experience as if it was one's own), Preston, Bechara, Damasio, Grabowski, Stansfield, Mehta and Damasio (2007) ran a psychophysiology and PET study where participants were asked to imagine a personal experience of anger or fear from their own past, an equivalent experience in someone else as though it were happening to them, and a nonemotional control experience of their own. Results show that when participants are able to relate to the experience of another person, they show similar patterns of psychophysiological and neuroimaging activation as those when they imagine their own emotional experience. But, when they are not able to relate to the other person’s story, these differences are not evident. Thus, the ability to relate is critical in eliciting the empathetic response.

Evidence in the marketing domain is consistent with this finding. In research by Hung and Wyer (2009), for instance, the authors examined situations when the ads are designed to benefit others (e.g., in charitable appeals) and showed that when the readers imagine themselves in the situation, it can sometimes conflict with the image they have of themselves as potential helpers and can decrease advertising effectiveness. Thus, for instance, when participants took the perspective of the beneficiary at the time they encountered the appeal for help, pictures (and other imageable features in the ad of the victim) increased the ease with which they could imagine the situation and had a positive impact on their desire to help. However, when they had an a priori disposition to take the perspective of a potential donor, these same ad features actually decreased the ad’s effectiveness because this perspective conflicted with that encouraged by the ad (imagine yourself as the victim).

The research cited above is indicative of the complexities associated with charitable giving. On the one hand, making an ad vivid and showing highly imageable features is likely to increase participants ability to imagine actually being there in the scene. That is, it might transport them and increase their feelings of empathy, leading to increased engagement. However, many donation appeals
that are received focus on asking potential donors to take the perspective of a donor alongside the appeal (e.g., “This Christmas, donate and help UNHCR save refugees around the world”). This might actually backfire if the ad itself wants the donor to take the perspective of the victims. Additional research is clearly needed to understand both the motivational and cognitive factors that might affect how imagery increases and decreases the desire to help or to get engaged with a cause.

7. Concluding remarks: From doubt to functionality

The objective of this chapter has been to point out that despite the debate about the existence of image based representations, the field has moved forward and identified a multitude of different effects of imagery on memory, judgments and decision-making. Although much of the research on the cognitive determinants of imagery has been in psychology, work in consumer research can be consolidated into different themes. The approach taken in this chapter is inspired by Kosslyn’s call to focus on the purpose that imagery serves. That is, we move forward with a view that imagery has a functional role to play in our lives. With this view, several themes of research can emerge and can help understand how our behavior can be shaped by how we think. Although the bugaboo of whether this thinking involves mental images can raise its head again, the point is that much of the research that has been covered finds evidence that an image-based process leads to results that are different from when such processes are not used. These effects come from diverse areas such as the impression people form of products and ads, how they imagine consumption, their decisions about helping others and cultural and individual differences in the use of imagery. The review of the work covered has been far from exhaustive. Rather, the objective of the chapter has been to show how a phenomenon that has historically been treated with so much skepticism can yield so many insights into consumption behavior.

Work in consumer research is typically hard to integrate given the varied nature of the phenomena explored by consumer researchers. To provide a common platform for discussion, the first sections of this article have documented the historical origins of imagery as well as some aspects of the imagery debate that arose. The objective of this discussion was to not only provide a reader with the necessary background but to also raise the distinction between perception and imagery both of which are often conflated. This discussion of what imagery is was followed by the more pragmatic question of what elicits imagery. Although imagery can be self-generated, the focus in this article was on imagery elicited in response to prose and pictures. In consumer research, much of the communication we receive is in the form of words or pictures. Work on mental models was covered to point out how these stimuli (prose as well as pictures) can lead to different image-based representations. Given that the manipulation of these image-based representations is one of the key aspects of imagery, the discussion that followed focused on the dynamic aspects of imagery (i.e., how people form and manipulate the images they form) as well as the different mechanisms by which this dynamic imagery might influence us and how it might be used. The article concludes with a discussion of how imagery might be used for a purpose – an approach that can perhaps unify the diverse and seemingly unrelated areas of research.

In discussing past work, some interesting research questions arose. For instance, although pre-consumption imagery can increase familiarity with a product as one draws on past experiences to understand the product, might such imagery also decrease purchase intent as one feels that the experience has been had already? Could it satiate one’s desires without actual consumption? This general question can also be considered in the context of auditory imagery. Consumers are bombarded with ads and jingles. Does retrieving the auditory inputs in the absence of the stimuli (e.g., a jingle) lead to a greater desire to experience the product or does it decrease it? Other issues such as the fluency with which people engage in different types of imagery (auditory, visual, olfactory etc.) also provide avenues for further research. Cultural differences in these tendencies have seldom been explored. The implications that research on these processes might have for consumer behavior could be profound and far-reaching. As we continue to explore the different functional uses of imagery in various domains, it becomes clear that this phenomenon of “imagining something” is so familiar and central to our everyday life that we cannot choose to ignore its implications. Whether it is in the pursuit of understanding or, as Wordsworth notes, a retrospective act that fills one with pleasure, it is a dance where past perceptions partner with the skill of imagining to create an experience that is uniquely our own.

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