Researching brand images: The nature and activation of brand representations in memory

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'Memory structure and function are at the heart of all psychological activities: with the possible exception of reflexes, all of human performance is directed or influenced by memory. Theory construction in all fundamental areas of psychological investigations, [...], is predicated on assumptions about how memory works. The success of work in applied areas, [...], is dependent on deciding on the appropriate theory of memory' (Whittlesea 1997, p. 336).

Theories derived from social and cognitive sciences like psychology have been widely applied to marketing topics of different kinds. Also brands have been subjected to psychologically orientated investigations since it became apparent that it is primarily the consumers' perception of brands that yields value for a company. As consumers' brand perceptions are stored in and retrieved from memory, research and theories on memory are highly relevant to researchers on this topic. In the next section, a number of theories and research findings on memory will be described. Firstly, some general background on the nature of memory and its content will be discussed. Secondly, theories on the representation and activation of knowledge in memory will be described within two main theoretical streams: spreading activation theories and feature list theories. This overview intends to provide an idea of how academics over the years have tried to model how humans can make sense out of all the information that they perceive everyday. The main question has always been how we can represent knowledge, and how our brain organises all these different bits of information. The overview will present different approaches, and where possible the arguments against a model's validity are stressed. Thirdly, one special class of representation theory called frame theory will be elaborated upon. Finally, this theory will be applied to the notion of brands, which will serve as a basis for research on brand representations in memory.

2.1 The nature of memory and its content

The enormous amount of stimuli that confronts us in everyday life would make us perceive the world as a chaotic place, if we had no mean of ordering and storing experiences. The faculty of memory enables us to create order by storing previously obtained knowledge, experiences, feelings et cetera, and enables us to relate past, present and future events. A lot of research has been done (and is still being carried out) in attempts to try and reveal the nature of memory: the way in which our brain perceives, processes, stores and retrieves information. Some research findings and theoretical conceptualizations have been very interesting and influential in cognitive science. In the next section, a number of classic and fundamental notions on memory will be described which are relevant to research on the
2.1.1 Short Term Memory, Long Term Memory and Working Memory

Based on the extent to which incoming information is processed, in 1968 Atkinson and Shiffrin proposed a general frame for information processing (Barsalou 1992a; Raaijmakers 1984). They made a classic distinction between three structural components: the sensory register, short term memory (STM) and long term memory (LTM). When information is perceived through the senses, the sensory register briefly establishes a perceptual representation of the information. For example, the visual system establishes images of visual stimuli in its sensory register, the auditory system establishes acoustic images of acoustic stimuli in its sensory register, and so forth (Barsalou 1992a). The sensory register can temporarily contain large quantities of information, which in a next phase is categorized and transferred to STM by means of selection and categorization mechanisms. These mechanisms enable the categorization of perceptual representations. The categorized representation is then temporarily stored in STM. For example, all visually perceived elements of a chair (arms, legs, back, seat, color, et cetera) are solely stored in the sensory register, and by means of selection and categorization processes are combined into a categorized representation of chair, which is then temporarily stored in STM. Short-term memory is assumed to have a limited storage capacity, both in quantity as in duration. It is assumed to be capable of temporarily storing about five to seven ‘chunks’ of information, for no longer than approximately 20-30 seconds. The two main functions of STM are to maintain information in a directly accessible state, and to transport the information to LTM. Information in STM is processed by means of coding and repetition, using information from LTM. If the information is processed well enough, it is transferred to LMT (Barsalou 1992a; Raaijmakers 1984). Long-term memory is assumed to have an unlimited storage capacity. It is assumed that information stored in LTM will be in memory ‘forever’ (which does not imply however that all information stored is accessible at all times). Repetition of storage and frequent retrieval can enhance the level of processing and with that the ease of retrieval.

Theory on working memory (WM) has been developed since 1974 by Baddeley and Hitch (Baddeley 1986; Baddeley and Hitch 1994), and has been proposed as an alternative to STM. Instead of postulating a modal, one unit STM, Baddeley and Hitch conceptualize WM as a multi-component system. Placed within a 3-component model, working memory comprises:
1. an auditorial loop for manipulating and storing speech-based information;
2. a visuo-spatial sketchpad that performs a similar function for visual and spatial information;
3. a ‘supervising’ central executive, which functions as an attention-directing control system.

These systems each have a temporary storage function. WM assumes that incoming information activates all corresponding representations in the (long-term) memory.
system. Although WM is conceptualized here as a faculty for processing incoming information, it is also seen as the moment-specific part of the memory-system in which already stored representations are in a state of temporarily activation (Barsalou 1992a; Van Leyden sr. 1989). It should be noted that there is no real consensus among academics on the exact anatomy of memory. Based on the views described here, in this thesis the distinction between working memory and long-term memory is maintained, wherein working memory is conceptualized as the information in long-term memory that is currently in the temporary memory state of activity. This information is in a ‘working memory state’ (Barsalou 1992a, p. 105). The definition of brand representation (paragraph 2.5.3) will incorporate this point.

2.1.2 Emotion
We perceive the world through our senses. Our senses of sight, hearing, taste, touch, smell and time (and to some even our intuition) provide us with information about the world, which enables us to deal with it. A physical brain structure called the limbic system is assumed to play an organizing role in the processing of information. All incoming information is labeled according to ‘emotionality’ by a tiny brain structure within the limbic system, called the amygdala. The labeling of information according to emotionality enables us (amongst other things) to act spontaneously, or reflectively towards, for instance, threatening events. It also enables us to ‘feel’, or experience emotions, when memory content is retrieved/activated. For example, when we hear a familiar voice, we might experience feelings of pleasure or joy if the speaker is a friend, or feelings of displeasure if the speaker is someone we dislike. We may also experience feelings of nostalgia when seeing coffee packets ‘from the old days’. The fact that all stored information is emotionally labeled also enables us to evaluate recalled events or thoughts as either positive, negative or neutral. Whenever we encounter situations that provide us with information, this activates representations and their emotional labels in LTM, by which we can evaluate the situation or stimulus. Although it is not clear in literature on this subject whether emotion is an independent mental system or subordinate to cognitive functioning (see Orbach 1995), there is agreement on the notion that emotion plays a leading part in the cognitive processing of experiences and perceptions, and as such also plays a prime role in the evaluation of concepts.

2.1.3 Consciousness and implicit versus explicit memory
Whenever memory is discussed as the storage facility of the human mind, there is always the discussion to what extent we are conscious or unconscious of all the information that we hold in memory. In brand research in particular there is a popular view that some of the brand knowledge that consumers have is at an unconscious level, yet does have an impact on consumer behavior. Whether or not this particular view is correct, we need to take into account that there is a distinction between levels of consciousness. Orbach (1995) states that, within cognitive psychology, processes like registration, interpretation, categorization, storage, and retrieval of incoming information are mostly assumed to take place out of consciousness. Yet the products of this unconscious processing influence the content of consciousness as well as behavior. Closely related to the notion of consciousness
is the distinction between an implicit memory and an explicit memory. Research on implicit memory covers two aspects, both of which are related to learning new information. The first aspect relates to the process of implicit learning, wherein implicit denotes that knowledge is acquired incidentally as a result of mere exposure to a set of stimuli. The second aspect is the product of learning, wherein implicit denotes the idea that the acquired knowledge is unconscious and difficult to verbalize (Goschke 1997). Explicit memory refers to conscious learning processes and the conscious recollection of acquired knowledge. The main contrast between implicit and explicit memory involves knowledge recollection. Where retrieval is based on deliberate or conscious recollection of a specific episode, it is attributed to explicit memory. But when retrieval does not involve use of these mechanisms, and performance is completed without deliberate, conscious, or willful reference to a specific episode, the evidence of memory is attributed to implicit memory (Kirsner 1998). For example, implicit memory plays a role when reading a newspaper: we do not actively and consciously activate our ability to read and recognize words, yet this knowledge is implicitly activated. Barsalou (1992a) describes the distinction as incidental retrieval (involving implicit memory) versus intentional retrieval (involving explicit memory).

This study concerns the retrieval of brand-related knowledge. Partly following Barsalou’s distinction (1992a), and Kihlstrom (1984, in Orbach 1995), who defines the level of consciousness of stored memories by the availability for retrieval, in this thesis the retrieval of stored memories is conceptualized as follows:

1. information that can be retrieved easily is considered conscious, explicit and its activation is intentional;
2. information that cannot be retrieved, yet influences behavior, is considered unconscious, implicit and its activation is incidental.

2.1.4 Nature of memory content
Memory is generally understood as the main storage facility for all information one perceives from situations encountered in life. However, although all information is assumed to be stored, a distinction can and must be made based on the nature of information. For example, think back to a moment of learning grammar in primary school. During this specific episode in life, an enormous amount of information of varying nature is perceived. Firstly, there is the memory of the episode itself, the event of learning. One might possibly recall sitting in a classroom and receiving the instruction to read or study a textbook. This type of memory is referred to as episodic memories. Episodic memory refers to memory for ‘when’ information, for autobiographical events, including the context (time, place, setting) in which the event occurred (Medin and Ross 1992). Secondly, one might remember who the teacher was, what he/she looked like, what the textbook cover looked like, and who was sitting next to you. This type of memory is referred to as semantic memories, and could be considered ‘what/who’ knowledge. Both episodic and semantic memories are types of declarative memory. Declarative memory is a system of events and facts, such as vocabulary, names, categories of classification, experience events, et cetera, which can be recalled intentionally (Orbach 1995). Declarative knowledge can also be referred to as ‘knowing that’
memories. They can often be verbalized or imagined (Medin and Ross 1992). Thirdly, by studying grammar, an understanding of language has developed, enabling us to communicate in an understandable way with other people. Although we do not consciously reflect on the grammatical validity of each sentence we utter, grammar rules are stored in memory. This kind of knowledge is referred to as procedural knowledge, also referred to as 'knowing how' memories (Medin and Ross 1992). Procedural memory relates to memory of information that has become automatic and remains unconscious, such as grammar knowledge and its use in speech, driving skills, getting dressed, reading a word et cetera (Medin and Ross 1992; Orbach 1995).

As shown in the previous chapter, there is a great variety of attributes underlying the representation of a brand. They include episodic memories (for instance the consumer-related attributes), semantic memories (for instance attributes related to product characteristics, brand identifiers, market, et cetera), and procedural knowledge (like usage and purchase attributes et cetera). With respect to the retrieval of these memories, some are probably more easily verbalized than others. Chapter three (in discussing the measurement and activation of brand representation attributes) will further elaborate this point.

### 2.1.5 Concepts

Concepts are assumed to be the basic constituents of knowledge in cognitive science. Concepts are conceptualized as units of knowledge. Whenever attempts are made to define concepts, these definitions are primarily framed within categorization models (see paragraph 2.2.3.). For example, Bower and Clapper (1989) describe a concept as an internal summary that captures some of the similarities that exist across a collection of entities or situations. Instead of defining concepts themselves, it is mostly their functions that are stated. One function of concepts is that they promote 'cognitive economy': by partitioning the world into classes, concepts allow us to decrease the amount of information that we must perceive, learn, remember, communicate and reason about. A second function of concepts is that they allow us to bear in mind our past experiences on present concerns. As the same situation never repeats itself exactly, past experience is useful to the extent that it is partitioned into classes that do reoccur. A third function of concepts is that they permit inductive inferences, particularly about properties that are not perceptible. For example, coming across a growling dog, you have direct knowledge only of its appearance. By categorizing it as a dog, one can infer many of its properties that are not visible, such as the possibility that it will bite if its territory is invaded (Smith 1989; Smith et al 1992). Assuming that concepts underlie the representation of knowledge in memory, the question becomes how these concepts are stored. The following paragraph will address this question.
Since the rise of memory research at the end of the 19th century, the question concerning how knowledge is stored in and retrieved from memory has been a topic of research and discussion. A lot of theories have been developed over the years, some of which have been very influential. A number of these have been applied in marketing science, sporadically as the actual focus of research (c.f. Joiner and Loken 1998; Ratneshwar and Shocker 1988; Romaniuk and Sharp 1996a, 1996b), but mostly as an unspoken assumption. In most brand image and consumer behavioral studies, no explicit choices for memory models are stated. Nevertheless, it should be acknowledged that it is memory that sets the basic frame of reference for these kinds of studies. Over the years cognitive scientists have developed numerous (variations on) models on the representation of knowledge in memory. Although it is to date still not clear how exactly knowledge is represented (there is still no consensus between the different views on memory), there have been major advances in this field of research. Currently the separate system account can be considered the dominant theory of memory representation. This separate system account assumes that people have two memories. One preserves the details of particular experiences, and is responsible for performance in tasks such as recognition and recall. The other system is committed to abstracting commonalities across events. This system preserves structural and conceptual knowledge in an organized network, operates by spreading activation, and is responsible for performance in tasks like classification and identification (Whittlesea 1997).

For the present study on brand representations in memory, a frame of reference needs to be set with respect to the conceptualization of knowledge representation. For this reason, developments within memory research will be described in chronological order. A number of theories on the activation and representation of knowledge will be discussed. In line with the separate system account, these theories concern spreading activation theory (processes of recall and recognition) and classification theories (processes of classification and identification)\(^1\). As both have their basis in the hierarchical associative network theory, this will be the first for discussion.

### 2.2.1 Hierarchical associative network theory

One of the first models concerning the representation of knowledge is the hierarchical associative network theory, proposed by Collins and Quillian in 1969. This theory states that knowledge is organized in a strict hierarchical network of linked nodes. Although these nodes are often represented by a word, it is important to realize that the node does not actually represent the word but rather the concept. The links designate the relation between any two nodes (Medin and Ross 1992). An important assumption in this model is that properties of a concept at one level are

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\(^1\) The aim of this thesis is not to criticize the different models for knowledge storage in memory. The overview of models intends to picture a historical development, leading up to a specific theory that will be taken as the basis for the present research. As research on memory functions is a very complex scientific area, it cannot be covered in full detail in this thesis. The interested reader is advised to use the references in the text as a starting point for more detailed information.
not only valid for that concept, but also for all concepts at lower levels. Within the network a concept on a specific level is linked to both subordinate and superordinate concepts. For example, a ‘sparrow’ is subordinate to ‘bird’, which in turn is subordinate to ‘animal’ (figure 2.1).

Although the hierarchical associative network theory gained a lot of credit, not least because it made such intuitive and appealing sense, some phenomena cannot be explained by it. According to the theory, a sentence like ‘a sparrow is a bird’ will be verified faster than a sentence like ‘a sparrow is an animal’, because the pathway through the memory network from ‘sparrow’ to ‘bird’ is shorter than the pathway from ‘sparrow’ to ‘animal’. Evidence shows that these kinds of predictions do hold in most cases. However, there are instances in which the assumption of a strict hierarchy in a network does not hold. People are faster in verifying the statement ‘a penguin is an animal’ than the statement ‘a penguin is a bird’. This result violates the presumed hierarchy. Another finding from statement verification studies is that people are faster in verifying the statement ‘a sparrow is a bird’ than the statement ‘a penguin is a bird’. This is an example of the typicality effect: instances that are more typical of a category are verified more quickly than atypical instances of that category. A third problem refers to the so-called relatedness effect. ‘A bat is a bird’ takes longer to falsify than ‘a bat is a plant’. False responses in which the subject and the category are related or have similarities (such as wings and ability to fly for bats and birds) often lead to longer reaction times (Medin and Ross 1992).

![Figure 2.1: example of a hierarchical associative network representation.](image)

The concerns with the hierarchical associative network model have paved the way for two (often intertwined) streams of memory models: spreading activation models and feature list models. In general, spreading activation models focus more on the concept activation aspect of knowledge representation, whereas feature list models focus more on the elements underlying the representation of a concept. In the next section, these two streams will be elucidated. The latter class of models is of particular interest as this thesis focuses primarily on the elements underlying brand representations in memory. Within the feature list approach to concept representation, several different models can be distinguished. The development in these models will be described, leading to frame theory, which will then set the cognitive/psychological frame of reference for the present research.
The following theories are illustrated by the usage of a fictional example of a specific man who has admitted to his memory representations of the brands Adidas and Nike. This man is French, and he is a sports fanatic. He especially loves soccer and athletics, two areas of sports in which both brands are well represented. Adidas sponsored the French national team at the Mondial Championships in 1998 and, as such, he has encountered the brand Adidas more often than Nike in a soccer context. Nike has been a more specific athletics brand, and he mainly knows this brand from that area of sport².

2.2.2 Spreading activation theory

In marketing and related research areas, the most often applied theory on memory is that of spreading activation. This theory is also referred to as associative network theory. It has been so widely applied that it has reached the status of ‘common sense’ among market researchers (Lawson 1998). According to associative network theories, declarative knowledge is encoded as a network structure, consisting of nodes representing concepts, and links representing associations among concepts (Anderson and Pirolli 1984; Collins and Loftus 1975). In spreading activation theory, the idea of a strict hierarchical organization is abandoned and, rather than being hierarchically organized, memory is conceptualized as a complex set of interconnected concepts. Connections are called associative links and are based on semantic relatedness or semantic distance: concepts that are semantically related are situated closer to each other and, if they are not related, their relative distance is larger (Collins and Loftus 1975; Medin and Ross 1992; Van Leyden sr. 1989). According to spreading activation theory, associative links vary in strength. The associative link between notions that are repeatedly experienced in co-occurrence becomes stronger each time it is perceived in real life, and also each time the set is recalled from memory. The strength of association fades when the link is less rehearsed by fewer instances of recall or perception. Figure 2.2 shows the associative network representation of the brands Adidas and Nike, and some other related notions represented as different nodes in memory. The two brand nodes are linked, or associated, and are or are not associated with the others. The strength of the associations is roughly indicated by the line thickness.

Figure 2.2: example of a spreading activation representation of Adidas and Nike.

² Associations and links in all figures in this chapter are fictional; they do not represent research findings.
The spreading of activation implies that if one of the nodes in a network is activated, then automatically the surrounding concepts become activated. The activation spreads over the network, which takes time. Based on the strength of associations between concepts, each time another concept is activated, the activation level decreases, until it is too low to further activate linked concepts and fades out. This process is often compared with throwing a stone into a pool whereby the height of the ripples on the surface indicates the strength of activation. The further away from the initial activation center (where the stone fell in the water), the bigger the area covered by the initial activation and the lower the local activation. Based on the level of activation, knowledge 'comes to mind'. One will only become aware of those activated nodes that surpass a certain threshold. The nodes that are not activated or do not reach the threshold and will remain unaware. This implies that whenever a node is activated, the combination of all nodes co-activated above the threshold defines what the impulse stimulus of the activation process is (which could be for example an entity perceived in the real world). For example, if one encounters a dog, the 'dog' node would be activated, and with that, a great number of associated nodes. All of the nodes that are activated above the threshold level will then jointly define what kind of dog it is.

Spreading activation models primarily focus on the process and patterns of concept activation. It is assumed that static nodes represent concepts, but exactly from what and how these concepts are comprised is not clear. Although some concepts may semantically be more related than others and, as such, are activated more or less simultaneously, the theory is not clear on what causes this semantic relatedness. Medin and Ross (1992) indicate that, although the spreading activation model has been quite influential in conceptions of our organization of knowledge, the model is unconstrained in its accounts of data and predictions therefore are in many cases too general and lack specificity.

2.2.3 Feature list models
As mentioned before, research on reaction times in similarity judgment tasks has shown that in some cases people react faster to concepts that are, within the hierarchical associative network view, a number of links away from each other, than to concepts that are assumed to be close. Rosch (1975), together with Mervis (1975), explained reaction time differences by researching the typicality of concepts. Our typical conception of, for instance, a bird is that of a flying animal of a certain size, which also includes certain other bird specific characteristics like 'is covered by feathers', 'eats seeds', 'lives in trees', and 'lays eggs'. A sparrow is more typical on these features than a penguin. Therefore, Rosch and Mervis argue, it takes less time to verify that a sparrow is a bird than it does for the atypical penguin. The process of deriving features from entities we encounter underlies feature list models. Features are assumed to be the units of storage. Also referred to as classification or categorization models, feature list models deal primarily with the way knowledge is stored and organized in memory, in contrast to spreading activation, which deals with the activation of it. A number of models have been proposed in the literature, some of the most well-known being the classical or defining theory, prototype theory, exemplar theory, connectionism and frame theory.
The main focus of feature list models is on the composition of a concept, rather than on activation between concepts (as seen in spreading activation models). Barsalou and Hale (1993) provide a clear description of the aspects underlying the different feature list models. To a varying degree across model assumptions, four types of relation can integrate features:

1. ‘aspect’ relations (‘wings’ are an aspect of birds);
2. ‘truth’ relations (indicate whether or not a feature underlies a specific concept: the feature ‘white’ is true for a swan, not for a sparrow);
3. connectives (‘and’, ‘or’: indicate combinations of features that underlie a concept: ‘white’ and ‘wings’ both belong to swan);

The main thing that differs among these feature list models is their assumptions on the way that features are stored, interrelated and combined in forming a concept. By investigating these models more closely and in chronological order, a development can be seen from an initial very strict model towards a less strict model. With the development of frame theory, a flexible but still very acceptable model is proposed that incorporates the advantages of both spreading activation models and feature list models. The next paragraphs will describe in a nutshell the basic assumptions of and general criticisms towards a number of influential feature list models. From this, the rationale of frame theory is explicated. Frame theory will be accepted as the theoretical cognitive basis for the present research and applied to the notion of brand representations.

2.2.3.1 Classical or Defining theory

According to the classical theory of concept representation, the features that comprise a concept are singly necessary and jointly sufficient to define the concept. For a feature to be singly necessary every instance of the concept must have it; for a set of features to be jointly sufficient, every entity having that set must be an instance of the concept. An object is categorized as an instance of a concept if and only if it contains the defining features of the concept. Hence this theory has also been addressed as the Defining Theory of Concepts. Theoretically the features are only combined by ‘and’ relationships and the combinations of features imply the concept. In classical theory, features are either present or absent: there is no nuance (Barsalou and Hale 1993; Margolis 1994; Smith 1989). The classical theory is illustrated in figure 2.3 by applying the Adidas and Nike notions from paragraph 2.2.1. Note that with respect to our French man, soccer is associated with Adidas. So is Nike, but to a lesser degree. This lesser degree is not incorporated in classical theory.

A number of criticisms have been raised towards this view on concept representation. The main criticism is that the model is too strict. Firstly, there is the problem that most natural kinds of concepts cannot be represented definitionally. Smith (1989) provides the example of tiger. For most people, when asked, a specific fea-
ture of tiger is striped. However, if one came across a white tiger (without stripes), it is likely one would still categorize it as a tiger. Hence, 'striped' cannot be a defining feature of the concept tiger. Secondly, experiments producing typicality effects run counter to classical theory. Typicality effects refer to the fact that people have no trouble in indicating some instances as more typical of a concept than other instances. Apple and peach are considered typical fruits, whereas raisin and fig are less typical, and olive and pumpkin are atypical.

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<th>Feature</th>
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Figure 2.3: classical feature representation of Adidas and Nike.

2.2.3.2 Prototype theory

Typicality effects have been widely studied in research on categorization processes, and have led to the conceptualization of prototype theory. Rosch (1975) in particular, together with Mervis (1975), contributed to the formulation of this theory. In 1975, they explored the hypothesis that members of categories that are considered most prototypical are those with most features in common with other members of the category and least features in common with other categories. The prototype theory of concept representation proposes that concepts are represented by an 'ideal' or 'prototype', and whether or not an instance is an example of the concept depends on the similarity of that instance to the prototype for the concept (Hampton 1997). The prototype is the set of features most likely to occur across exemplars. In contrast to the classical theory, features are not integrated by 'and' relations according to prototype theory. Rather, features are derived from the frequency of encountering the exemplar, and from that 'predictions' are made on the relations between features and categories. The more frequently a feature is derived from a perceived exemplar, the higher the chance that on perceiving this feature on another occasion, the exemplar from which it is derived is a category member of the prototype. Constructing a prototype requires recording some measures of frequency or probability for each feature. At various points in learning, a prototype model assesses feature frequency for a category and revises its prototype. As feature frequency rises above a threshold, it is added to the prototype; as feature frequency falls below threshold, it is moved from the prototype (Barsalou and Hale 1993).

The typicality of an encountered exemplar may be taken to be a direct measure of the exemplar's similarity to the concept's prototype, and similarity is assumed to be involved in categorization, memory, naming, reasoning and so forth. Typical exemplars are categorized faster than atypical exemplars because categorization involves determining whether an exemplar exceeds certain critical levels of similar-
ity to the prototype, and the more similar the item is to the prototype, the faster this determination can be made (Smith 1989). Figure 2.4 illustrates the prototype approach for the example of Adidas and Nike. Since Adidas sponsored the French national team at the World Soccer Championships in 1998, our Frenchman will have encountered Adidas often in the context of soccer. Nike has been a more specific athletics brand, and he might have more frequently encountered Nike while watching running events. As a consequence, Adidas will not include the feature ‘running’, because running is not frequently associated with the brand. Likewise, Nike is less likely to include the feature ‘soccer’. Upon encountering a sports shoe, with a swoosh on the side, while watching a ‘running event’, the best prediction would be that the encountered exemplar is branded Nike, for these features best suit the prototype of the brand Nike.

One noteworthy variant of the model deals with the properties of the features incorporated in the prototype, and is called weighted prototype model. According to the general prototype theory, the most frequent features comprise the prototype. This implies that a feature is or is not an element of the prototype: a binary value. In weighted prototype models, features receive a value that represents the degree to which a feature is part of the prototype. The main advantage is that a weighted prototype model uses more of the information provided by an exemplar than the unweighted prototype model. Essentially, an unweighted prototype model assumes that a feature is either completely relevant or irrelevant to the prototype. In weighted prototype models, each feature included in the prototype is relevant to the extent that it occurs across category members. If one feature is more diagnostic of category membership than another is, it receives more weight (Barsalou and Hale 1993) (for example, Nike’s swoosh).

Although both unweighted and weighted prototype models have advantages over classical models, there are drawbacks. One of the main critics is that these models are ‘vague and unconstrained’ (Smith 1989). The core of this criticism is that prototype theory assumes that memory incorporates a faculty for making abstractions from encountered entities and events. However, the theory does not address this faculty, but is only concerned with the outcome of it (Hampton 1997; Margolis 1994; Osherson and Smith 1981).

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<tbody>
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<td>stripes</td>
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<td>soccer</td>
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Figure 2.4: prototype model of Adidas and Nike.

2.2.3.3 Exemplar theory

The models described so far imply that some form of abstraction takes place. Features are derived from encountering exemplars, and so an abstraction of a cat-
egory member is established. Classical models then assume that these derived features need to be present in a new encountered exemplar for it to be classified as a member of the category, whereas prototype models predict membership from the presence of these derived features. In both cases, abstraction of features is based on the frequency of occurrence of a certain feature over encountering situations. One theory that does not incorporate this abstraction process, is exemplar theory. Exemplar theory implies that knowledge is represented through particular memories of individual episodes. The encoding of each encountered exemplar produces a separate memory trace. This is in contrast to the former models, in which features are represented once and each further encounter with exemplars strengthens the links between properties of the abstract representation. Another difference is that in exemplar models the encoding of novel instances can in principle occur without changing representations of already stored instances. In the former models each newly encoded exemplar will lead to a revision of the generic representation (Goschke 1997; Hampton 1997). In exemplar models, each exemplar is a conjunction of features and the representation of a concept is a disjunction of all its exemplars. The exemplar view thus states that concepts are represented by their most common exemplars. For an exemplar to be placed in a category, it need not match all of the features of an old exemplar exactly, but must simply be similar to an old exemplar, to a subset of exemplars or to all exemplars (Barsalou and Hale 1993).

2.2.3.4 Connectionist models

Connectionism is a class of knowledge representation models that along with network theories and feature list models shares the use of binary features, integrated by predictive relations. Connectionist models can be seen as an integration of (extended) weighted prototype models, mixed with exemplar models on the one hand, and spreading activation models on the other hand. In connectionist networks, prototypical information is extracted across many exemplars, while simultaneously storing unique information of individual exemplars (Barsalou 1992a). In general, connectionist models possess four characteristics: (1) every feature is used to predict a category; (2) features can predict absence of a category. In contrast to weighted prototype models, in predicting category absence feature weights can be negative; (3) rather than passively reflecting feature frequency, connectionist weights are active and typically adjusted to minimize categorization error. If categorization is substantially off track, weights are adjusted substantially in the direction that will minimize future errors; (4) weights are interactive rather than independent. If one weight produces high categorization accuracy, other weights may not change much. Even though these latter weights could be more optimal, they need not change because categorization is satisfactory (Barsalou and Hale 1993; Quinlan 1991). Figure 2.5 illustrates the connectionist representation of the brands Adidas and Nike and some of their features.

Connectionist models are quite capable of representing concepts, primarily intended to explain human behavior (Tijsseling 1998), and stem from the discipline

4 In contrast to this common conception, Medin and Florian (1992) argue that exemplar models are also models of abstraction.

5 This view is congruent with multiple-trace memory models (see Hintzman 1986).
of Artificial Intelligence. But with respect to the representation of knowledge in human memory, they lack some important aspects, as do the other theories described so far. The following paragraph will briefly elaborate on these deficiencies. The specific properties of frame theory face some of the problems with the models described so far, and will set the theoretical frame of reference in this thesis.

Figure 2.5: connectionist representation of Adidas and Nike.
Note: ('W_a' weight for Adidas; 'W_n' weight for Nike).

2.3 Knowledge representation: Frame theory

The feature list models described previously are all based on features. These features are binary by nature: they are assumed to be either present or absent in a representation (whether weighted or not). Furthermore, features are independent knowledge units, which are only interrelated in defining a concept. Although these models of memory representation have been widely researched and applied, they all lack two important properties of human knowledge, according to Barsalou (1992b) and Barsalou and Hale (1993): attribute-value sets and relations.

1. With respect to Attribute-Value (AV) sets, feature list models operate on a single flat level of analysis. However, the characteristics of exemplars typically form AV sets, with some characteristics (values) being instances of other characteristics (attributes), adding a second level of analysis. For example, 'blue' and 'green' are both values of color; 'swim' and 'fly' are both values of locomotion. People encode exemplar characteristics as values of more abstract attributes, rather than as independent features. Taking the Adidas and Nike example, both brands are represented by an attribute 'Origin', on which the values are Germany for Adidas and America for Nike. The next paragraph describes AV sets in more detail.

2. With respect to relations, people do not store representational components independently of one another, as argued by feature list models. Instead, people have extensive knowledge about the relationships between them. Paragraphs 2.3.2 and 2.3.3 elaborate on these relational aspects.

Frame theory incorporates these notions explicitly. According to frame theory, frames provide the fundamental representation of knowledge in human cognition. Frames are dynamic relational knowledge structures whose form is flexible and context dependent. A frame is comprised of three components: attribute-value sets, structural invariants, and constraints. Another important feature of frame theory is that frames are recursive: each attribute within a frame is in itself
composed as a frame (Barsalou 1992b, 1993). The next paragraphs will describe in
detail the three main components of frame theory, to a large extent as advocated
by Lawrence Barsalou.

2.3.1 Attribute - Value sets
Instead of a concept being represented by independent, individual features, a con-
cept is represented by a set of attributes, each with a specific value. Research find-
ings have indicated the importance of attribute-value relations in cognition, both
in learning and in recognition. Barsalou (1993) argues that binding values to
attributes is central to cognition: 'People don't simply note the presence or
absence of features in the input, as feature list theories assume. Instead, people
bind features in the input to more general attributes. On encountering someone
who is a white adult female, perceivers don't simply note the presence of the fea-
tures white, adult and female; instead they bind these features to attributes for
race, age, and gender. People know these attributes and recognize specific fea-
tures as values of them'. An attribute is defined as a concept that describes an
aspect of at least some category members (Barsalou 1992b). For example, the
brand mark describes an aspect of Nike, as does the brand's origin. A concept (like
brand mark) is only regarded as an attribute when it describes an aspect of a larger
whole. When the concept of brand mark is considered in isolation, it is not an
attribute. In that case, brand mark is defined by attributes like shape and color,
each with a specific value. Brand mark is considered an attribute when viewed as
describing some aspects of a category's members, like in the category of sport shoe
brands (of which Nike is one exemplar, see figure 2.6).

![Diagram of Nike frame representation]

Category concept is indicated by capitals within an oval; Attributes are indicated by ovals;
Values are indicated by small ovals. Figure form derived from Barsalou (1992b)
and Barsalou and Hale (1993).

Figure 2.6: part of the frame representation of the concept Nike.

A frame represents different exemplars within a category by adopting different
values for its attributes. An exemplar can be differentiated from other exemplars
in two ways: (1) by having unique values on joint attributes. For example, the
frames of Adidas and Nike both incorporate the attribute brand mark, but the
unique values 'stripes' and 'swoosh' differentiate the two sport shoe brand exem-
plars from each other; (2) by possessing a value for exemplar-unique attributes. For
example, the Dutch brand HAK is the only celebrity endorsed vegetable brand in
Holland, therefore in the canned vegetables category only HAK will include (a value on) an attribute ‘celebrity’. Frames often contain attributes that can be indicated as core attributes. Attributes become core attributes by frequent co-occurrence with each encounter of an exemplar. Certain attributes have values for every exemplar, so that the encoding of the values causes their attributes to be processed together frequently, thereby forming an experiential core. In addition to that, some attributes may be necessary conceptually, so that it is impossible to understand the concept without considering them, even when values are absent (paragraph 2.3.2 will discuss this issue in more detail). Core attributes are relevant representatives of the concept across all contexts, and Barsalou and Billman (1989, in Barsalou 1992b) refer to this as attribute systematicity. For example, a core attribute in the frame of Heineken will be alcoholic beverage product with a value ‘beer’. Attribute systematicity is not all-or-none but varies continuously as attributes co-occur to different extents. Similarly, since the attributes associated with a frame vary in systematicity, frames are not rigid structures.

**2.3.2 Structural invariants and constraints**

When perceiving exemplars in different situations, attributes often appear together across contexts. Correlational relationships develop between attributes that co-occur frequently, as described by feature list models, but that is not all. Conceptual information is also derived from the co-occurrence of attributes. Conceptual information refers to perceptions like ‘is part of’, ‘is above’, ‘indicates’, ‘causes’, et cetera. Some relationships between attributes may be fixed, in the sense that they do not vary often across exemplars of a category. Such relations between attributes are referred to as structural invariants. For example, people know structural relationships between head, neck, and brain in their concept of human, such as ‘the brain is inside the head’, and ‘the head is above the neck’. In all situations when a person is perceived, his head will be above his neck. Hence the two attributes head and neck co-occur frequently, and a correlational relation develops. But also, as the two attributes are always ordered in the same way, a structural invariant relation develops. Besides spatial relations, many other structural invariants exist like temporal relations, causal relations, intentional relations, possessions, et cetera (Barsalou 1992b, 1993; Barsalou and Hale 1993). With conceptualizing exemplars of a concept being represented by attribute-value sets and structural invariants, simple frames are introduced. Simple frames are defined as a co-occurring set of multi-valued attributes that are integrated by structural invariants.

Simple frames enable the representation of constraints, which are also conceptual relationships, but of another type. Whereas structural invariants are conceptual relations between attributes that hold true across exemplars of a concept, constraints capture contingencies between attribute values that vary widely from exemplar to exemplar. Constraints indicate that the value on one frame attribute constrains the value on another attribute (Barsalou 1992b, 1993; Barsalou and Hale 1993). For example, in purchasing sport shoes, the value ‘long’ on the attribute durability constrains the value ‘high’ on the attribute prize.
2.3.3  Recursion
Because values are concepts in themselves, they in turn can be attributes having still more specific values. Within a frame, each attribute may be associated with its own frame of more specific attributes, its 'attribute frame'. For example, the frame of sport shoe can include attributes like performance, running, and brands. Values on the attribute brands (like 'Nike', 'Reebok', and 'Adidas') are concepts in themselves, being comprised of attributes like brand mark, origin and advertisement, each with specific values (figure 2.7). Recursion refers to the process by which the content of a concept can be continually decomposed (Barsalou 1993; Barsalou and Hale 1993).

![Figure 2.7: Example of recursion: attribute frames of the concepts Sport shoe and Nike.](image)

2.3.4  Context dependency
It is not necessary that all the elements that comprise a frame representation, that is to say, the total attributes-values set and their structural invariants, are activated at the same time in all situations. On a particular occasion, one subset of a concept's attributes may be likely to occur, whereas, on another occasion, a different set of attributes might be expected. Indeed, across different instances, some attributes may almost always be bound to occur (the core-attributes) and others only occasionally (Barsalou and Hale 1993). One important aspect of frame theory regarding brand research is this notion of context-dependency. Theories of knowledge often assume that concepts are context-independent and universal. However, concepts would only be context-independent if they represented exemplars in isolation, omitting the typical situations in which they occur. For example, a context-independent concept for chair might only represent the physical parts of chairs, omitting the situations in which they are normally found, such as a library or a living room. A concept would be universal if all relevant exemplars were covered simultaneously. However, Barsalou et al. (Barsalou et al 1993) argue that concepts are in fact context dependent. People typically picture concepts within the larger situations that contain them. For example, a person's concept of chair represents chairs in particular situations, such as chairs in a living room. Two types of situations are distinguished: an episodic situation represents a single (learning or
encountering) event that occurred at a specific time; a generic situation generalizes from related episodic situations. Barsalou et al (1993) further argue that concepts are locally situated. Local refers to the idea that the concept constructed by a person on a given situation is particular to that situation, thus only covering exemplars in that situation and not attempting to cover all exemplars universally. For example, someone’s concept for chair only covers those chairs in the current situation, such as the chairs in the living room.

Context dependency can be derived from individual sampling models, which state that people derive attributes and their values from perceived and stored concept exemplars (individuals), and simultaneously store information about the situations in which these perception occurred (Barsalou et al 1998). Figure 2.8 illustrates how attributes and values are derived and strengthened over a number of encounters with a category exemplar. Applied to sport shoes, the first time (S1) a particular person encounters a particular sport shoe (E1), the value ‘swoosh’ (V1) is derived, creating an attribute brand mark shape (A1), along with the value ‘blue’ (V2) on a created attribute brand mark color (A2). In the next situation (S2), again the value ‘swoosh’ is perceived, strengthening the associative relationship between E1 and A1 and between A1 and V1. But in this situation, its color is ‘yellow’, creating a new value (V22) on the same attribute brand mark color. So the associative relationship between E1 and A2 is also strengthened. Additionally, the perceiver notices that the brand mark is accompanied by the word ‘Nike’ (V3), creating an attribute brand name (A3). Finally, on the third encounter (S3), again the brand mark shape ‘swoosh’ is perceived, and also the accompanying brand name ‘Nike’, strengthening the relationship between the concerning exemplar, attributes and values. But for the attribute brand mark color, again a new value is derived: white (V23). This again strengthens the relationship between the exemplar and the attribute brand mark color.

Figure 2.8: derivation and strengthening of attributes (A) and values (V) from an encountered exemplar (E) at different situations (S).

Note: thicker lines indicate strengthened associative relations.

6 Figure derived from Barsalou, Huttenlocher and Lamberts (1998)
It can be seen from figure 2.8 that by storing the situations from which both values and their attributes are derived, these situations may also influence the activation of the representation. When a situation like S1 re-occurs, it is more likely that the attribute-values 'swoosh' and 'blue' are activated and thus represent the concept, whereas the attribute value 'Nike' on the attribute brand name is less likely to be evoked by the situation. This is an important notion for research on brands, as it explicitly states that different situations may trigger different features of a brand.

2.4 Summarizing the memory models

The overview of models in this chapter sets out to provide a chronological and conceptual description of the developments in theories on knowledge representation. Starting from hierarchical associative network theory, two (intertwined) streams of research have emerged: one focusing primarily on the activation of knowledge (spreading activation and connectionist models), and one focusing primarily on the elements underlying the representation of knowledge (such as feature list and frame theory). In all, eight models have been described in this chapter, some briefly, others in a bit more detail. Numerous models that have been proposed in the literature on memory are not included, like Anderson and Bower's HAM models, Anderson's ACT and ACT* models, Raaijmakers and Shiffrin's SAM. Furthermore, adjustments and refinements of the described models have lead to a range of 'spin-off' models. Almost all of these memory models are still under development. Most of the fundamental experimental research on memory models make use of simple (though methodologically elegant) experiments with tasks primarily related to the learning and recall of (fictional) words, their practical applicability to such an everyday topic as brands is quite low. Therefore, applying these models to complex representations like brands is not without caution. However, as indicated by the quote at the beginning of this chapter, in order to investigate psychological activities, a chosen theory should ideally underlie the investigations. Although all theories have their pros and cons, a choice has been made from this overview of theories to accept frame theory as the theoretical frame of reference for the organization of knowledge, combined with the knowledge activation principles of spreading activation theory. The two main arguments for choosing for this theory is first of all based on its explicit distinction between the actual features that people perceive from and associate with a specific concept, and the abstracted, higher order category in which these are implicitly fitted in human memory. This allows for the comparison of concepts (i.e. brands in this case) on both the level of attributes (i.e. association types) as on the level of attribute values (i.e. the associations). A second consideration that is of relevance to the study of brands is the explicit role that the theory puts on the context dependency of concept activation. Knowledge related to (a) brand(s) is assumed to be represented in long term memory by simple, recursive and context-dependent frames. The activation of attribute values underlying these frames follows the principle idea of spreading activation. The next paragraph will elaborate more on the application of this theory to brand representations in memory.
2.5 Brand representations in memory

2.5.1 The onset: formation of brand representations

As described in paragraph 2.3.4, concept attributes and their respective values are derived from all situations in which a concept is encountered. These situations provide the informational sources. Regarding brands, the formation (or consolidation) of a brand representation starts from two general sources: purchase motivation and daily life information/experience (figure 2.9). These sources provide an individual with all kinds of knowledge of and experience with products and brands, through direct purchase experience and/or mere exposure. The knowledge and experiences related to the product and/or brand in question are stored in memory as associations. New associations (new facts or new experiences) lead to the formation of specific product or brand attributes. Repeated experiences along with already stored knowledge lead to an intensification of existing product and brand attributes.

![Diagram](image)

Figure 2.9: formation and intensification of a brand representation in memory.

Daily life information/experience will provide the consumer with all kinds of information, including information with respect to products and brands. The consumer is actively or inactively exposed to all kinds of products and brands, even if he does not use them, or does not intend or need to use them. Daily life exposure to products and brands reaches the consumer indirectly. Indirect information refers to information which is inactively gained by the consumer, and which (s)he merely obtains from being exposed to elements (media, social contacts etc.) within his environment. Indirect information can be subdivided into marketer-controlled information (e.g. advertising) and non-marketer-controlled information (e.g. word-of-mouth). Daily life information thus imposes inactive product and brand exposure, which leads to product and brand knowledge. Inactive product and brand exposure can also lead to purchase motivations. For instance, if one hears of a product that is ultimately refreshing after taking part in sport, this may serve as an informational motive for purchase. The relationship between purchase motivation and product and brand exposure displayed in figure 2.9 indicates that there is also another route: if a purchase motivation occurs, it may lead to an active exposure to different kinds of products and brands (the consumer actively starts searching for information), which in turn leads to product and brand knowledge. The opposite of indirect information is direct information on products and brands. Direct information is obtained by trial or usage of the product or brand, and refers to direct personal experience with the product and/or the brand. Yet a consumer can also be motivated or have knowledge of a product and/or brand by experiences from those in one's immediate social circle.
Purchase motivations may lead to initial (or repeated) product or brand trial/usage.
With respect to purchase motivation, Rossiter, Percy and Donovan (1991) distinguish two dimensions of purchase motives: informational and transformational motives. Five informational motives are distinguished: problem removal, problem avoidance, incomplete satisfaction, mixed approach-avoidance and normal depletion. Transformational motives can be regarded as ‘feel’ motives, being purchase motives that promise a transformation in the brand user’s sensory, mental, or social state. Three such motives are distinguished: sensory gratification, intellectual stimulation and social approval. Rossiter, Percy and Donovan do not explicitly address the question how these motives themselves are derived. Presumably, informational motives will be drawn from internal physical states. Negative feelings or negative physical conditions encourage the consumer to resolve this need. For instance, if one is thirsty, one needs to drink. If one needs transport, one could consider purchasing a bike. Transformational motives can be derived from being a member of a social community, which provides norms and values (social approval), or from an (unconscious) aim to reach a certain goal (intellectual stimulation). Motives of the informational and transformational kind will be derived intrinsically (physical sensations) or extrinsically (social pressure). So besides daily life information/experiences, direct information obtained through the fulfillment of purchase motives derived from product or brand purchase also leads to product and/or brand knowledge (Biel 1993; Cobb-Walgren et al 1995; Krishnan 1996).

The result of all obtained product/brand experiences and knowledge is that attribute values are formed in memory. From the paragraphs on memory, we can conceptualize the memory representation of the brand as a frame of attributes of the product, the brand and all experiences and knowledge derived. New attribute values derived from new experiences or exposures may be formed. Being reinforced may consolidate already existing attributes. So, by the acquisition of experience and knowledge, product and brand attributes are formed or consolidated and a brand representation is formed.

2.5.2  Frame theory applied to brand representations
In this thesis, frame theory is accepted as the best description of representation of brand related knowledge. From the developments of models focusing on the elements underlying knowledge representation, it can be seen that frame theory provides theoretical accounts for human knowledge that are not incorporated in earlier models. It is assumed that knowledge is stored as simple and recursive frames in long-term memory, and that the manifestation of a specific concept follows from the activation of attribute values in working memory by means of spreading activation processes. Working memory is conceptualized as the active part of memory containing the moment-specific subset and configuration of activated attribute values. On one occasion, one subset of a concept’s attributes might be bound to the exemplar, while on another occasion, another subset of attributes might be bound.

From the IBRA, described in the previous chapter, it is clear what we may expect to be ‘in there’ when we are looking for the content of consumer memory. ‘In’ refers
to brand-related memory content in long-term memory. Following the terminology of frame theory, in the representation of brands in memory a distinction is made between brand attributes (i.e. association types, like the 'Origin' of sports brands) and brand attribute values (i.e. the actual brand associations: 'Germany' for Adidas and 'America' for Nike). The IBRA is a theoretical pool of attributes a consumer may have with any brand. The representation of a specific brand will either include none of these (if the person is unfamiliar with the brand, all of them (which is theoretically possible, but improbable), or in most cases a subset of them. For each brand, a specific set of brand attributes comprises its frame representation. Important to stress is that it should not be assumed that all attributes are in there. This might be one of the major pitfalls in applied market research on brands: assuming that a certain attribute is part of the representation of the brand in memory. If an attribute is not a representative of the brand in memory, and a respondent is presented with questions based on the assumption in a research situation, then there is a chance that the attribute is extorted or created, and hence the measurement will be questionable.

The manifestation of a brand representation results from the activation of the values on a subset of all framed attributes in working memory. The question then is under what circumstances attributes and their values become activated in memory. Two influential factors are considered in this thesis and will preliminarily be briefly addressed, in order to clarify the subjoined definition of brand representation. Chapter 3 will address them in more detail.

1. Explicit providing of cues can have an enhancing effect on the activation of attribute values. For instance, the frame of queen will contain attributes like name, country, age, residence, and predecessors. If someone is asked to describe queen, (s)he would be able to mention some values spontaneously. If (s)he was given the word 'Holland', chances are that 'Beatrix' would come to mind. Without providing this word, one could mention all kinds of names or none at all. This refers to the notion of situated/specific (a queen) versus generic concepts (all queens) (see Barsalou et al 1993). Cues can direct the activation of knowledge, and thus influence the subset of activated attributes. Paragraph 3.3.1 will elaborate on the role of cues.

2. The notion of context dependency indicates that the activation of attribute values is dependent on the situation within which the activation is triggered. A particular context activates a particular subset of attributes, the reason being that the context provides cues to activate knowledge. As displayed in figure 2.8, without a context representation only the encountering of an exemplar would trigger attributes. With the storage of contextual information, there is a two-way activation: from the perception of the exemplar and from the perception of the situation. Moreover, context may determine the relevance of an attribute for that context. For instance, within a purchase decision context some brand attributes might be more relevant than others (like price, durability), while these need not be relevant in a neutral context. Paragraph 3.3.2 will exhaustively discuss (research on) the role of context on the activation of knowledge.
2.5.3 Definition of Brand Representation

As a conclusion to this chapter I propose to apply the term brand representation to refer to the collection of brand-related knowledge stored in memory. Based on the IBRA, the application of frame theory, and incorporating the factors influencing knowledge activation, I suggest the following definition of a brand representation:

'A brand representation is the brand specific collection of product-, brand- and consumer-related attributes (consisting of all knowledge of and feelings towards a brand) which an individual holds in long term memory, (a subset of) which incidentally and/or intentionally becomes active in working memory in a moment-specific configuration, dependent on activation cues, activation context, and personal dispositions'.

A number of aspects from this definition will be elucidated briefly:

1. 'A brand representation is the brand specific collection of product-, brand- and consumer related attributes [...]'. A set of product-, brand- and consumer related attributes underlies each brand representation, the configuration of which and the unique values on the attributes differentiate the brand from others. Therefore, a brand representation is brand specific. No two brands are alike. There can be, to a small or large extent, an overlap in the set of specifying attributes, but the configuration of attributes and values on these attributes brand specific and unique.

2. 'A brand representation is the brand specific collection of [...] knowledge, [...]'. A brand representation ranges from concrete knowledge of product- and brand characteristics (color, taste, price) to very abstract symbolic functions of the brand (like its personality or ideology). In this definition, knowledge is conceptualized as a generic term that covers factual knowledge, attitudes and experiences with respect to the brand and its product(s).

3. 'A brand representation is the brand specific collection of [...], and feelings [...]'. All incoming sensory information is transferred via a brain system known as the amygdala, which provides the information with an 'emotional label'. This label can have a negative, neutral or positive impact on the evaluation of the brand.

4. ' [...] which an individual holds in long term memory, [...]'. Although some authors suggest that a brand is a collective entity, shared by a group of people by some form of common thoughts, its representation still must reside in an individual's memory. Acting towards a brand is an individual act, which indeed can be influenced by social group processes, but originates in the individual's mind. Therefore, the basis for researching brand representations should be the individual.

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7 As early as 1963, Timothy Joyce (1971) stated in an essay on brand image measurement: 'it is psychologically, and logically, impossible for two people to have precisely the same image of a brand, in the sense that [...] no two people have the same experiences; however, their respective images may have many of the same features [...]'. Naturally, in doing image research we are primarily concerned with the key, operational features of the images held by individuals, and we have to simplify and to restrict the field to features of the image which can be shared by a number of individuals if our conclusions are to be of practical value [...]. But the wealth of associations which a brand may have for a particular person and the wealth of patterns of these associations among different individuals make up the territory we are studying.'
5. ‘[...] which incidentally and/or intentionally becomes active in working memory [...]’. Paragraph 2.1.3 described the distinction between implicit and explicit knowledge. The activation of these different types of knowledge has been referred to as either incidental (for implicit knowledge) or intentional (for explicit knowledge).

6. ‘[...], (a subset of) which [...] becomes active in working memory in a moment-specific configuration, dependent on activation cues, activation context, and personal dispositions’. The manifestation of a memory representation of a brand is not static in all circumstances. In most instances, only a subset of all stored attributes is activated. The exact configuration of this subset product-, brand - and consumer related attributes depends on the way brand knowledge is activated, and is therefore moment specific. It depends on external factors as well as on internal factors. External factors like context and the nature and number of cues applied have an influence on the activation and therefore on the configuration of product-, brand - and consumer related attributes. Personal dispositions like momentary product- and brand involvement also influence this moment specific configuration.