Journal of Business Research xxx (2015) xxx–xxx

Contents lists available at ScienceDirect

Journal of Business Research

One pie, many recipes: Alternative paths to high brand strength☆

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ARTICLE INFO

Article history:
Received 1 September 2015
Received in revised form 1 October 2015
Accepted 1 November 2015
Available online xxxx

Keywords:
Brand associations
Brand strength
Multiple regression analysis
Fuzzy-set qualitative comparative analysis
Brand management

ABSTRACT

Brand strength, defined as an evaluative or behavioral response to a brand, is at the heart of brand management. This research studies the simultaneous influence of number, favorability, consensus (measured and perceived), and uniqueness of brand associations on brand strength in two product categories: gasoline and toothpaste. The study combines multiple regression analysis (MRA) and fuzzy-set qualitative comparative analysis (fsQCA) to gain a nuanced understanding how distinct combinations of brand association characteristics influence brand strength. The findings illuminate complex brand-association configurations that drive brand equity and contribute to the development of a theory of brand strength and its drivers. Such a theory serves managers who position their brands in the marketplace and aids companies' brand building activities.

1. Introduction

Confronted with phenomena where a number of different predictors may lead to a specific outcome, researchers in management, marketing, and branding tend to use variance-based techniques such as multiple regression analysis (MRA) to test their models of reality. Opting for specific analytical approaches and the assumptions underlying the respective methods (e.g., reliance on fit indices, linear relationships) may have a substantial influence on the resulting reality researchers detect (Armstrong, 2012; Fiss, 2011; Woodside, 2015). The objective of this research is to learn more about similarities and potential differences in findings and resulting consequences for theory development in the field of brand strength when applying MRA compared to fuzzy-set qualitative comparative analysis (fsQCA).

Research on cognitive brand equity proposes that, in general, the strength of brands results from what stakeholders know about a brand and how they evaluate that knowledge. Literature defines brand strength as an evaluative or behavioral response such as commitment, trust, reputation, or recommendation (Broniarczyk & Alba, 1994; Janiszewski & van Osselaer, 2000) that affects brand choice (Agarwal & Rao, 1996; Cobb-Walgren, Ruble, & Donthu, 1995; Low & Lamb, 2000). Keller (1993) conceptualizes brand knowledge as associations in consumers' minds that vary by content, favorability, strength, and uniqueness. Keller (2008) and Kapferer (2012) summarize empirical evidence concerning specific association characteristics driving brand strength and conclude that brands are strong when potential customers hold a large number of favorable and unique associations which they share with many other potential customers. Researchers use variance-based (symmetric) techniques to investigate whether the number of brand associations (Bennett, Haertel, & McColl-Kennedy, 2005), the relative presence of positive versus negative associations (Spears, Brown, & Dacin, 2006), the uniqueness of brand associations (Krishnan, 1996), and agreement with desired brand associations (Malär, Nyffenegger, Krohmer, & Hoyer, 2012) influence consumer brand response. These studies, however, do not investigate how combinations of different brand association characteristics influence brand strength.

Ordanini, Parasuraman, and Rubera (2014) and Woodside (2015) convincingly argue that single antecedent conditions are rarely necessary or sufficient alone in predicting a level of an outcome condition. In addition, the very nature of symmetric models hinders the recognition of antecedent conditions that associate with only high or only low levels of the outcome condition. Configurations of association characteristics leading to high brand strength found by MRA may differ from configurations found by fsQCA because these methods apply significantly different perspectives and assumptions concerning data and the reality the data represent.

MRA focuses on the relationships between independent variables and an outcome of interest across individual cases. MRA incorporates

☆ The authors appreciate comments and insights by JBR reviewers to an early version of this paper.

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http://dx.doi.org/10.1016/j.jbusres.2015.12.037
0148-2963/

the drivers of high and low levels of the dependent variable in one algorithm. The relationship between predictor variables and outcome variable is symmetric. MRA treats contrarian cases (cases having similar high scores on one or more antecedent conditions but an outcome score opposite to the majority of cases) as outliers or noise in the data. The method assumes that one combination of weighted predictors best predicts (at the same time) both high and low levels of the outcome of interest. MRA calibrates net effects of variable-level influences and ideally tests fit validity of the detected model on additional samples.

The fsQCA method builds on the idea that individuals are complex cases that need to be understood as entities (De Meur, Rihoux, & Varone, 2004). fsQCA analyzes which individual combinations of levels of predictor variables lead to a high (and/or low) individual value of the outcome in the data set. Relationships are potentially asymmetric. Predictor configurations that accurately predict a high level of outcome are not necessarily the mirror opposites of predictor configurations that accurately predict a low outcome. fsQCA also allows equifinality (Ordanini et al., 2014). Different complex configurations of high and low levels of predictor variables may lead to the same outcome. A high value on one of the predictors in combination with specific levels on additional predictors may lead to a high outcome; but a low value on that predictor combined with specific levels of other predictors may lead to a high outcome, too. These configurations are sufficient for the outcome of interest to occur. None of them is necessary (Woodside, 2015). Under specific circumstances, the same cause can produce different effects (Urry, 2005). fsQCA aims to uncover the relevant causal conditions for contrarian cases (Ragin, 2000). Asymmetric, case-oriented methods like fsQCA thus complement standard quantitative approaches like MRA because they offer the potential to identify complex configurations of antecedents that MRA may not reveal. Researchers applying fsQCA use additional samples to test the predictive validity of the resulting models.

Woodside (2015) suggests combining both analytical methods to improve theory development. This research uses both MRA and fsQCA to gain a richer and more nuanced understanding of how different combinations of brand association characteristics influence brand strength. MRA provides an analysis of variable-level effects by identifying how association characteristics—individually and combined—affect brand strength. fsQCA provides a case-level perspective that complements the MRA approach by investigating different paths to high brand strength (equifinality) and combinations of brand association characteristics that lead to high versus combinations that lead to low brand strength (asymmetry).

This research is the first attempt to investigate the simultaneous influence of the number, favorability, and uniqueness of brand associations as well as consumers' measured and perceived agreement concerning these associations on the strength of brands. Two categories, gasoline and toothpaste, provide the empirical setting. The research results leave no doubt about the importance of favorable associations and a high degree of perceived sharing of brand associations with others. Actual consensus of brand associations is of little importance. The number of consumers' brand associations appears to have a positive aggregate effect. However, detailed results applying case-related analysis identify cases where a small number of brand associations lead to high brand strength. These findings contribute to the development of a theory of drivers of brand strength. Such a theory serves managers who position their brands in the marketplace, by showing brand-association configurations that drive brand equity.

Section 2 presents the theoretical frameworks that underlie the comparison between research results based on MRA versus fsQCA. This section presents the propositions for both the symmetric and asymmetric analyses. Section 3 describes the data collection method and the measures. Section 4 provides the relationships between brand association characteristics and brand strength found through MRA and fsQCA. The conclusion section critically compares the findings, discusses the limitations of the study and its implications for theory development.

Table 1
Sample structure.

	Gasoline	Toothpaste
Completed questionnaires	758	770
Missing data (no valid associations)	31	38
Final sample	727	732
Number of association tasks	2794	2808
Average number of brand associations per task	2.88	2.93

2. Theoretical framework

Literature linking brand association characteristics with brand strength indicates that the number, valence, and uniqueness of brand associations as well as the level of agreement with desired brand associations influence consumer brand response (Bennett et al., 2005; Chen, 2001; Krishnan, 1996; Malär et al., 2012; Spears et al., 2006). By applying correlation-based methods, this literature almost exclusively assumes a symmetric relationship between simple association characteristic and brand strength: A change of a characteristic in either direction (more or less) leads to a change in brand strength.

The number of associations a consumer links to a brand depends on the knowledge and experience a consumer has with a certain brand (Romaniuk & Nenycz-Thiel, 2013). With an increasing number of brand associations the memory structure that represents a brand becomes richer, and the brand becomes stronger (Krishnan, 1996).

H1. The size of an individual's brand association set has a positive effect on brand strength.

Brand managers recognize that creating favorable brand associations is an important driver of brand equity (Christodoulides & de Chernatony, 2010; Dacin & Smith, 1994). Symmetric empirical research confirms a positive link between the favorability of brand associations and brand strength (Koll & von Wallpach, 2014; Krishnan, 1996).

H2. The favorability of an individual's brand associations has a positive effect on brand strength.

Many researchers suggest that unique brand associations are beneficial for customer-based brand equity because such unique associations help differentiate the brand and simplify decision making (Broniarczyk & Gershoff, 2003; Dhar & Sherman, 1996; Krishnan, 1996; Zaichkowsky, 2010). Symmetric empirical studies find partial support for this assertion (Krishnan, 1996; Romaniuk & Gaillard, 2007).

H3. The uniqueness of an individual's brand associations has a positive effect on brand strength.

Consensus concerning a brand is the degree to which different people share the same associations regarding a brand. Association sharing can be a measurable entity or a perception of consumers. Kapferer (2012) proposes that consumers' consensus about a brand's characteristics is an important driver of brand strength. Consensus makes most consumers feel more comfortable because their beliefs are not at odds with beliefs of others (Ross, Greene, & House, 1977) and consensus also increases liking (Gershoff, Ashesh, & Anirban, 2008).

H4. The actual consensus of an individual with other individuals in terms of their brand associations has a positive effect on brand strength.

H5. The perceived consensus of an individual with other individuals in terms of their brand associations has a positive effect on brand strength.

Limited conceptual as well as empirical work addresses potential higher order effects of brand association characteristics on brand strength. Likely reasons are methodological difficulties of detecting such effects with standard quantitative methods, for example, because

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Table 2
Means and correlations of independent variables.

Independent variables	M (SD)	F	U	CM	CP
Number (N)	2.88 (1.01)	0.176	0.072	−0.204	0.086
	2.93 (0.97)	**0.165**	**0.036**	**−0.167**	**0.068**
Favorability (F)	3.38 (0.99)		0.054	−0.103	0.282
	3.95 (0.84)		**−0.032**	**−0.023**	**0.300**
Uniqueness (U)	0.68 (0.25)			−0.126	−0.081
	0.71 (0.23)			**0.033**	**−0.019**
Measured consensus (CM)	0.18 (0.09)				−0.023
	0.13 (0.06)				**−0.013**
Perceived consensus (CP)	4.99 (1.27)				
	5.12 (1.26)				

Product categories: gasoline ($n = 2794$) and **toothpaste ($n = 2808$)**

of multicollinearity (McClelland & Judd, 1993). For similar reasons, existing studies refrain from stating asymmetric hypotheses or proposing equifinal paths to high brand strength that involve both high and low levels of specific antecedents. Nevertheless, a large number of non-unique and favorable product category associations may lead to high brand strength, while a large or small number of unique and favorable brand-specific associations may drive the same outcome.

Based on a complexity theoretic asymmetric perspective, the relationship between configurations of brand association characteristics of consumers and brand strength can take many different forms. Each of the association characteristics can be sufficient for high brand strength to occur, but none of them may be necessary for high brand strength. Different configurations combining several association characteristics may lead to high brand strength, whereas other configurations may explain low brand strength. In these configurations, each association characteristic may relate positively, negatively, or not at all to high brand strength. Thus, varying combinations of association characteristics might result in high or low brand strength. Three tenets result:

T1: Few brand association characteristics may be necessary, whereas many are sufficient for explaining brand strength.

T2: Multiple combinations of absence (low levels) or presence (high levels) of brand association characteristics lead to high brand strength.

T3: Combinations of brand association characteristics leading to high brand strength differ from combinations leading to low brand strength.

3. Methods

3.1. Data collection

The research consists of the analysis of consumers' brand associations and brand strength with regard to two different product categories over a period of 4 weeks via a series of online surveys. Each respondent received an invitation to evaluate brands in one of the two product categories.

In the first week, participants indicated their brand awareness for the six largest gasoline (toothpaste) brands in the German market (aware/not aware). Respondents who were aware of at least four brands—the overwhelming majority of respondents—qualified for participation in the survey. Qualified respondents were shown one brand randomly selected from those they were aware of. The next question asked respondents about their associations when thinking of this brand. Respondents wrote down up to a maximum of eight free associations and indicated how negative or positive they perceived each of the associations on a five-point Likert scale to be (Spears et al., 2006). Respondents also stated how strongly they believed other people shared their stated set of associations with the brand and indicated their level of agreement to a set of three items measuring attitudinal brand strength (see Appendix A for all questionnaire items). Over the next 3 weeks the participants received the same questionnaire for three additional gasoline (toothpaste) brands. Brand presentation followed a

Table 3
Regression results (DV: brand strength).

	Gasoline		Toothpaste	
Effect	Standardized coefficient	Significance	Standardized coefficient	Significance
Number (N)	0.048	0.001	0.056	0.001
Favorability (F)	0.622	< 0.001	0.251	< 0.001
Uniqueness (U)	−0.020	0.173	−0.017	0.311
Measured consensus (CM)	0.014	0.404	0.011	0.565
Perceived consensus (CP)	0.110	< 0.001	0.430	< 0.001
N × F	0.051	0.001	0.025	0.147
N × U	0.018	0.239	−0.045	0.012
N × CM	0.012	0.436	−0.036	0.055
N × CP	−0.017	0.235	−0.021	0.221
F × U	−0.024	0.098	−0.009	0.600
F × CM	−0.018	0.216	0.014	0.400
F × CP	0.101	< 0.001	0.057	< 0.001
U × CM	0.015	0.343	−0.029	0.102
U × CP	0.002	0.876	0.003	0.877
CM × CP	−0.008	0.564	0.022	0.182
Brand 1[a]	0.128	< 0.001	0.000	0.998
Brand 2[a]	0.069	0.001	0.022	0.294
Brand 3[a]	0.035	0.038	0.043	0.037
Brand 4[a]	0.066	0.001	0.025	0.220
Brand 5[a]	0.036	0.068	0.028	0.170

[a] Coefficients for brand-specific dummy variables must be interpreted with respect to the base level Brand 6; a significant positive regression coefficient indicates that for the corresponding brand consumer response is significantly more positive than for the base level Brand 6.

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Table 4
Data calibration.

	Number	Favorability	Uniqueness	Measured consensus	Perceived consensus	Brand strength
Values from	1–8	1–5	0–1	0–0.54	1–7	1–343
Threshold of full non-membership	1	1	0	0.1	1	2
Threshold of full membership	5	5	1	0.2	7	294
Cross-over point	3	3	0.66	0.15	4	64

random order. In the third week, participants provided socio-demographic information. Respondents received financial compensation.

An online panel provided respondents representative for the German population from 18 to 80 years in terms of socio-demographic characteristics. After 4 weeks, 758 (770) respondents had completed all questionnaires. The researchers deleted consumer–brand combinations with no valid associations. The final sample consisted of 727 (732) respondents who had completed 2794 (2808) association tasks for the gasoline (toothpaste) brands category. Respondents mentioned on average 2.88 brand associations in each gasoline brand task and 2.93 in each toothpaste brand task (Table 1).

3.2. Measures

3.2.1. Brand associations

Two researchers coded the associations mentioned in the free association task and discussed discrepancies until they achieved agreement for all codes and all associations classified as invalid. The resulting individual codes served for calculating brand-specific indices for number, favorability, uniqueness, and consensus of brand associations at the individual consumer level. The study tests how these indices, together with a measure of perceived consensus, affect consumer brand strength.

3.2.2. Number and favorability of brand associations

The number of thoughts a respondent links to a brand name reflects the individual-level brand association set size (Krishnan, 1996; Nelson, Bennett, Gee, Schreiber, & McKinney, 1993). Averaging the favorability of all mentioned associations for each respondent–brand combination determines the favorability score, with higher numbers indicating a more favorable evaluation.

3.2.3. Uniqueness

A relative uniqueness score for each respondent–brand combination results from establishing an intra-consumer comparison of the proportion of associations linked to one brand compared with the associations linked to all other brands in the product category (Grohs & Koll, 2014; Romaniuk & Gaillard, 2007). The uniqueness score can range from 0 (when a consumer mentions each association for the target brand also for each other brand) to 1 (when a consumer mentions every single association for the target brand only).

Table 5
Individual association characteristics related to high strength of gasoline and toothpaste brands.

Brand association characteristics	Consistency, gasoline	Consistency, toothpaste	Raw coverage, gasoline	Raw coverage, toothpaste
Large number (N)	0.798	0.898	0.658	0.595
High favorability (F)	0.822	0.906	0.773	0.844
High uniqueness (U)	0.731	0.826	0.696	0.717
Strong measured consensus (CM)	0.647	0.813	0.612	0.401
Strong perceived consensus (CP)	0.904	0.888	0.739	0.882

3.2.4. Measured and perceived consensus

A measure of factual consensus concerning brand associations draws on the logic of Koll and von Wallpach (2010). The measure first calculates the percentage of consumers who mention a specific association (relative association consensus). Measured consensus for each respondent–brand combination adds up these relative association consensus scores for all associations a respondent mentioned for a brand (Grohs & Koll, 2014). The measured consensus score can range from a minimum close to 0 (if a participant only provides associations that no one else does) to a theoretical maximum of 100% (if every participant mentions exactly the same associations).

To measure respondents' perceived consensus respondents rated on a seven-point Likert scale how strongly they believed that other people share their thoughts regarding the brand, with higher numbers indicating higher perceived consensus (Gershoff et al., 2008).

3.2.5. Brand strength

The study measures brand strength on seven-point Likert scales as a composite of three indicators of customer-based brand equity typically used as brand strength measures: trust, reputation, and image (Chaudhuri & Holbrook, 2001; Mittal & Frennea, 2010). Cronbach's alphas are 0.92 for both gasoline and toothpaste brand strength scales.

4. Analyses and results

4.1. Multiple regression analysis

Table 2 shows the means and standard deviations as well as the bivariate correlations among the independent variables number, favorability, uniqueness, measured consensus, and perceived consensus of associations for both product categories. Most correlations are small ($rs \leq 0.2$), except for the positive correlation between the average favorability of the associations and perceived consensus ($rs \geq 0.28$). This result indicates that an individual overestimates population consensus more for alternatives that she or he likes (Gershoff et al., 2008).

MRA examines the relationships between the independent variables and the dependent variable *brand strength*. The analysis tests whether the brand's association set size, favorability, uniqueness, measured consensus, and perceived consensus as well as all two-way interactions influence an individual's brand strength for a specific brand. In line with

Table 6a
Configurations of brand association characteristics predicting high strength of gasoline brands.

Patterns of brand association characteristics					Raw coverage	Unique coverage	Consistency
N	F	U	CM	CP			
°	+	+	°	+	0.606	0.091	0.839
−	+	°	+	+	0.421	0.061	0.840
+	+	°	−	+	0.328	0.033	0.880

Solution coverage: 0.708; solution consistency: 0.831.
Notes
+/− indicates high/low levels of each association characteristic; ° indicates "does not matter."
N = number, F = favorability, U = uniqueness, CM = measured consensus, CP = perceived consensus.

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Table 6b
Configurations of brand association characteristics predicting high strength of toothpaste brands.

Patterns of brand association characteristics					Raw coverage	Unique coverage	Consistency
N	F	U	CM	CP			
+	+	+	°	+	0.480	0.050	0.939
−	+	−	°	+	0.373	0.032	0.948
°	+	−	−	+	0.357	0.018	0.948
+	+	°	−	+	0.449	0.008	0.941

Solution coverage: 0.627; solution consistency: 0.932.
Notes
+/− indicates high/low levels of each association characteristic; ° indicates "does not matter."
N = number, F = favorability, U = uniqueness, CM = measured consensus, CP = perceived consensus.

Table 7b
Predictive validity for the models predicting high strength of toothpaste brands for two subsamples.

Models	Subsample 1		Subsample 2	
	Consistency	Coverage	Consistency	Coverage
N.F.U.CP	0.934	0.485	0.938	0.484
-N.F. -U.CP	0.943	0.380	0.941	0.370
F. -U. -CM.CP	0.944	0.358	0.940	0.347
N.F. -CM.CP	0.937	0.454	0.939	0.445

Note: . indicates "and"; letter on its own indicates "high level"; and letter with - indicates "low level."
N = number, F = favorability, U = uniqueness, CM = measured consensus, CP = perceived consensus.

prior research (e.g., Du, Bhattacharya, & Sen, 2007), these continuous variables of the moderated regression are mean centered. The multiplicative formulation accounts for the moderating effects. Given the interest in variable-level effects across brands, the model calibration step pools the information over all brands and uses dummy variables to account for brand-specific effects. The model formulation thus assumes fixed effects of all explanatory variables but shifting intercepts for the different brands. Because of the potential occurrence of different numbers of observations per respondent and pragmatic reasoning, the model postulates identical, independently distributed error terms; the study uses ordinary least squares (OLS) for the parameter estimation.

The model fits the data well for both product categories (gasoline: $F = 148.83$, $p < 0.01$; toothpaste: $F = 66.22$, $p < 0.01$). The independent variables explain a fairly large amount of variation in the brand strength variable (gasoline: $R^2 = 0.52$; toothpaste: $R^2 = 0.32$). Table 3 contains the OLS regression results. Results indicate a positive effect of association set size, favorability, and perceived consensus of brand associations for both product categories, but no influence of association uniqueness and measured consensus. Results support H1, H2, and H5. However, results fail to support H3 and H4.

Perceived consensus moderates the effect of favorability in both product categories, suggesting that more favorable associations have a stronger positive effect if consumers believe that more people share the associations with them. In the gasoline category, a positive interaction effect of association set size and favorability indicates that a larger number of associations increase the positive effect of association favorability on brand strength. In the toothpaste category, a negative interaction effect of association set size and uniqueness indicates that a larger number of associations have a less positive effect on brand strength if the associations are unique.

Regression researchers tend to rely on fit validity indicators and compare fit indices and relationships in test and holdout samples. For each product category, the researchers split the data file randomly into two subsamples. MRAs for both subsamples indicate a high overall fit (gasoline subsample one: $F = 67.78$, $p < 0.01$, $R^2 = 0.50$, subsample two: $F = 82.58$, $p < 0.01$, $R^2 = 0.55$; toothpaste subsample one: $F = 34.45$, $p < 0.01$, $R^2 = 0.33$, subsample two: $F = 33.17$, $p < 0.01$, $R^2 = 0.32$). The parameter estimates are stable across all four subsamples for the positive effects of association set size, favorability, perceived consensus, and the interaction of favorability and perceived consensus on brand strength. The positive interaction effect of association set size and favorability is significant in one subsample in each product category. The negative interaction effect of association set size and uniqueness is significant in only one subsample in the toothpaste category. Instead, a positive interaction effect of measured and perceived consensus on brand strength emerges in the other subsample in the toothpaste category. The latter findings require caution in deriving managerial and theoretical implications, because the validity test indicates that they are not stable across randomly drawn subsamples.

Table 7a
Predictive validity for the models predicting high strength of gasoline brands for two subsamples.

Models	Subsample 1		Subsample 2	
	Consistency	Coverage	Consistency	Coverage
F.U.CP	0.834	0.607	0.848	0.607
-N.F.CM.CP	0.835	0.424	0.842	0.423
N. F. -CM.CP	0.882	0.335	0.894	0.329

Note:
. indicates "and"; letter on its own indicates "high level"; and letter with - indicates "low level."
N = number, F = favorability, U = uniqueness, CM = measured consensus, CP = perceived consensus.

4.2. Fuzzy-set qualitative comparative analysis

Applying Ragin's (2008) direct calibration method, Table 4 presents the calibration of sampled cases' degree of membership in fuzzy sets. To make cases more distinguishable by widening the range of variables, the researchers multiplied all measures of the multi-item construct brand strength, and proportionally transformed the multiplied values into fuzzy scores between 0 and 1 (Chang, Tseng, & Woodside, 2013).

The frequency threshold for the minimum number of cases in a fuzzy subset is set to 1% of the number of brand-respondent combinations studied (28 cases). The cutoff level for consistency is set to a minimum of 0.80 (Ragin, 2006). For the remaining consistent combinations, the study calculates truth tables and selects the "intermediate solution" (Ragin & Sonnett, 2004) for interpretation.

Table 5 shows that, for gasoline brands, perceived consensus is a necessary and empirically relevant predictor of high brand strength (consistency ≥0.90 and coverage ≥0.5; Schneider & Wagemann, 2007). A large number and high favorability of associations are sufficient predictors whereas high uniqueness and strong measured consensus are neither necessary nor sufficient for high brand strength. In the toothpaste category, high uniqueness, strong perceived consensus of associations, and high measured consensus each are sufficient for predicting high brand strength. High favorability and a large number of consumer associations are necessary and empirically relevant conditions for being a strong toothpaste brand. For both product categories, the high raw coverage of single association characteristics points to configurations of several characteristics that relate to high brand strength. These results support Tenet 1.

Tables 6a and 6b show configurations of brand association characteristics that predict high strength of gasoline and toothpaste brands. The configurations present some similarities. Strong gasoline brands and strong toothpaste brands can have low or high levels of all observed characteristics, except favorability and perceived consensus, which are high in all configurations. With one exception for gasoline brands, measured consensus is either very low or does not matter for high brand

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strength. One configuration of associations leading to high brand strength holds for both product categories: a large number of highly favorable associations for which consumers perceive strong consensus, but where actual consensus is low, leads to high brand strength. For toothpaste brands a large number of highly favorable, highly unique, and perceived consensual associations lead to high brand strength independent of factual consensus. For gasoline brands, no need exists for a large number of associations if the other conditions are in place.

The other configurations leading to high brand strength are idiosyncratic to the product categories. Gasoline brands can be strong if consumers have a small number of highly favorable and consensual brand associations independent of the associations' uniqueness. For toothpastes, brand strength can be high if a small number of associations that are not unique are highly favorable and perceived as consensual, or if consumers perceive highly favorable associations as highly consensual that are not unique and not measurably consensual. These results support Tenet 2.

In both product categories, the fsQCA analysis shows no consistent pattern of association characteristics leading to low brand strength. Therefore, combinations of brand association characteristics that lead to high versus combinations that lead to low brand strength are different, indicating an asymmetric relationship between brand association characteristics and high vs low brand strength. These results support Tenet 3.

fsQCA researchers test the predictive validity of the configurations leading to high or low values in the outcome condition through cross-validation with holdout samples. Tables 7a and 7b show the results for testing the models appearing in Tables 6a and 6b for two randomly selected subsamples (Woodside, Schpektor, & Xia, 2013). All models present high consistency (>0.83) and substantial coverage (> 0.32).

5. Discussion

Multiple facets of brand associations have been proposed as relevant conditions for brand strength. Following Keller (2008) most branding literature assumes that highly unique and highly favorable associations are the basis for strong brands.

This study examines whether brand association set size (i.e., the number of associations a brand elicits), favorability of these associations, association uniqueness (i.e., only one brand among a set of brands elicits this association), and an association's degree of consensus (i.e., a brand elicits an association from many consumers) are able to explain variations in consumers' attitudinal brand strength. The study tests these drivers of brand strength at an individual consumer level for two product categories with six brands in each product category. Given the limited theoretical and empirical evidence about complex configurations of brand association characteristics that relate to high brand strength, the study uses two approaches to explore these links: MRA and fsQCA. These two analytical methods yield complementary insights.

MRA establishes that the number, favorability, and perceived consensus of brand associations individually have a positive effect on brand strength, but uniqueness and measured consensus do not. fsQCA supports these findings. MRA and fsQCA also agree that a combination of high favorability and perceived consensus is most beneficial for a brand. MRA results further indicate a stronger effect of a large number of favorable associations for one subsample in each product category. fsQCA provides a more nuanced perspective. For both gasoline and toothpaste brands, cases of high favorability in combination with both a high and a low number of associations (and independent of the number of associations) can result in high brand strength. For one subsample in the toothpaste brands category, MRA shows that the association set size has a less positive effect on brand strength, if respondents mention unique associations. Again, fsQCA illuminates these results further. Uniqueness and the number of associations can both have a positive and a negative effect on brand strength. Specifically, fsQCA identifies cases where a large number of unique associations relate to high brand strength, but also cases where a small number of non-unique associations have a relationship with high brand strength. fsQCA also provides preliminary evidence that no configuration of brand association characteristics is sufficient to explain low brand strength.

6. Conclusion

6.1. Implications for theory development and brand management

Brand associations are crucial for branding researchers and brand managers because they lead, along the hierarchy of effects, to an evaluative or behavioral response toward the brand, for example, commitment, trust, purchase intention, recommendation, choice, or willingness-to-pay (Agarwal & Rao, 1996; Broniarczyk & Alba, 1994; Cobb-Walgren et al., 1995; Janiszewski & van Osselaer, 2000). Collecting and relating brand associations with attitudinal brand responses gives marketers and researchers a thorough understanding how brand knowledge influences consumers' attitudes and preferences and helps inform brand-building activities.

Using both MRA and fsQCA to examine the links between brand association characteristics and brand strength advances theory development. MRA provides a variable-level approach and fsQCA focuses on a case-level analysis. MRA identifies effects of drivers across respondents and brands and is diagnostic of brand strength if similar effects across consumers exist. fsQCA identifies consumer segments that have distinct configurations of brand association characteristics that result in high brand strength. Therefore, the recommendation of the present study is to use both methods for better understanding and theory development. This approach seems especially promising for fields where multiple, potentially even opposite configurations of antecedents may predict an outcome, if contrarian outcomes may result from the same levels of one predictor in combination with differing levels of other predictors, or if one can reasonably assume that the relationship between the predictors and the outcome is not symmetric.

In terms of theory development and brand building activities, the study results leave no doubt about the importance of favorable associations and a high degree of perceived sharing of brand associations with others. These two antecedents also reinforce each other's positive effects on brand strength. Actual consensus of brand associations is of little importance, a finding that resonates with the observation that for brands to function as a symbol, consumers need to perceive—but not actually have (Berthon, Pitt, & Campbell, 2009)—a commonality of meaning that customers attribute to the brand (Elliott, 1994). In line with existing research (Krishnan, 1996), the number of consumers' brand associations appears to have a positive aggregate effect. However, detailed results applying case-related analysis identify cases where a small number of brand associations lead to high brand strength.

The use of fsQCA also helps to better understand the effects of brand association uniqueness. The degree to which one's associations are unique to the brand can have a positive or negative effect on brand strength, suggesting equifinality. These findings empirically support a notion from brand positioning research that brands establish equity in two ways (e.g., Barwise & Meehan, 2004; Keller, Sternthal, & Tybout, 2002; Punj & Moon, 2002). First, brands may be a legitimate member of a product category, when consumers hold primarily non-unique product category associations with the brand (Krishnan, 1996). Second, brands can be different or distinct, when consumers hold brand associations that do not have a link with other brands (Broniarczyk & Alba, 1994). Finally, the results of fsQCA indicate asymmetric effects of brand association characteristics on brand strength, that is, no consistent configuration of the five analyzed association characteristics drives low brand strength.

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6.2. Limitations and further research

The study has several limitations that may serve as starting points for future research. The free association technique is an interesting and insightful method for eliciting consumers' brand associations. The free association technique imposes fewer restrictions than other methods, like the pick-any technique, and is close to the core idea of branding which calls for the creation of unique brand-specific associations to achieve differentiation. This unforced approach seems a promising avenue to grasp unique brand associations relative to forced-choice techniques. Furthermore, this technique leads to a listing of associations from the consumer perspective that is in line with the consumer-centric view of Keller's (1993) conceptualization of brand associations. Nevertheless, the elicitation task is time-consuming for respondents who may stop the task once they reach the required number of associations. The researcher needs to trade-off between the benefits of setting a high number of required associations and the cost of triggering random associations or more dropouts. Coding and analysis of resulting brand associations is laborious, and researchers sometimes have difficulty to clarify the underlying meaning of elicited associations. Qualitative methods can provide additional insights into the individual meanings of specific associations.

The present study focuses on two (rather) low involvement product categories. Future research should investigate high involvement categories to identify similarities and potential differences. Such an analysis would allow empirical generalization of results beyond the product categories addressed in this research and would further aid the development of a brand association-centered theory of brand strength. The MRA model in this study assumes constant effects for the brand association characteristics, and the fsQCA approach does not disentangle cases in terms of different brands. Further research on a brand level can provide additional insights on whether specific association characteristics benefit some brands more than others, for example, brands that target a wider or a narrower audience, have a premium versus a budget price level, or cater to the average versus the atypical category user.

Appendix A. Constructs and measures.

Constructs	Items	Data
Number of associations	*What comes to your mind, if you think of brand X?*	Number of mentioned associations (1 to 8)
Favorability of associations	*How negative or positive do you evaluate this association?*	Average favorability of associations (1 to 5)
Uniqueness of associations	Uses the associations mentioned within individuals and across brands.	Calculation of uniqueness score (0 to 1)
Measured consensus	Uses the associations mentioned across individuals and within brands.	Calculation of measured consensus score (0 to 1)
Perceived consensus	*Other people have similar thoughts regarding Brand X as I have.*	Single item perceived consensus score (1 to 7)
Brand strength	*I trust brand X.* *Brand X has a high reputation.* *I have a positive image of brand X.*	Average score of multiple items (1 to 7)

Note: Higher numbers indicate higher levels of favorability, uniqueness, measured consensus, perceived consensus, and brand strength.

References

Agarwal, M. K., & Rao, V. R. (1996). An empirical comparison of customer based measures of brand equity. *Marketing Letters*, *7*(3), 237–247.

Armstrong, J. S. (2012). Illusions in regression analysis. *International Journal of Forecasting*, *28*(3), 689–694.

Barwise, P., & Meehan, S. (2004). Don't be unique be better. *Sloan Management Review*, *45*(4), 23–26.

Bennett, R., Haertel, C. E., & McColl-Kennedy, J. R. (2005). Experience as a moderator of involvement and satisfaction on brand loyalty in a business-to-business setting. *Industrial Marketing Management*, *34*(1), 97–107.

Berthon, P., Pitt, L. F., & Campbell, C. (2009). Does brand meaning exist in similarity or singularity? *Journal of Business Research*, *62*(3), 356–361.

Broniarczyk, S. M., & Alba, J. W. (1994). The role of consumers' intuitions in inference making. *Journal of Consumer Research*, *21*(3), 393–407.

Broniarczyk, S. M., & Gershoff, A. (2003). The reciprocal effects of brand equity and trivial attributes. *Journal of Marketing Research*, *40*(2), 161–175.

Chang, C. -W., Tseng, T. -H., & Woodside, A. G. (2013). Configural algorithms of patient loyalty. *Journal of Services Marketing*, *27*(2), 91–103.

Chaudhuri, A., & Holbrook, M. B. (2001). The chain of effects from brand trust and brand affect to brand performance: The role of brand loyalty. *Journal of Marketing*, *65*(2), 81–93.

Chen, A. C. -H. (2001). Using free association to examine the relationship between the characteristics of brand associations and brand equity. *Journal of Product and Brand Management*, *10*(7), 439–451.

Christodoulides, G., & De Chernatony, L. (2010). Consumer-based brand equity conceptualisation and measurement: A literature review. *International Journal of Market Research*, *52*(1), 43–66.

Cobb-Walgren, C. J., Ruble, C. A., & Donthu, N. (1995). Brand equity, brand preference, and purchase intent. *Journal of Advertising*, *24*(3), 25–40.

Dacin, P. A., & Smith, D. C. (1994). The effect of brand portfolio characteristics on consumer evaluations of brand extensions. *Journal of Marketing Research*, *31*(2), 229–242.

De Meur, G., Rihoux, B., & Varone, F. (2004). L'analyse quali-quantitative comparé (AQQC): Un outil innovant pour l'étude de l'action publique. *Pyramides*, *8*, 137–148.

Dhar, R., & Sherman, S. J. (1996). The effect of common and unique features in consumer choice. *Journal of Consumer Research*, *23*(3), 193–203.

Du, S., Bhattacharya, C. B., & Sen, S. (2007). Reaping relational rewards from corporate social responsibility: The role of competitive positioning. *International Journal of Research in Marketing*, *24*(3), 224–241.

Elliott, R. (1994). Exploring the symbolic meaning of brands. *British Journal of Management*, *5*(June), 13–19.

Fiss, P. C. (2011). Building better causal theories: A fuzzy set approach to typologies in organization research. *Academy of Management Journal*, *54*(2), 393–420.

Gershoff, A. D., Ashesh, M., & Anirban, M. (2008). What's not to like? Preference asymmetry in the false consensus effect. *Journal of Consumer Research*, *35*(1), 119–125.

Grohs, R., & Koll, O. (2014). Uniqueness and (false) consensus: Two important facets of brand associations? *Proceedings of the AMA summer marketing educators conference, San Francisco, USA.*

Janiszewski, C., & van Osselaer, S. M. J. (2000). A connectionist model of brand quality associations. *Journal of Marketing Research*, *37*(3), 331–350.

Kapferer, J. -N. (2012). *The new strategic brand management: Creating and sustaining brand equity long term* (5th ed). London: Kogan Page.

Keller, K. L. (1993). Conceptualizing, measuring, and managing customer-based brand equity. *Journal of Marketing*, *57*(1), 1–22.

Keller, K. L. (2008). *Strategic brand management: Building, measuring, and managing brand equity* (3rd ed.). Upper Saddle River, NJ: Prentice Hall.

Keller, K. L., Sternthal, B., & Tybout, A. (2002). Three questions you need to ask about your brand. *Harvard Business Review*, *80*(9), 80–86.

Koll, O., & von Wallpach, S. (2010). How facets of unaided brand knowledge affect consumer response. *Proceedings of the 39th European Marketing Academy Conference, Copenhagen, Denmark.*

Koll, O., & von Wallpach, S. (2014). Intended brand associations: Do they really drive consumer response? *Journal of Business Research*, *67*(7), 1501–1507.

Krishnan, H. S. (1996). Characteristics of memory associations: A consumer-based brand equity perspective. *International Journal of Research in Marketing*, *13*(4), 389–405.

Low, G. S., & Lamb, C. W. (2000). The measurement and dimensionality of brand associations. *Journal of Product and Brand Management*, *9*(6), 350–368.

Malär, L., Nyffenegger, B., Krohmer, H., & Hoyer, W. D. (2012). Implementing an intended brand personality. *Journal of the Academy of Marketing Science*, *40*(5), 728–744.

McClelland, G. H., & Judd, C. M. (1993). Statistical difficulties of detecting interactions and moderator effects. *Psychological Bulletin*, *114*(2), 376–390.

Mittal, V., & Frennea, C. M. (2010). Customer satisfaction: A strategic review and guidelines for managers. *Fast Forward. MSI Report* (pp. 10–701).

Nelson, D. L., Bennett, D. J., Gee, N. R., Schreiber, T. A., & McKinney, V. M. (1993). Implicit memory: Effects of network size and interconnectivity on cued recall. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, *19*(4), 747–764.

Ordanini, A., Parasuraman, A., & Rubera, G. (2014). When the recipe is more important than the ingredients: A qualitative comparative analysis (QCA) of service innovation configurations. *Journal of Service Research*, *17*(2), 134–149.

Punj, G., & Moon, J. (2002). Positioning options for achieving brand association: A psychological categorization framework. *Journal of Business Research*, *55*(4), 275–283.

Ragin, C. C. (2000). *Fuzzy-set social science*. Chicago, IL: University of Chicago Press.

Ragin, C. C. (2006). Set relations in social research: Evaluating their consistency and coverage. *Political Analysis*, *14*(3), 291–310.

Ragin, C. C. (2008). Calibration versus measurement. In D. Collier, H. Brady, & J. Box-Steffensmeier (Eds.), *Methodology volume of Oxford Handbooks of Political Science*. Oxford Publications (http://www.u.arizona.edu/~cragin/fsQCA/software.shtml).

Ragin, C. C., & Sonnett, J. (2004). Between complexity and parsimony: Limited diversity, counterfactual cases and comparative analysis. In S. Kropp, & M. Minkenberg (Eds.), *Vergleichen in der politikwissenschaft*. VS Verlag für Sozialwissenschaften: Wiesbaden.

Romaniuk, J., & Gaillard, E. (2007). The relationship between unique brand associations, brand usage and brand performance: Analysis across eight categories. *Journal of Marketing Management*, *23*(3–4), 267–284.

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Romaniuk, J., & Nenycz-Thiel, M. (2013). Behavioral brand loyalty and consumer brand associations. *Journal of Business Research*, *66*(1), 67–72.

Ross, L., Greene, D., & House, P. (1977). The "false consensus effect": An egocentric bias in social perception and attribution processes. *Journal of Experimental Social Psychology*, *13*(3), 279–301.

Schneider, C., & Wagemann, C. (2007). *Qualitative comparative analysis (QCA) und fuzzy sets: Ein lehrbuch für anwender und jene, die es werden wollen.* Opladen: Budrich.

Spears, N., Brown, T. J., & Dacin, P. A. (2006). Assessing the corporate brand: The unique corporate association valence (UCAV) approach. *Journal of Brand Management*, *14*(1–2), 5–19.

Urry, J. (2005). The complexity turn. *Theory, Culture & Society*, *22*(5), 1–14.

Woodside, A. G., Schpektor, A., & Xia, X. (2013). Triple sense-making of findings from marketing experiments using the dominant variable based-logic, case-based logic, and isomorphic modeling. *International Journal of Business and Economics*, *12*(2), 131–153.

Woodside, A. G. (2015). The general theory of behavioral pricing: Applying complexity theory to explicate heterogeneity and achieve high-predictive validity. *Industrial Marketing Management*, *47*, 39–52 (http://dx.doi.org/10.1016/j.indmarman.2015.02.004).

Zaichkowsky, J. L. (2010). Strategies for distinctive brands. *Journal of Brand Management*, *17*(8), 548–560.

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