

How to create reproducible brand personality scales

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Abstract By means of personality traits, brands can be characterized in a concise and comprehensible manner that predestines a brand's personality for management with the assessment of brand characteristics and comparison with competing brands. To be able to do comparisons, the respective personality model has to be reproducible. The differing measurements must be invariant across brands, time, and, if needed, cultures. This reproducibility, however, is in question for existing brand personality scales. Recent studies could not replicate several of the existing solutions, neither in other countries nor for other brands than those in the respective studies in which the scales were generated. This study examines potential causes for invariance problems and identifies a more stringent application of the psycho-lexical approach as a remedy. The study traces back to Galton's (Fortn Rev 36:179–185, 1884) thoughts about synonyms. When factor items possess substantially more pairwise synonyms with items within this factor than with traits outside that respective factor, the personality model will turn out to be reproducible. Surveys were conducted in the USA, Germany, and France to test for cross-cultural invariance. Implications, particularly for global branding, will be discussed.

Keywords Brand personality · Psycho-lexical approach · Synonyms · Implicit personality theory · Reproducibility

The missing reproducibility of brand personality scales

For several decades, marketing literature has addressed the assignment of human personality traits to brands. The theory of animism lies behind this approach (Gilmore 1919; Harvey 2005), in which tangible objects are characterized by attributes that are typically associated with humans. The association of human personality traits with brands encourages consumers to characterize brands as their partners or friends (Fournier 1998). Personality scales help marketers position and reposition their brands (Grohmann 2009). Brand personality is a strong predictor of brand equity (Aaker 1997; Grohmann 2009). One facet of brand personality is brand gender (Grohmann 2009). The positive effect of brand gender on brand equity has been demonstrated (Lieven et al. 2014). Thus, brand personality appears to be an ideal instrument to manage brands, to adjust brand personality according to consumers' perceptions, and to compare a company's own brands with competitors' brands. As with any comparison, the measuring tool has to be valid and stable. Otherwise, comparisons are vacuous. Steenkamp and Baumgartner (1998) postulate the generalizability of consumer behavior theories to make them applicable across different countries. This is achieved when the measurements are equivalent and invariant. This holds whether the measurements occur among different brands, industry sectors, consumer groups, or countries and cultures.¹

In recent years, scholars made recommendations to increase confidence in scientific findings by testing their reproducibility (Open Science Collaboration 2015). Several attempts have been made to test the reproducibility of

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¹ The invariance is required for the measurement tool, however, not for the results measured by this procedure.



the most famous brand personality model (Aaker 1997). The ambiguous results have been widely discussed in other literature. Thus, unlike the concept of brand equity that is shaped rather consistently in literature, with only few equity models not differing substantially from each other (Brady et al. 2008; Keller 1993; Yoo et al. 2000), it seems that a valid and reproducible brand personality model is unavailable. Moreover, the personality models themselves and their conceptualization have been challenged as being unable to measure brand personality (Azoulay and Kapferer 2003). Freling and Forbes (2005), for instance, argued that the definition of brand personality as "...the set of human characteristics associated to a brand" (Aaker 1997, p. 347) was vague and indistinguishable from brand image or brand identity. To narrow the purport of "brand personality," Azoulay and Kapferer (2003) defined the term more precisely as the "...set of human personality traits that are both applicable to and relevant for brands" (p. 151). Even more precisely, Caprara et al. (2001) presented the most stringent constraint, claiming that "...personality descriptors [should] load on the same factor when used to describe human personality and brand personalities" (p. 381).

While the concept of brand personality and several exemplary scales have been described in detail in other literature (Freling et al. 2011; Freling and Forbes 2005; Geuens et al. 2009; Kim et al. 2001; Ouwersloot and Tudorica 2001; Yoon 2004), the deployment of the respective scales has not been analyzed in depth. Most of the authors use a procedure that starts with a set of characteristics that describe human personality. Within this so-called psycho-lexical approach (Ashton and Lee 2005), traits that describe human personalities are collected from a dictionary. Thereafter, exploratory factor analyses (EFA) based on empirical data refine the model by post hoc elimination of attributes that do not fit. However, such an approach may not be based on theory, but on the requirements of mathematical procedures (Kelloway 1995). These procedures are known to be suspiciously blind to any theory (Mueller and Hancock 2001). The use of EFAs may be acceptable to detect coherences where theories do not (yet) exist. The lexical approach, however, has a theoretical background that lies in the dictionary itself. As Galton (1884) explained, "Roget's thesaurus [...] contained fully one thousand words expressive of character, each of which has a separate shade of meaning, while each shares a large part of its meaning with some of the rest" (p. 181). Words sharing a large part of their meaning with other words are called synonyms. They are defined as "words which express what is essentially the same idea, but which (commonly) differ from one another" (Dolch and Leeds 1953, p. 185). The traits *honest* and *reliable* are direct synonyms (Collins English Thesaurus). Although they do not identically mean the same thing, they belong together in a way that a person

perceived as being *honest* is perceived as reliable as well. At least, both characteristics can come to mind by raters of a sincere human personality. But how, then, can it happen that the terms "honest" and "reliable" both do not load on the same factor? In Aaker's (1997) model, only "honest" is listed under the factor "sincerity," while "reliable" loads on "competence." Of course, the EFA has mathematically correctly assigned both traits regarding the particular set of brands in Aaker's (1997) research. However, one can be skeptical whether such a model is reproducible.

This study suggests an approach with a closer integration of lexical knowledge in the construction of brand personality scales to make them reproducible. Personality traits will be selected in a way so that factors emerge a priori according to their common synonyms. The underlying rule claims that traits having a high number of common synonyms belong to a specific factor. These traits share only a few common synonyms with traits outside this factor. By this, solid predictions can be made about the later tests in factor analyses. In a way, the EFA becomes confirmatory within this approach because it should support the beforehand developed factor solution based solely on the determination of common synonyms in the thesaurus. The contribution of this study lies in the simplification of today's scale development procedure and in its support for a reproducible outcome of scale construction. Brand managers will be more confident about their brand personality models, and practitioners can be a priori assured that their scales work reliably, even in cross-cultural studies.

In what follows, the psycho-lexical approach will be described, including how it is used nowadays to develop brand personality scales. After a critical discussion of this procedure, an alternative approach will be proposed that is based on the implicit knowledge of language by common synonyms. To test the validity of this approach, Aaker's (1997) brand personality model will be evaluated theoretically based on the common-synonyms rule and empirically with EFAs and confirmatory factor analyses (CFAs). A control model will be analyzed the same way. Results of six surveys in the USA, Germany, and France will be reported (each two for Aaker's and the new model). The personality models will be applied to 12 internationally well-known brands.

Theoretical development

The psycho-lexical approach

Galton's (1884) article was the start of the psycho-lexical approach (Caprara and Cervone 2000). Psychologists in the nineteenth and twentieth centuries felt the need to describe human personality with all its facets, including



neuroticism, agreeableness, and even intelligence (for a comprehensive overview, cf. John et al. (1988)). The so-called sedimentation hypothesis of the psycho-lexical approach implies that those characteristics that are important when describing humans are deposited in language (Goldberg 1981). Galton not only collected these traits but also distinguished them depending on their separate or common shades of meaning. Galton, who also introduced the theory of correlations (1888), influenced Charles Spearman, who in turn developed the first factor analyses (1927). R. Cattell, Spearman's student, used factor analyses to distribute personality traits across different clusters (Cattell 1943, 1945). According to the lexical approach, a set of character traits is selected from the dictionary. Subsequently, factor analyses are conducted to reduce this set to a smaller number of groups on which several characteristics are "loading." Based on the psycho-lexical approach, Goldberg (1990) designed the renowned Big Five Model that included 339 trait adjectives, loading on the factors "extraversion," "agreeableness," "conscientiousness," "neuroticism," and "openness."

Aaker's brand personality model (1997)

In the 1990s, researchers and marketers began to perceive brands as being endowed with personality (Aaker and Fournier 1995). In 1997, Aaker developed a brand personality model composed of five factors, similar to Goldberg's (1990) Big Five: "sincerity," "excitement," "competence," "sophistication," and "ruggedness." Aaker began the construction of her model with 309 attributes that were derived from existing personality models and qualitative research. This list of attributes was too large and unruly, so it was reduced to 114 traits through the assessment of survey participants' perceptions about the descriptiveness of the original 309 characteristics for three brands: Wrangler (jeans), Pepto-Bismol (stomach medication), and Dr. Pepper (soft drink). In a test-retest design, the 114 traits were initially reduced to 45, depending on the highest item-to-total correlations in an EFA, and because three traits had a test-retest correlation only below .60, these were also eliminated, leaving 42 traits in five factors.

Aaker et al. (2001) evaluated Aaker's (1997) model in Japanese and Spanish. In the Japanese model, the "ruggedness" factor had to be replaced by "peacefulness". In the Spanish model, "competence" and "ruggedness" were replaced by "passion" and "peacefulness," respectively. No five-factor solution could be found in Austin et al. (2003) and Milas and Mlačić (2007). Furthermore, appropriate solutions could not be found due to cross-loadings. Hosany et al. (2006) applied Aaker's model to tourist destinations. Only 27 traits remained, loading on only three factors: "sincerity," "excitement," and

"conviviality." Milas and Mlačić (2007) investigated the effects of different stages of aggregation on the factor solutions and found significant differences. Aaker achieved a five-factor solution with aggregated data, whereas Milas and Mlačić (2007) obtained only two. Kim et al. (2001) had to remove six items from Aaker's scales, which did not load on any factor. Twenty-five attributes indeed loaded on the same factors, but the factors themselves had different meanings, which resulted in only six traits loading on identical factors as in Aaker's model. Ferrandi et al. (2015) tested Aaker's (1997) model on replicability in France. Instead of five factors, a solution based on the eigenvectors in the above one resulted in seven factors. Nine traits had to be removed to receive a useful five-factor solution. Not all factors had the same meaning as in Aaker's model and had to be reinterpreted. Thus, Aaker's model is an interesting reflection of the Big Five's scales; however, it may not be suitable for practitioners in global branding to measure and compare brand personality in a cross-cultural context.

Several possibilities have been discussed as to what could have caused the missing reproducible. The most obvious explanation came from Austin et al. (2003), pointing out that not all of Aaker's dimensions were predicted on the basis of Goldberg's (1990) Big Five Model (neuroticism, for example, is pretty much never a dimension of brands). Furthermore, Aaker was criticized for aggregating the data across brands. Aggregation can have serious impacts on correlations, the effect of which is known as the ecological fallacy (Robinson 1950).

Another reason may be the subjectivity of the different researchers conducting their own factor analyses. One of the problems with EFA is the missing-criterion variable against which the solution could be tested and different approaches to the number of factors or the choice of factor rotation cannot be resolved by objective criteria (Tabachnick and Fidell 1996). It is in the nature of exploratory factor analysis that a detailed model is not specified in advance (Bollen 1989). Some minor rules exist, e.g., the extraction of factors with eigenvalues above 1.0, or the interpretation of the scree plot. However, marketers should avoid a situation where their applied procedures lead to meaningless results. Although mathematical procedures are important and helpful, they are no substitute for a theoretical basis. Without any preceding theory, EFA results are a sole function of the "mechanics and mathematics of the method" (Kieffer 1999, p. 77). Because of these threats to valid EFA solutions, "appropriate use of EFA necessitates thoughtful and informed researcher decision making" (Henson and Roberts 2006, p. 397). Collecting personality traits from several sources that themselves may have been founded properly on a theoretical basis (as the psycho-lexical approach) is appropriate as long it is about personality. However, the applied procedures thereafter may



not be appropriate for brand personality models. Aaker created the initial set of 309 traits by selecting and eliminating redundancies from “personality scales from psychology, personality scales used by marketers (academics and practitioners), and original qualitative research” (Aaker 1997, p. 349), which is appropriate according to the psycho-lexical approach. To transfer them to brands, 25 subjects (70% female) were interviewed regarding how descriptive these traits are for the brands Wrangler, Pepto-Bismol, and Dr. Pepper. This may be problematic because a measuring instrument was directly derived from and thus is confounded with the object that originally had to be measured. This may be appropriate if the object serves as a reference, e.g., dividing the reference of the 21,600 nautical-mile (NM) circumference of the earth by 360 degrees, which defines one degree as 60 nautical miles for any great circle. However, are Wrangler, Pepto-Bismol, and Dr. Pepper reference brands? It may have been Wrangler that convinced Aaker to include the traits “Western” and “outdoorsy,” two traits that caused problems in subsequent research (Austin et al. 2003).

Selecting brand personality factors by common synonyms

One of the first thoughtful theoretical steps to creating brand personality scales should be the involvement of the lexical knowledge. Referring to the sedimentation hypothesis, personality traits are encoded in language (Goldberg 1981), sharing more or less meaning with each other in the form of synonyms (Galton 1884). A synonym is defined “one of two or more words or expressions of the same language that have the identical or nearly the same meaning in some or all senses” (Whitten et al. 1979, p. 109). Following implicit personality theory, humans exhibit consistent consensus regarding synonymous personality traits. Goldberg and Kilkowski (1985) applied synonyms to explore correlations in self- and peer-rating studies. According to their findings, “...this issue can never be resolved in the absence of detailed information regarding the sheer similarity of meaning among the trait-descriptive terms used in these investigations” (Goldberg and Kilkowski 1985, p. 82). This is what causes the traits *reliable* and *honest* to occur simultaneously in a judgment about a sincere person. Depending on respondents’ perception of high or low sincerity, their ratings for reliable and honest will correlate positively. Because all classical statistical analyses are correlational in nature (Knapp 1978), the correlation matrix is the basis for any EFA. The correlation between traits X_1 and X_2 then determines the product of their respective factor loadings, which can be seen as bivariate correlations between the factor and its respective indicator variables, i.e., the trait. To load on a

specific factor, loadings of traits must be sufficiently high. Thus, correlations between this factor’s traits must be high as well. Because the correlations stem from the implicit knowledge of personality raters, those traits that possess a high number of common synonyms will load higher on a common factor than traits that have no common synonyms with these characteristics. As a result, a factor is linked to traits having a high number of common synonyms which, in turn, have only a few common synonyms with traits outside this factor.

Assessing common synonyms of selected traits

One famous source of synonyms is Collins English Thesaurus. The procedure to determine common synonyms goes on as follows, explained by the traits “honest” and “reliable” (Fig. 1). “Honest” and “reliable” are the traits followed by their respective synonyms. Each item from the first trait is pairwise compared to each item of the second trait regarding their identity. By this, it can be determined that “honest” and “reliable” are direct synonyms (“reliable” is a synonym for “honest” and vice versa). All common synonyms can be seen by the arrows in Fig. 1. Altogether, “honest” and “reliable” possess seven common synonyms. The numbers of these synonyms are inserted for each pair of traits into a symmetrical matrix such as it is depicted, as a hypothetical example, in Fig. 2.

In the hypothetical description in Fig. 2, the pairwise numbers of common synonyms were derived from comparisons of the traits as described above. Inside the first factor, $3 \times (3 - 1) = 6$ cells exist (without the diagonals). Outside the first factor, this number is 15 in factor 2. By the sum of common synonyms within factor 1 (30) and outside this factor in factor 2 (4), the division of the average number of synonyms within the factor ($30/6 = 5.00$) by the average number of synonyms outside the factor ($4/15 = .27$) represents the cross-ratio between the two factors ($5.00/.27 = 18.8$). From the deliberations in this theoretical section, it can be expected that the higher this ratio is, the higher the loadings within the respective factor will emerge in statistical procedures such as factor analyses. As well, only low cross-loadings with other factors will be found.

Proof of concept

Theoretical study

The above procedure was demonstrated with 69 selected traits, 42 belonging to Aaker’s (1997) model, 40 belonging to a new control model (13 traits overlap with the Aaker constructs). The respective traits were selected from



Fig. 1 Seven common synonyms between *honest* and *reliable* (Collins English Thesaurus)

honest; above board; authentic; bona fide; candid; conscientious; decent; dinkum; direct; equitable; ethical; fair; fair and square; forthright; frank; genuine; high-minded; honest to goodness; honorable; impartial; ingenuous; law-abiding; on the level; on the up and up; open; outright; plain; proper; real; reliable; reputable; round; scrupulous; sincere; straight; straightforward; true; trustworthy; trusty; truthful; undisguised; unfeigned; upfront; upright; veracious; virtuous

reliable; attested; certain; definitive; dependable; failsafe; faithful; honest; predictable; regular; reputable; responsible; safe; sound; stable; staunch; sure; tried and tested; tried and true; true; trustworthy; trusty; unflinching; upright; well-built; well-engineered; well-founded

Fig. 2 Hypothesized distribution of common synonyms across factors

Items (N = 8)		Factor 1 (n = 3)			Factor 2 (n = 5)				
		Trait 1	Trait 2	Trait 3	Trait 4	Trait 5	Trait 6	Trait 7	Trait 8
Factor 1	Trait 1	5	6	0	0	0	1	0	
	Trait 2	5	4	1	0	0	0	1	
	Trait 3	6	4	0	0	1	0	0	
Factor 2	Trait 4	0	1	0	11	2	5	6	
	Trait 5	0	0	0	11	7	1	3	
	Trait 6	0	0	1	2	7	8	7	
	Trait 7	1	0	0	5	1	8	2	
	Trait 8	0	1	0	6	3	7	2	
# of cells within factor [$n \times (n - 1)$]		6			20				
# of cells outside factor [$n \times (N - n)$]		15			15				
# of common synonyms within factor		30			104				
# of common synonyms outside factor		4			4				
Avg # of synonyms within factor		5,00			5,20				
Avg # of synonyms outside factor		0,27			0,27				
Cross Ratio		18,8			19,5				

existing models and from the dictionary by a group of six doctoral students evaluating the traits' ability to describe personality. In the first step, the synonyms were assessed from Collins English Thesaurus and thereafter compared pairwise for common synonyms.² Results for the USA can be seen in Appendix 1. For the Aaker model (Appendix 1a), the 42 traits had a total of 1245 synonyms. Each of the 42 traits and their synonyms then were pairwise compared with each synonym of each other trait, which resulted in 291 common synonyms. Subsequently, the cross-ratios were calculated similarly to the procedure in Fig. 2. The same was done for the 40 traits of the control model. From

the total of 1290 synonyms, 1038 were common. The numbers of common synonyms in the control model are depicted in Appendix 1b.

Comparing the cross-ratios for the factors in Aaker's model, these were 6.8 for "sincerity," 5.9 for "excitement," 2.6 for "competence," 15.4 for "sophistication," and 32.8 for "ruggedness." The ratios for the control model were 69.0 for "agreeableness," 32.7 for "sincerity," and 36.8 for a factor named "assertiveness." Thus, the ratios between traits within the factors and outside the factors were mostly substantially higher in the control model. The same procedure was applied to both models in a German translation and a French translation (results in Appendices 2a, 2b, 3). As thesauri, Collins English Thesaurus was used for the USA, the DUDEN was used for Germany (Dudenredaktion 2014), and for France, the

² Due to the magnitude of items, the detection of common synonyms was done by a software program. The code and respective instructions are available from the corresponding author.



thesaurus website of a university was chosen (Université de Caen). The main figures of the analyses are cited in Table 1. It can be seen that the total number of synonyms is substantially higher in the control model. As well, a comparison of the cross-ratios reveals that these are higher for the control than for the Aaker model in each country.

The distribution of common synonyms (Appendices 1a, 1b) can also be visualized by a multidimensional scaling (MDS) after the numbers are converted to distances by subtracting them from the maximum value. Figure 3a shows the result for Aaker's (1997) model. Some traits are depicted close to each other as described by Aaker's EFA solution. Others, however, are rather scattered. The traits of the factor "excitement," for example, "cross-load" with other attributes from the factors "sincerity" and "competence." The traits that originally built the two factors "sophistication" and "ruggedness," rather seem to belong to only one common construct here. The MDS for the control model, in contrast, depicts the respective traits in the three intended factors clearly separated from each other (Fig. 3b).

Empirical study

The Aaker and the control model both have been tested for a set of global brands. A variety of worldwide available and well-known brands was selected: BMW (cars), L'Oreal

and Dove (cosmetics), Sony (electronics), Apple (IT), Coca-Cola and Kellogg's (food), Febrèze (household products), Nike (apparel), and Google, Hilton, and Visa (service brands). These brands were selected by a group of six doctoral students to cover several product and service brands, as well as keeping the number of stimuli reasonably small to avoid overload. In each country, two separate surveys were conducted, one for the Aaker and one for the control model. At the beginning, the 12 brand logos were shown, and survey participants could choose one or more brands that they were familiar with, that they had bought yet or that they knew from friends. By this, it could be guaranteed that no brands were assigned to respondents that they did not know and that could have led to them answering with insignificant statements. For each selected brand, participants rated the respective personality traits (42 in the Aaker and 40 in the control model) that were presented in random order.

Participants were recruited via e-mail invitation by an international provider of survey sampling. The provider collected completed questionnaires from respondents aged 18–65 and according to the countries' demographics to provide a representation as close as possible to the population. Sample sizes were calculated by the 5:1 rule, which requires 5 cases for each variable (MacCallum et al. 1999). Thus, with about 40 variables, sample sizes of 200–210 participants seemed sufficient. In the USA, 214

Table 1 Results of the synonym detection per model and country

	Aaker		Control model		
	Factor	Cross-ratio	Factor	Cross-ratio	
<i>USA</i>			<i>USA</i>		
42 traits	Sincerity	6.8	40 traits	Agreeableness	69.0
1245 synonyms	Excitement	5.9	1290 synonyms	Sincerity	32.7
291 common synonyms	Competence	2.6	1038 common synonyms	Assertiveness	38.8
	Sophistication	15.4			
	Ruggedness	32.8			
<i>Germany</i>			<i>Germany</i>		
42 traits	Sincerity	3.9	40 traits		
950 synonyms	Excitement	3.7	1072 synonyms	Agreeableness	68.6
318 common synonyms	Competence	.5	917 common synonyms	Sincerity	19.7
	Sophistication	2.5		Assertiveness	60.9
	Ruggedness	3.4			
<i>France</i>			<i>France</i>		
42 traits	Sincerity	1.5	40 traits	Agreeableness	4.8
1366 synonyms	Excitement	.3	1405 synonyms	Sincerity	8.1
612 common synonyms	Competence	1.2	1410 common synonyms	Assertiveness	4.5
	Sophistication	5.3			
	Ruggedness	2.2			



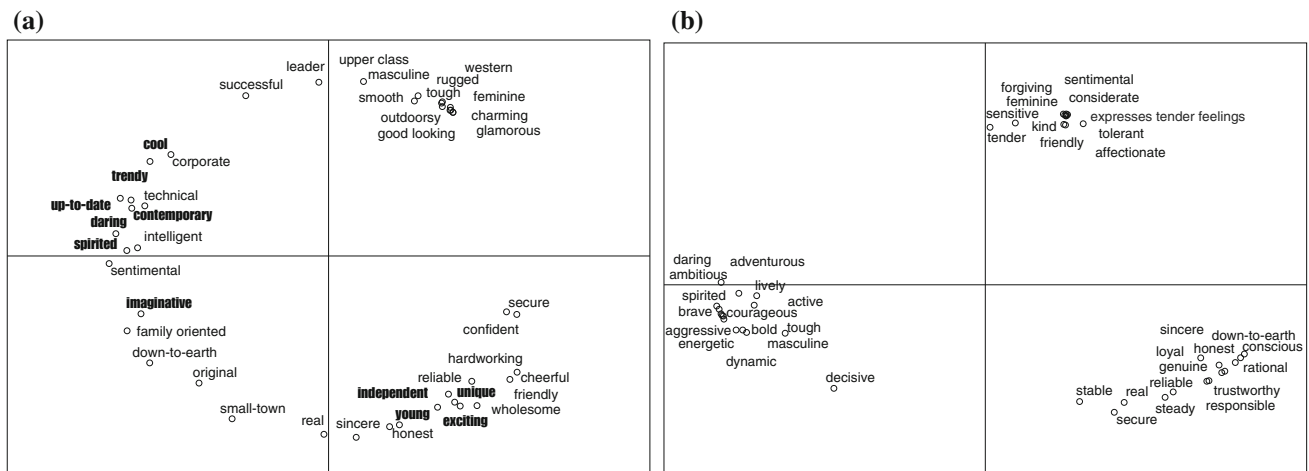


Fig. 3 Multidimensional scaling for the USA (MDS). a Aaker's (1997) model, b control model

respondents participated in the Aaker study (52.7% female, $M_{Age} = 42.4$, $SD_{Age} = 11.9$), and 207 in the control study (54.6% female, $M_{Age} = 41.0$, $SD_{Age} = 14.3$). In Germany, 207 respondents participated in the Aaker study (48.9% female, $M_{Age} = 43.5$, $SD_{Age} = 12.2$), and 218 in the control study (51.3% female, $M_{Age} = 43.4$, $SD_{Age} = 12.5$). In France, 207 respondents participated in the Aaker study (62.2% female, $M_{Age} = 40.7$, $SD_{Age} = 14.0$), and 225 in the control study (52.5% female, $M_{Age} = 42.4$, $SD_{Age} = 13.7$). In less than 2% of the scores, answers were missing, which could impede factor analyses, particularly CFA. These missing answers were replaced with an imputation method, keeping both means and variances equal to the original sample.

Exploratory factor analyses

EFAs were conducted separately for each country, with the Aaker and control model with principal component analyses and varimax rotation. Results can be seen from Appendices 2a and 2b. Setting Aaker's model in the factor-extraction procedure with a minimum of an eigenvalue of 1 for each factor resulted in a suggested model with three factors in the USA and four factors in Germany. In France, five factors were extracted. To achieve a better comparability, the number of factors to be extracted was fixed at five as in the original Aaker model. For the control model, all procedures with minimum eigenvalues of 1 resulted in three-factor solutions as initially expected. Factor loadings are scattered in the Aaker model, with only a few solutions close to the original scale. The closest solutions to Aaker can be found for the factor excitement in Germany and ruggedness in the USA and Germany. Adding all loadings that seemed to be right in a way that reflected Aaker's original solution resulted in a share of only 49.2%. For the control model, this share was 79.2%.

Confirmatory factor analyses

Both models were analyzed with CFAs. In all models, error terms of the manifest variables were allowed to correlate, however, complying with the following rules: (1) The correlations were allowed only between error terms of the manifest variables, but not between error terms of manifest and latent constructs; (2) correlations were only allowed between error terms of the same factor, but not between error terms across factors; and (3) only those correlations were chosen in which the modification indices were above 10. The respective results can be found in Appendix 3.

For the Aaker model, only the brands in the USA showed acceptable-fit indices with CFI and NFI above .900 (Bagozzi and Yi 1988; Hu and Bentler 1999). In Germany and France, CFI and NFI were below .900. Furthermore, one value for the average variance explained (AVE) was below .5 in Germany, and all AVEs were below .5 in France. In these cases, less than half of variance within the respective factor was explained by the manifest variables that constituted missing convergent validity (Fornell and Larcker 1981). For the control model, the CFI and NFI were sufficiently high in all countries (above .900).

Thus, Aaker's scales do not seem to be a viable brand personality model across countries. However, also for the control model, cross-country comparisons could suffer from measurement variance, i.e., the assumption of the invariance or measurement equivalence has to be rejected (Steenkamp and Baumgartner 1998). To examine a potential invariance violation, a multigroup analysis was specified with the USA, Germany, and France as groups according to the method of Chen (2007). Comparing the CFI, RMSEA, and SRMR between a model in which factor loadings were unconstrained, and another model in which they were constrained to be equal, no difference exceeded the cutoff values that could indicate invariance



($\Delta\text{CFI} = .940-.943 = -.003 > -.005$; $\Delta\text{RMSEA} = .035-.034 = .001 < .010$; $\Delta\text{SRMR} = .0390-.0382 = .0008 < .025$). Thus, the invariance assumption of the control model across the USA, Germany, and France was supported, and the model emerged as reproducible.

Discussion, limitations and conclusion

The main finding of this article is the positive link between an extended lexical approach by the use of synonyms and an enhanced reproducibility of the emerging brand personality scales in empirical studies within different cultural environments. The pivotal problem underlying this research was the question why researchers perform the second step (incorporating brands to develop a tool to measure brands) before the first, i.e., building valid and reproducible personality models by incorporating the knowledge that is deeply ingrained in human language and thereafter applying these personality models to brands. It was not the intention of this article to criticize Aaker's (1997) model in general – it worked quite well in the USA. The theoretical and empirical studies in this article, however, showed evidence why personality models may not have been reproducible, and recommendations were given regarding how to improve them. The achieved results encourage researchers and marketers to further make extensive use of brand personality models. As the single most important managerial implication, this method could support the global brand manager. Obviously, globalization has advanced in recent decades. As more nations open their economies to other parts of the world, manufacturers venture into new markets to increase revenues, and these companies take their existing brands with them. Marketers then face the question of how to manage brands in different countries (Douglas et al. 2001). Some international companies, particularly those with convenience goods, leave brand management to their local subsidiaries. However, if global culture is converging, then a homogeneous brand strategy would evidently save time and expense (De Mooij 2003). Aaker and Joachimsthaler (1999) claimed that successful global branding requires a system that measures brand equity in terms of brand personality. Thus, a global brand personality model is required.

Of course, character perceptions may differ according to varying cultures. Therefore, adjusting Aaker's original model for each culture may be appropriate. The marketing practitioner, however, is unable to manage a brand globally with such a variety of models unless one shortens Aaker's scales to a reproducible rump model. However, only a few items that load identically would remain. This article showed how the required generalizability can be improved. By a worldwide application of a brand gender model that

fulfills the synonym rule (Grohmann 2009), it could be shown how cultural differences influence perceptions of brand equity (Lieven and Hildebrand 2016).³

By far, it is not claimed that the described procedure solves all problems of cross-cultural invariance. Nevertheless, it supports the construction of reproducible models in a way that fulfills necessary conditions (the synonym rule) rather than resulting in reproducible scales by all means. Careful consideration is still required, and factor analyses are not obsolete regarding the demonstrated method.

The presented procedure extends the psycho-lexical approach by the rule that personality traits are combined to a factor when they possess a sufficiently high number of common synonyms and only a few synonyms with traits outside of this factor. Accordingly, brand personality scales can be theoretically founded and justified. As the proof of concept demonstrated, a higher reproducibility could be achieved. It could be argued that the described procedure overly predetermines the structure of the personality scales, and many traits with too many common synonyms may be redundant, which can also be seen from the high Cronbach's alphas. The redundancy itself, however, is no problem since factor analysis is a way to reduce a set of redundant variables (Briggs and Cheek 1986). The difference described in the present article from the traditional way to develop and evaluate personality scales is the fact that the development of the scales is done before EFAs by the synonym rule. Human character traits are sedimented in language and can be selected to a personality model by the procedure described here. However, EFAs are not needless. The human personality scales built by the presented procedure can be tested with an EFA if the selected human character traits load on the same factors when applied to brands, as Caprara et al. (2001). The EFA becomes rather confirmatory, similar to the CFA.

To avoid overloads by too many redundant synonyms, the parsimonious parameters in the CFA (PGFI and PNFI) should be sufficiently high by reducing the set of traits accordingly. PGFI and PNFI do not have predefined cutoff values; nonetheless, in connection with other fit indices, they can be adjusted to the highest values, comparing models that still have a good fit.

³ Lieven and Hildebrand (2016) revealed that androgynous brands generate higher brand equity relative to exclusively masculine, exclusively feminine, and undifferentiated brands. They also showed a brand gender congruence effect such that male consumers value masculine brands higher than females while female consumers value more feminine brands higher than males. Finally, highly masculine brands generate higher brand equity in more individualistic (Western) countries whereas highly feminine brands generate higher brand equity in more collectivistic (Eastern) countries.



It is knowledge from language that predetermines the factors, and only abnormalities or inadequate translation could deviate from this implicit knowledge in such a way that a shift in meaning can occur. Austin et al. (2003), who tried to adapt Aaker's model to restaurants, found that Asian survey participants could not interpret the trait "Western." Likewise, al-fresco dining restaurants were perceived to be more outdoorsy, and restaurants specializing in serving families were perceived as being family oriented.

Translations can be misleading. Obviously, the trait "aggressive" from English was translated to "agressif" in French, which seems to have a negative connotation in France compared to the USA. In Appendix 3, its coefficient in the French model under "assertiveness" is only .337; i.e., it would be better to remove it from the trait list. It might have been better to translate "aggressive" with "belliqueux," which has the meaning of the German "an-griffslustig" and in some sense the English "bellicose."

In Collins thesaurus, "reliable" and "honest" are direct synonyms (Fig. 1). While this holds in language, it could be challenged that this holds also for brands. Toyota certainly could be perceived as "honest"; nevertheless, due to several problems with their pedals, Toyota could not be deemed "reliable." However, the issue concerns human character, not technical properties. "Reliable" does not mean the same when used for a reliable friend or, in contrast, for a reliable car. The meanings are not too far away; however, if one uses personality models for brands, the respective traits should be personality characteristics as well. Another example is "Western," which could describe, as an example, the Marlboro Man. For Asian consumers, though, all American car brands like GM, Ford, and others may be Western in contrast to the Eastern Toyota. Relief for these misunderstandings could be the presentation of the character traits in whole sentences, e.g., "Toyota reminds me of a reliable person" to avoid the shift of meaning of "reliable" from a personality trait to a functional property. Unfortunately, this makes translations even more difficult in an international context. When there exists the risk of such shifts in meaning, one should rather refrain from implementing these traits. Similarly, Appendix 3 demonstrates that several traits should not be used in an international context: "young," "technical," "corporate," and "Western." Particularly, the trait "feminine" does not positively contribute to the

constructs. All of this has been apparent in the synonym matrices. "Young," "technical," "corporate," and "Western" had no common synonyms at all, while "feminine" had two (Appendix 1a). This non-overlapping property could be seen as a limitation of the described method. In some brand personality models, particularly for cosmetic brands, "feminine" may be required to be included in the brand personality scale. "Feminine" itself has 18 synonyms in the Collins Thesaurus, whereof only two were common synonyms in the Aaker model used in the USA ("feminine" had the synonym "tender" in common with the trait "sentimental," and "feminine" had the synonym "pretty" in common with the trait "good looking"). Hence, to let the trait "feminine" absolutely be part of the scales, one could include other characteristics with synonyms in common with "feminine" (e.g., "humble," "modest"). Particularly, the synonyms of "feminine" themselves could be added, though they might lead to high redundancy or even overload. Alternatively, researchers or marketers intending to describe femininity and masculinity should make use of Grohmann's (2009) brand gender model, which has been found reproducible in 10 countries on four continents (Lieven and Hildebrand 2016).

Lieven and Hildebrand (2016) also demonstrated the usefulness of brand gender as part of personality to predict brand equity, which is one of the most important outcomes of marketing and brand management. This is one of the main purposes of brand personality: to describe brands' characteristics in an intuitive way that is comprehensible to almost anyone and to derive conclusions regarding brand image, strength, and equity (Aaker and Joachimsthaler 1999). The reason why the use of brand personality has not been propagated more often in recent years may be found in the ambiguous results that occurred when the replication of existing scales was attempted. Using the method described in this study may help to develop better scales. Through an a priori analysis from the dictionary, mistakes can be avoided. Empirical data do not have to be assessed again and again due to poor model fit or the need to remove traits that did not load correctly. In addition to the robust theoretical foundation, the procedure, thus, is a resource-saving endorsement of the existing approach. It is also suitable for any development of personality models in sociology or psychology.



Appendix 1

(a) Cross-ratios model Aaker USA

		Sincerity (n = 11)	Excitement (n = 11)	Competence (n = 9)	Sophistication (n = 6)	Ruggedness (n = 5)
Items (N = 42)	down-to-earth					
	family-oriented					
	small-town					
	honest					
	sincere					
	real					
	wholesome					
	original					
	cheerful					
	sentimental					
	friendly					
	daring					
	trendy					
	exciting					
	spirited					
	cool					
	young					
	imaginative					
	unique					
	up-to-date					
	independent					
	contemporary					
	reliable					
	hardworking					
	secure					
	intelligent					
	technical					
	corporate					
	successful					
	leader					
	confident					
	upper class					
	glamorous					
	good-looking					
	charming					
	feminine					
	smooth					
	outdoorsy					
	masculine					
	western					
	tough					
	rugged					
	down-to-earth					
	family-oriented					
	small-town					
	honest					
	sincere	1				
	real	13				
	wholesome	10				
	original	4				
	cheerful	4				
	sentimental	3				
	friendly	6				
	daring	2				
	trendy	2				
	exciting	2				
	spirited	3				
	cool	1				
	young	1				
	imaginative	7				
	unique	1				
	up-to-date	1				
	independent	1				
	contemporary	1				
	reliable	2				
	hardworking	1				
	secure	2				
	intelligent	1				
	technical	1				
	corporate	1				
	successful	2				
	leader	1				
	confident	1				
	upper class	1				
	glamorous	1				
	good-looking	1				
	charming	1				
	feminine	1				
	smooth	1				
	outdoorsy	1				
	masculine	1				
	western	1				
	tough	1				
	rugged	1				
	daring					
	trendy					
	exciting					
	spirited					
	cool					
	young					
	imaginative					
	unique					
	up-to-date					
	independent					
	contemporary					
	reliable					
	hardworking					
	secure					
	intelligent					
	technical					
	corporate					
	successful					
	leader					
	confident					
	upper class					
	glamorous					
	good-looking					
	charming					
	feminine					
	smooth					
	outdoorsy					
	masculine					
	western					
	tough					
	rugged					
	# of cells within factor [n × (n - 1)]	110	110	72	30	20
	# of cells outside factor [n × (N - n)]	341	341	297	216	185
	# of common synonyms within factor	118	94	28	64	78
	# of common synonyms outside factor	54	49	45	30	22
	Avg # of synonyms within factor	1,1	0,9	0,4	2,1	3,9
	Avg # of synonyms outside factor	0,2	0,1	0,2	0,1	0,1
	Cross Ratio	6,8	5,9	2,6	15,4	32,8



(b) Cross-ratios control model USA

		Agreeableness (n = 11)										Sincerity (n = 14)										Assertiveness (n = 15)																								
Items (N = 40)		Agreeableness (n = 11)										Sincerity (n = 14)										Assertiveness (n = 15)																								
		expr. tender feel. considerate forgiving kind feminine sentimental affectionate friendly sensitive tender tolerant honest sincere rational conscious genuine trustworthy down-to-earth reliable responsible secure real stable steady loyal masculine decisive courageous dynamic energetic spirited aggressive brave bold tough lively ambitious daring active adventurous	3	4	13	1	1	7	8	6	18	2	13	9	7	3	1	10	1	1	3	1	1	2	1	3	1	3	2	2	3	6	6	1	1	5	2	3	2	4	4	4	7	3	2	2
expresses tender feelings																																														
considerate																																														
forgiving																																														
kind																																														
feminine																																														
sentimental																																														
affectionate																																														
friendly																																														
sensitive																																														
tender																																														
tolerant																																														
honest																																														
sincere																																														
rational																																														
conscious																																														
genuine																																														
trustworthy																																														
down-to-earth																																														
reliable																																														
responsible																																														
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real																																														
stable																																														
steady																																														
loyal																																														
masculine																																														
decisive																																														
courageous																																														
dynamic																																														
energetic																																														
spirited																																														
aggressive																																														
brave																																														
bold																																														
tough																																														
lively																																														
ambitious																																														
daring																																														
active																																														
adventurous																																														
# of cells within factor [n × (n - 1)]																																														
# of cells outside factor [n × (N - n)]																																														
# of common synonyms within factor																																														
# of common synonyms outside factor																																														
Avg # of synonyms within factor																																														
Avg # of synonyms outside factor																																														
Cross Ratio																																														



Appendix 2

(a) EFA factor loadings for Aaker's model

	USA					Germany					France				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
<i>Sincerity</i>															
Down-to-earth	.693					.705									.743
Family oriented	.710					.666							.603		
Small-town					.800					.717					.719
Honest	.775					.573					.691				
Sincere	.751					.649					.701				
Real	.773						.630				.705				
Wholesome	.623					.530					.733				
Original		.574				.604							.581		
Cheerful	.690						.543								.537
Sentimental	.547								.544						.712
Friendly	.773					.593					.556		.514		
<i>Excitement</i>															
Daring	.537						.652					.552			
Trendy		.647					.671						.703		
Exciting	.644						.657								.542
Spirited	.603						.636								.652
Cool	.613						.737						.634		
Young							.670								.711
Imaginative	.647						.758					.626			
Unique	.665						.666						.591		
Up-to-date		.753					.781					.583			
Independent	.698						.655					.494			
Contemporary		.669					.776					.445			
<i>Competence</i>															
Reliable	.757						.637				.600				
Hardworking	.702						.681					.552			
Secure	.714						.688				.601				
Intelligent	.719						.754					.689			
Technical			.549				.541	.545				.743			
Corporate		.674					.643					.461			
Successful		.737					.722						.551		
Leader		.732					.691						.596		
Confident	.681						.780				.612				
<i>Sophistication</i>															
Upper class					.510					.658		.432			
Glamorous				.548						.675		.563			
Good looking	.566						.604						.619		
Charming	.626									.584					.532
Feminine					.570					.651				.575	
Smooth	.595					.553					.604				



	USA					Germany					France				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
<i>Ruggedness</i>															
Outdoorsy					.781					.557					.625
Masculine					.761					.589					
Western					.713					.837					.749
Tough					.685					.525					
Rugged					.817					.826					.741

Extraction method: principal component analysis. Rotation method: varimax with Kaiser normalization
 Bold numbers represent high loadings correctly assigned to the intended factors

(b) EFA factor loadings for control model

	USA			Germany			France		
	1	2	3	1	2	3	1	2	3
<i>Agreeableness</i>									
Expresses tender feelings	.803			.833			.809		
Considerate		.573		.755			.719		
Forgiving	.706			.745			.697		
Kind	.649	.529		.720			.790		
Feminine	.721			.603			.625		
Sentimental	.723			.823			.786		
Affectionate	.776			.826			.800		
Friendly		.690		.627				.602	
Sensitive	.759			.806			.645		
Tender	.802			.855			.813		
Tolerant	.504			.697			.629		
<i>Sincerity</i>									
Honest		.707		.573				.632	
Sincere		.621		.623			.620		
Rational		.529		.536					.566
Conscious		.594			.745				.594
Genuine		.729			.702				.648
Trustworthy		.772			.660				.773
Down-to-earth		.601			.567		.642		
Reliable		.767			.743				.774
Responsible		.718			.611				.659
Secure		.686			.758				.773
Real		.734			.749				.686
Stable		.728			.755				.704
Steady		.729			.750				.700
Loyal		.665			.550				.610
<i>Assertiveness</i>									
Masculine									
Decisive				.666	.591			.602	
Courageous				.505			.589		.532
Dynamic		.547			.695			.736	
Energetic				.554			.645	.664	



	USA			Germany			France		
	1	2	3	1	2	3	1	2	3
Spirited			.529			.617			.629
Aggressive			.781			.818			.727
Brave			.522	.583			.584		
Bold			.561			.736			.629
Tough			.756			.705			.536
Lively		.548			.550			.590	
Ambitious			.584			.571		.659	
Daring			.718			.723		.632	
Active		.596			.706			.738	
Adventurous			.604			.711			.576

Extraction method: principal component analysis. Rotation method: varimax with Kaiser normalization

Bold numbers represent high loadings correctly assigned to the intended factors

Appendix 3

Coefficients Aaker and control model

	Aaker model				Control model		
	USA	Germany	France		USA	Germany	France
SRMR	.0567	.0755	.0770	SRMR	.0382	.0686	.0457
CFI	.920	.881	.839	CFI	.957	.929	.942
NFI	.901	.861	.819	NFI	.941	.912	.929
RMSEA	.066	.075	.078	RMSEA	.051	.064	.062
<i>Sincerity</i>				<i>Agreeableness</i>			
Down-to-earth	.819	.713	.628	Expresses tender feelings	.781	.761	.828
Family oriented	.756	.660	.451	Considerate	.844	.852	.845
Small-town	.542 ^a	.322 ^a	.358 ^a	Forgiving	.817	.836	.877
Honest	.859	.775	.733	Kind	.884	.814	.886
Sincere	.853	.801	.738	Feminine	.582	.486 ^a	.555 ^a
Real	.846	.778	.669	Sentimental	.754	.824	.823
Wholesome	.733	.640	.557	Affectionate	.849	.864	.867
Original	.707	.671	.693	Friendly	.896	.907	.914
Cheerful	.855	.819	.796	Sensitive	.822	.824	.732
Sentimental	.766	.765	.660	Tender	.817	.850	.841
Friendly	.835	.843	.713	Tolerant	.805	.790	.859
α	.943	.914	.888	α	.952	.952	.956
AVE	.615	.520	.420	AVE	.654	.652	.682
<i>Excitement</i>				<i>Sincerity</i>			
Daring	.812	.745	.749	Honest	.829	.811	.844
Trendy	.672	.758	.577	Sincere	.823	.818	.831
Exciting	.868	.766	.739	Rational	.755	.717	.810
Spirited	.825	.778	.693	Conscious	.816	.671	.855
Cool	.839	.771	.710	Genuine	.779	.736	.791
Young	.745	.710	.510 ^a	Trustworthy	.789	.724	.683
Imaginative	.853	.821	.736	Down-to-earth	.797	.753	.809
Unique	.806	.728	.682	Reliable	.691	.742	.696
Up-to-date	.680	.806	.719	Responsible	.792	.767	.804



	Aaker model				Control model		
	USA	Germany	France		USA	Germany	France
Independent	.843	.755	.715	Secure	.790	.703	.767
Contemporary	.660	.785	.601	Real	.789	.754	.855
α	.949	.939	.903	Stable	.775	.684	.743
AVE	.617	.587	.462	Steady	.811	.659	.773
<i>Competence</i>				Loyal	.829	.817	.817
Reliable	.832	.766	.625	α	.960	.947	.960
Hardworking	.826	.811	.751	AVE	.626	.550	.629
Secure	.825	.811	.715	<i>Assertiveness</i>			
Intelligent	.859	.856	.792	Masculine	.470 ^a	.505 ^a	.555 ^a
Technical	.556 ^a	.586 ^a	.604	Decisive	.752	.805	.851
Corporate	.466 ^a	.800	.547 ^a	Courageous	.827	.820	.875
Successful	.573	.662	.731	Dynamic	.802	.784	.780
Leader	.654	.759	.612	Energetic	.839	.785	.776
Confident	.819	.783	.651	Spirited	.850	.790	.778
α	.906	.924	.871	Aggressive	.573	.557	.337 ^a
AVE	.527	.583	.454	Brave	.860	.806	.838
<i>Sophistication</i>				Bold	.696	.613	.811
Upper class	.737	.629	.715	Tough	.652	.645	.759
Glamorous	.790	.636	.808	Lively	.841	.798	.817
Good looking	.816	.792	.700	Ambitious	.789	.787	.757
Charming	.869	.789	.751	Daring	.728	.775	.817
Feminine	.637	.510 ^a	.397 ^a	Active	.818	.776	.773
Smooth	.839	.836	.717	Adventurous	.843	.768	.831
α	.909	.873	.821	α	.954	.948	.952
AVE	.616	.501	.482	AVE	.584	.549	.591
<i>Ruggedness</i>							
Outdoorsy	.888	.887	.684				
Masculine	.758	.751	.529				
Western	.751	.567	.436				
Tough	.862	.677	.748				
Rugged	.797	.481	.631				
α	.895	.794	.774				
AVE	.661	.472	.379				

^a Cronbach's α is higher when this item is deleted

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