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RESEARCH

Implicit evidence for price-ending effects on quality and image perceptions

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Abstract
As just-below, 9-ending prices (e.g., $9.99) are frequently used in low-price segments, consumers may have learned to implicitly associate them with a better price value, but impaired product quality compared to round, 0-ending prices ($10.00; i.e., 'image effects'). Despite extant research documenting such image effects, a recent meta-analysis reports an overall null effect for the quality impairment of 9-ending prices, with even some opposite findings. This may either reflect true effect ambiguity or methodological (measurement) inadequacy: To the best of our knowledge, prior research has solely used *explicit* measurements (e.g., questionnaires) to capture *implicit* price and quality-image effects. In four preregistered laboratory experiments using implicit measures (i.e., IAT and GNAT), and contrary to a meta-analytic synthesis of explicit measures, we discover strong associations of 9-ending prices with lower-quality perceptions and an improved price image. Our findings offer practical guidance on the (dis)advantageous implicit psychological effects of 9- vs. 0-ending pricing strategies for pricing analysts, revenue managers, and marketers. We advance the scientific discourse by establishing evidence for image effects via unobtrusive measurement methods and by readjusting prevailing misconceptions on price-ending effects.

Keywords Price endings · 9-ending prices · Price image · Quality image · Implicit associations

'Just-below pricing'—setting prices just below a certain threshold (e.g., $99.99 instead of $100.00)—is one of the most prevalent psychological pricing strategies. The digit '9' is hence the most frequently used trailing digit in retailing and advertising (Holdershaw et al. 1997; Kim et al. 2022; Troll et al. 2023). While many organizations around the globe utilize 9-ending prices in hopes of increased demand compared to 0-ending prices, the effectiveness of just-below prices remains inconclusive from a scientific standpoint (Wieseke et al. 2016). Many studies find positive effects of 9-ending (vs. 0-ending) prices on sales and value perception (e.g., Schindler and Kibarian 1996; Anderson and Simester 2003) or highlight the sensitivity of consumers to small price changes (Larson and Tauscher 2025) while others find no evidence for a superiority of just-below prices or even reversed effects (e.g., Allred et al. 2010; Wieseke et al. 2016). A recent meta-analysis underlines this effect ambiguity in that 9-ending prices exerted (1) an overall positive, albeit small, effect on purchase decision and price perception, but (2) no significant effect on perceived product quality (Troll et al. 2023). Two explanations might illuminate this empirical ambiguity: First, the effects might simply not be real phenomena but rather emerge due to statistical chance, file drawer effects, and/or questionable research practices (e.g., Friese and Frankenbach 2020). Alternatively, the phenomena could be real, and the inconclusive empirical evidence might be rooted in inappropriate operationalization—namely measuring *implicit* associations with *explicit* measurements.

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Image effects have been solely investigated via explicit measurement such as questionnaires (e.g., "How would you rate the quality of this item?", Schindler and Kibarian 2001). Given that explicit memory can differ markedly from implicit memory (Greenwald and Banaji 2017) and given that consumers in real buying situations are likely driven by subconscious cues (Fortunato et al. 2014), explicit measures might be insufficient to study implicit image effects. Furthermore, the inconclusive meta-analytic findings for image effects (Troll et al. 2023) might be distorted by different product categories, price levels, brand preferences, and numerous other factors that impact explicit evaluations of product quality and price value.

To overcome these limitations, the present research uses implicit measurement to investigate the true existence of image effects (or lack thereof)—irrespective of confounding factors (e.g., product categories) and price frames (i.e., price level and price thresholds). We conducted four laboratory experiments with the Implicit Association Test (IAT; Greenwald et al. 1998) and the Go/No-Go Association Task (GNAT; Nosek and Banaji 2001) to study implicit associations between 9-ending prices and (a) price image as well as (b) quality image. Although multiple scholars have repeatedly pointed out the necessity of capturing image effects via implicit methods (Anderson and Simester 2003; Thomas and Morwitz 2005; Coulter and Coulter 2007), empirical investigations thus far remain missing. Our work seeks to fill this gap with an implicit measurement approach on price image effects. In all, we aim to generate actionable insights for revenue and pricing management on the implicit psychological perceptions of 9- vs. 0-ending prices.

Conceptual background

Price-ending digits and the image effect

When product quality is not directly observable, consumers make inferences about products by relying on product-related cues such as prices (Oxoby and Finnigan 2007; see Kunz et al. 2020). For instance, a high price leads consumers to expect a higher quality (Kurz et al. 2023). Contrary, a low price or discount may be associated with low(er) quality (Völckner and Hofmann 2007). Apart from absolute price levels, price endings may come with similar associations: Given that 9-endings are frequently used in low-price segments and to signal discounts, consumers may have learned to associate 9-ending prices with low(er) quality (quality-image effect) but improved price value (price-image effect). Contrary, 0-ending prices are frequently used in premium segments and may be associated with high(er) quality (Stiving 2000; Schindler 2006).

Empirical findings for image effects remain ambiguous and inconclusive. Although prior studies rather consistently found improved price-image effects for 9-ending (vs. 0-ending) prices (e.g., Naipaul and Parsa 2001; Schindler and Kibarian 2001), there is no clear evidence for a quality-image effect. A recent comprehensive meta-analysis concludes that the overall price-ending effect on price image ($g = 0.28$, $p = 0.007$) is small, and that there is no mean effect of price ending on quality image ($g = 0.00$, $p = 0.957$; Troll et al. 2023). In all, it may be premature to conclude that image effects are real given the overrepresentation of 9-ending prices in low-price segments—but similarly premature to conclude that the quality-image effect does not exist, given the sole use of *explicit* measurement methods like questionnaires that may insufficiently capture true implicit associations (Greenwald and Banaji 2017). Implicit measures are thus needed to gather evidence on the true existence of price and quality image effects.

Semantic networks and implicit measurements

How do implicit measurements differ from explicit ones? According to the 'Theory of Semantic Memory', human knowledge is organized in complex cognitive networks in which concepts are represented as interconnected nodes (Quillian 1967). These connections are shaped and strengthened through repeated co-occurrence and frequency-based learning; for example, the proximity and cognitive connection between 'bird' and 'wing' is stronger than between 'bird' and 'fin'. Following the 'Spreading Activation Theory', the activation of a concept activates connected concepts, with the level of activation depending on the connection's strength (Collins and Loftus 1975).

The most popular methods to measure these semantic associations are the IAT (Greenwald et al. 1998) and its derivatives, for instance, the GNAT (Nosek and Banaji 2001). In these tasks, participants react to two kinds of stimuli with a common response key. In the IAT, participants categorize stimuli of two target concepts (e.g., 'insect' and 'flower') and two attribute concepts (e.g., 'pleasant' and 'unpleasant') alternately. The assignment of keys on a keyboard is either congruent or incongruent. Based on 'Spreading Activation Theory', the IAT assumes that the presented stimuli pre-activate associated concepts, leading to faster response times when key assignment is congruent (e.g., 'flower' + 'pleasant'; Greenwald et al. 1998, 2003).

The GNAT proceeds similarly but uses an accuracy measure instead of response times. Participants respond to stimuli from only one target concept (e.g., 'flower'), and two attribute concepts (e.g., 'pleasant' and 'unpleasant') using a single response key. Stimuli are presented randomly, and participants either react to congruent or incongruent stimuli while ignoring noise stimuli. Since the GNAT is based on 'Signal Detection Theory' (Green and Swets 1966), it captures the hit rate

(correct classification of signals) and false alarm rate (incorrect classification of noises). The discriminability of signals and noises is expected to be higher when key assignment is congruent. Both IAT and GNAT can illuminate the (learned) link between semantic concepts prior to planned cognitive evaluation via different but complementary mechanisms (response latency vs. signal-detection sensitivity). The resulting measures (response times vs. hit rates / false alarm rates) are thus different operationalizations for the strength of automatic association (Nosek and Banaji 2001). While raw effect magnitudes are not directly comparable, the general convergence of IAT (e.g., faster response times) and GNAT (e.g., better signal-to-noise discrimination) provides evidence for theoretical coherence and the convergent validity of association strength across both tests.

Hypotheses

According to 'Spreading Activation Theory' and in line with the price-image effect (Schindler and Kibarian 2001), 9-ending prices should activate concepts linked to an improved price image given their higher presence in discount environments. This should lead to shorter response times (RTs), higher hit rates, and lower false alarm (FA) rates when both concepts share a response key (i.e., 'congruent' pairing; Tipper and Cranston 1985). We thus hypothesized:

H1 RTs are shorter when 9-ending prices and improved price image, as well as round prices and impaired price image share a response key vs. when the key assignment is incongruent.

H2 The discriminability of signal and noise stimuli is higher when 9-ending prices and an improved price image share a response key vs. when the key assignment is incongruent.

9-ending prices should further activate concepts linked to low(er) product quality, leading to shorter response times (RTs), higher hit rates, and lower false alarm (FA) rates when both concepts share a response key. We thus hypothesized:

H3 RTs are shorter when 9-ending prices and low quality, as well as round prices and high quality share a response key vs. when the key assignment is incongruent.

H4 The discriminability of signal and noise stimuli is higher when 9-ending prices and low quality share a response key vs. when the key assignment is incongruent.

The present studies

Experiment 1 investigates the price image effects (H1, H2) whereas Experiment 2 investigates quality image effects (H3, H4). In both experiments, we used both the IAT and the GNAT. We did so for three reasons: First, employing a second implicit method enhances robustness and result credibility. Second, the use of a single response key in the GNAT allows for the exclusion of potential confounding effects caused by the dominant hand reacting faster than the non-dominant one. Third, the GNAT focus on a singular target concept (i.e., 9-ending prices) enables us to examine associations with attribute concepts in isolation. If image effects reflect real phenomena, the IAT and the GNAT should reveal associations of 9-ending prices and improved price value as well as impaired product quality. We preregistered all hypotheses, experiments, and analyses on OSF and uploaded all experimental data (https://osf.io/b5avx/?view_only=b0beda82136643f2baad248ffc47e909). All experiments were conducted in accordance with the APA Ethical Principles (American Psychological Association 2016), approved by the Research Commission of the School of Management & Technology, and not funded externally. All participants gave their informed consent to participate and could revoke their consent and terminate the study procedure at all times.

Experiment 1: 9-endings vs. 0-endings and price-image associations

Experiment 1a and 1b sought to establish empirical evidence for cognitive links between price endings and price-image perceptions via implicit measurement methods (IAT in Exp.1a; GNAT in Exp.1b).

Method, sample, and procedure

We recruited participants at Leuphana University and asked them to participate in two subsequent laboratory experiments for a reward of either six euros or course credit. Upon entering the lab, participants received a short introduction and noise-cancelling over-ear headphones to avoid distraction during the experiment. The software 'Inquisit 5' (Millisecond Software 2018) guided participants through the study step-by-step with standardized instructions on the procedures and keyboard layout. We followed the 'Improved Scoring Algorithm' that recommended recruiting at least 39 participants to achieve sufficient statistical power (Greenwald et al. 2003). $N=49$ students participated in Experiments 1a-1b ($M_{age}=22.84$, $SD=4.10$; 73% females). No participants were excluded. Group 1 (congruent first) included 25, and group 2 (incongruent first) 24 participants.

Participants performed the IAT and GNAT according to their original procedures (e.g., Nosek and Banaji 2001; Millisecond Software 2018; see Tables S1 and S4, SOM). For

full details regarding stimuli and target concepts, randomization procedures, and reaction time limits, please refer to the extended documentation in the SOM.

Dependent variables and control variables

We recorded RTs (IAT), as well as hit and false alarm (FA) rates (GNAT) as dependent variables. We controlled for price level by dividing price stimuli into 'low prices' and 'high prices' following extant research (e.g., Schindler and Kibarian 1996; Coulter 2001). We exploratively controlled for price thresholds distinguishing 9-ending prices into 'just-below prices' and 'just-above prices' (see Table S3) to investigate the image effect irrespective of first digits changing and the absolute price levels. We also exploratively controlled for learning effects by randomizing task order.

Results

Experiment 1a

We closely adhered to the 'Improved Scoring Algorithm' for data analysis (Greenwald et al. 2003). This incorporates results from practice trials, includes latency penalties for incorrect responses, and uses a metric that is calibrated by each respondent's latency variability. Key indices are the difference between the latencies of the congruent vs. incongruent blocks. The resulting '*D-score*' indicates the effect size.

RTs in congruent blocks (M=790.89 ms, SD=130.11) were shorter than in incongruent blocks (M=931.23 ms, SD=243.37), with the IAT *D-score* indicating a moderate effect size, D=0.37, SD=0.52, $t(48)$=4.95, p<0.001 (see Fig. 1 and SOM for trial-level results). In line with H1, this yields empirical support for an implicit link of 9-endings and an improved price image. All effects persisted in explorative robustness analyses controlling for learning effects, price levels, and price thresholds (see SOM).

Experiment 1b

For the GNAT task, we considered participants' individual hit and false alarm (FA) rates of congruent and incongruent blocks, and the associated value of 'd-prime' (d') for discriminating between signal and noise (Nosek and Banaji 2001).

In line with H2, results from paired t-tests showed that hit rates in congruent blocks (M=93.45%, SD=6.12) were higher than in incongruent blocks (M=91.85%, SD=6.96), $t(48)$=2.310, p=0.025, d=0.33. FA rates were descriptively smaller in congruent (M=7.78%, SD=6.06) than in incongruent blocks (M=9.35%, SD=7.38) despite being marginally significant, $t(48)$=−1.756, p=0.086 (Fig. 2). Thus, signals and noises were better distinguishable in congruent (d'=3.21, SD=0.74) than in incongruent blocks (d'=3.03, SD=0.87), $t(48)$=2.138, p=0.038, d=0.31. All effects persisted in explorative robustness analyses (see SOM).

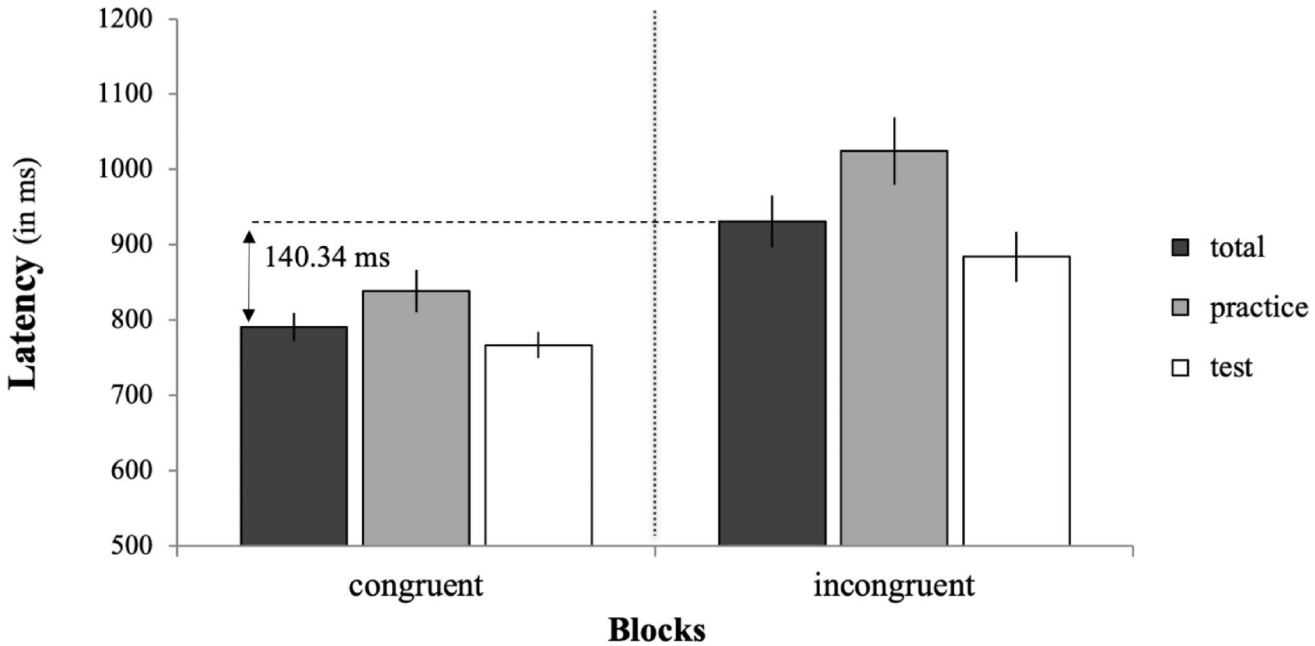


Fig. 1 *Results from Experiment 1a (overall).* Mean RTs in congruent blocks (M=790.89 ms, SD=130.11) were shorter than in incongruent blocks (M=931.23 ms, SD=243.37), D=0.37, SD=0.52, $t(48)$=4.95, p<.001

Discussion

The results show an implicit association between price endings and price-image perceptions in both Experiment 1a and 1b. Exploratory moderation analyses further imply that the price-image effect emerges irrespective of absolute prices or price thresholds.

Experiment 2: 9-endings vs. 0-endings and quality-image associations

Experiment 2a and 2b sought to establish empirical evidence for the cognitive links between price endlings and quality-image perceptions via the same implicit measurement methods (IAT in Exp.2a; GNAT in Exp.2b).

Method, sample, and procedure

The methodological procedure in Experiments 2a and 2b was identical to Experiments 1a and 1b, except that price-image perceptions were replaced by quality-image perceptions (see SOM for details). We recruited 50 participants with one participant having to be excluded due to a software failure (M_{age} = 23.55, SD_{age} = 3.68; 64% females). Participants were randomly assigned either to group 1 (congruent first, n = 24), or group 2 (incongruent first, n = 25).

Dependent variables and moderators

As in Experiment 1a and 1b, RTs (IAT), as well as hit and FA rates (GNAT) were recorded. We again exploratively controlled for price level, price thresholds, and potential learning effects as moderating variables.

Results

Experiment 2a

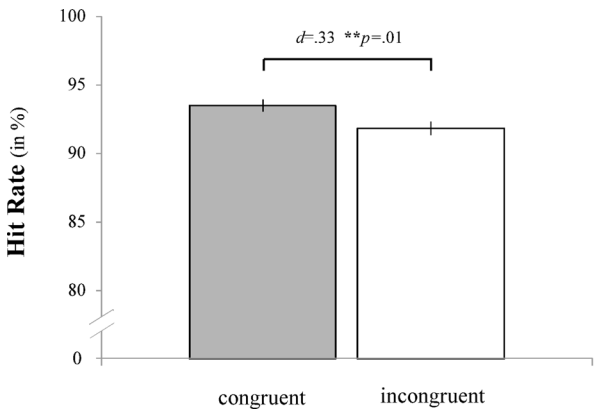
Mean latencies were significantly shorter in congruent (M = 693.17 ms, SD = 109.20) than in incongruent blocks (M = 937.56 ms; SD = 286.14), with the IAT *D-score* indicating a large effect size, D = 0.67, SD = 0.55, $t(48)$ = 8.55, $p < 0.001$. Confirming H3, this lends credence to an implicit link between 9-endings and reduced quality (see Fig. 3 and SOM for trial-level results). The effect persisted in exploratory robustness analyses when controlling for order effects, price thresholds, and price levels (see SOM).

Experiment 2b

In line with H4, the hit rate was significantly higher in congruent blocks (M = 92.94%, SD = 5.87) than in incongruent blocks (M = 86.22%, SD = 14.48), $t(48)$ = 4.089, $p < 0.001$, d = 0.58. Complementarily, the FA rate in incongruent blocks was higher (M = 11.65%, SD = 8.57) than in congruent blocks (M = 8.04%, SD = 6.55), $t(48)$ = 2.811, $p < 0.01$, d = 0.40 (Fig. 4). Accordingly, d' was higher for congruent (M = 3.16, SD = 0.82) than for incongruent blocks (M = 2.52, SD = 0.84), $t(48)$ = 5.949, $p < 0.001$, d = 0.85. All effects again persisted in exploratory robustness analyses (see SOM).

Discussion

The results show evidence for an implicit association between price endings and quality-image perceptions, even slightly stronger than for price image (Exp.1). The strength of this quality image effect becomes evident by (a) large IAT *D-scores*, (b) the large difference of *d'* in congruent and incongruent blocks in the GNAT task, and (c) the pattern's robustness when controlling for potential learning effects.



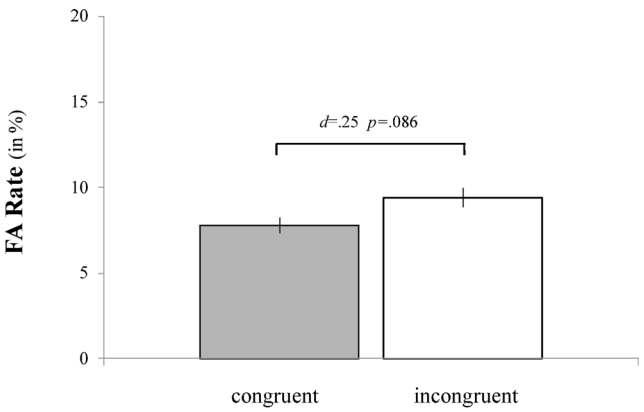


Fig. 2 *Results from Experiment 1b.* Hit rate in congruent blocks (M = 93.45%, SD = 6.12) was higher than in incongruent blocks (M = 91.85%, SD = 6.96), $t(48)$ = 2.310, p = .01 d = 0.33. FA rate only differed descriptively between congruent (M = 7.78%, SD = 6.06) and incongruent blocks (M = 9.35%, SD = 7.38), $t(48)$ = −1.756, p = .086, d = 0.25

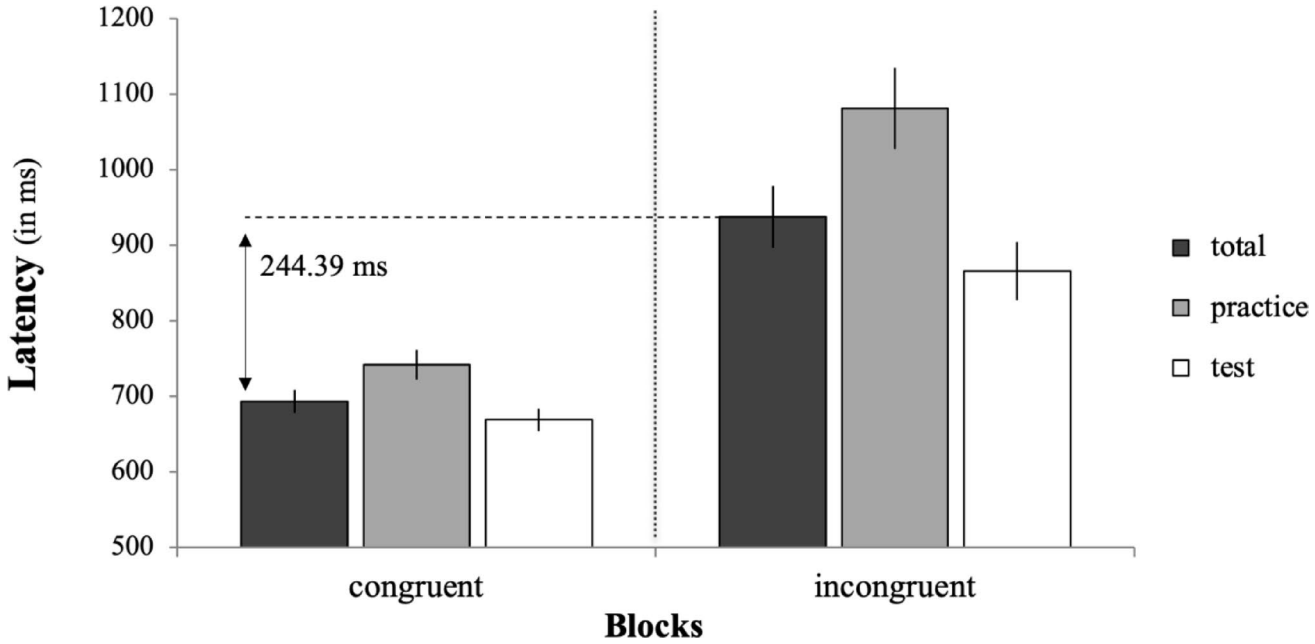


Fig. 3 *Results from Experiment 2a (overall).* Mean RTs in congruent blocks ($M = 693.17$ ms, $SD = 109.20$) were shorter than in incongruent blocks ($M = 937.56$ ms, $SD = 286.14$), $D = 0.67$, $SD = 0.55$, $t(48) = 8.55$, $p < .001$

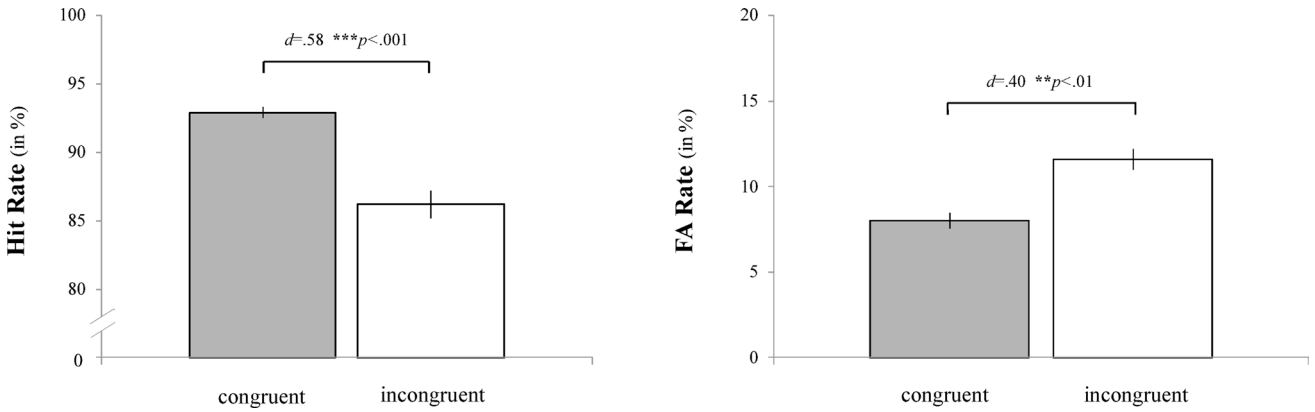


Fig. 4 *GNAT results from Experiment 2b.* Hit rate in congruent blocks ($M = 92.94\%$, $SD = 5.87$) was higher than in incongruent blocks ($M = 86.22\%$, $SD = 14.48$), $t(48) = 4.089$, $p < .001$, $d = .58$. FA rate in incongruent blocks ($M = 11.65\%$, $SD = 8.57$) was higher than in congruent blocks ($M = 8.04\%$, $SD = 6.55$), $t(48) = 2.81$, $p < .01$, $d = .40$

Exploratory moderation analyses further imply that the quality-image effect emerges irrespective of absolute price levels or price thresholds.

General discussion

Across four experiments, we establish evidence for the underlying cognitive links between 9- vs. 0-ending prices and price image (Exp.1a–b) as well as quality image (Exp.2a–b). To our best knowledge, we are the first to capture these cognitive links via implicit measures. Our results offer important impetus for scientific theorizing and organizational practice.

Theoretical implications

This study's theoretical contribution is threefold: First, we find strong implicit evidence for cognitive links between price endings and image perceptions. This is especially remarkable given that aggregated results from prior studies with explicit measurements did not display a quality-image effect (Troll et al. 2023). Our findings thus indicate that, indeed, the explicit measurement of implicit associations might come with important flaws and that implicit associations of 9-ending prices and quality detriments exist when measured implicitly. Second, extending prior work, the study design enabled us to focus on price-ending stimuli without risking confounding impacts of consumers' product

preferences or product categories. Third, by controlling for price levels and price thresholds, we captured robust image effects irrespective of absolute price levels and changing first digits. Our design and analyses thus help to rule out alternative processes beyond semantic associations (e.g., left-digit effects and processing fluency; Thomas and Morwitz 2005; Wieseke et al. 2016).

Results from Experiment 1a-b captured an implicit association between price endings and consumers' price-image perceptions. We found a medium-sized moderation effect of short-term learning: Learning effects mitigated the association of 9-ending prices and improved price perceptions, suggesting an overall weaker cognitive link. Moreover, Experiment 1b demonstrated that price level is an influential predictor for bargain perceptions, with less false alarms for high than for low prices. These less pronounced effects may be attributed to habituation mechanisms given that 9-endings have been used for decades in low-price segments and may no longer be considered a particularly strong signal for a 'bargain' deal (Holdershaw et al. 1997).

Results from Experiment 2a–b showed a strong association between 9-ending (vs. 0-ending) prices and a low(er) product quality. Particularly noteworthy is the robustness against learning effects. Moderation analyses indicated the effect's independency of changing first digits (€19.99 vs. €20.00) or not (€21.99 vs. €22.00) and absolute price levels (also indicators for quality; Völckner and Hofmann 2007). Our findings imply that 9- vs. 0-ending prices lead to an implicit cognitive activation of low-quality schemes irrespective of other price frames. Our implicit findings thus come with important implications for marketers: When deciding for 9-ending prices, one should consider that negative effects on consumers' low-quality perceptions may overcome positive effects on price image (e.g., for premium segments).

It is noteworthy that implicit associations of price endings with quality were consistently stronger than associations with price image; price endings are thus rather seen as an implicit cue for quality than for price value. Different factors might explain this asymmetry: For example, quality might be typically encoded at a relatively global and semantic level (e.g., "premium" vs. "cheap") and tightly bound to stable brand and category schemata, facilitating strong and readily activated associative links. By contrast, price image perceptions might be more context-dependent and situational, with the ubiquitous use of 9-ending prices having diluted a sharp signal for a "good deal" while simultaneously reinforcing subtle associations with lower-tier and mass-market positioning (i.e., lower quality).

Practical implications

Our results have direct, actionable consequences for retail and pricing management. Most importantly, 9-ending prices implicitly cue "better deal" and "lower quality," with the latter association being stronger and robust to price level or first-digit changes. Practitioners should therefore treat 9-endings not as a universal best practice but as a situational lever to be deployed where signaling good value outweighs potential quality dilution.

9-ending prices might be helpful to drive traffic and conversion in short-lived promotions and price-competitive marketplaces. Revenue and yield managers can exploit 9-endings for last-minute inventory clearance (e.g., unsold seats) when the quality signal is already anchored by context (e.g., time scarcity) rather than by the price ending. Furthermore, private-label products (Chen and Lim 2024), entry models, basket-builders (e.g., add-ons, accessories; see Szymanski and Darrow 2021), and mature products at the end of their life cycle might benefit from an implicit value cue in cases where quality penalties are commercially acceptable. Conversely, 0-ending prices are better suited for premium ranges, flagship products, high-quality launches, and services where perceived reliability, craftsmanship, or longevity drive willingness-to-pay. In these cases, 0-ending prices will signal implicit quality compared to 9-ending prices. As an additional strategy, using 'just-below round prices' without ending on a 9 (e.g., $49.00) might capture first-digit level advantages without activating low-quality schemes.

With regards to dynamic pricing (e.g., Sengupta et al. 2024; Qi et al. 2024), organizational actors in pricing and revenue management might strategically introduce rounding rules by segment and tier (e.g., defaulting to 0-ending prices for premium products). They might further prevent dynamic engines from using 9-ending prices on premium products through algorithmic penalty terms. In situations in which commercial constraints require 9-ending prices on higher-end offers (e.g., competitor matching, price grid parity), marketers should opt for alternative quality cues to neutralize the implicit quality drag of 9-ending prices (e.g., through warranties, certifications, or visual designs that emphasize quality). Additionally, when 9-ending prices are introduced, pricing analysts should complement A/B tests to track conversion rates and margins with additional quality-sensitive indicators to capture potential quality perception detriments (e.g., return rates, complaint incidence).

In sum, pricing management departments should treat price endings as a brand signal as much as a numeric tactic. While 9-ending prices can be deliberately deployed to signal good value-for-money, 0-ending prices will appeal more to consumers in premium segments that look for quality and

reliability. That being said, pricing departments should also consider category norms, retailer conventions, and historical price grids when setting price endings to avoid unwanted contrast effects.

Limitations

As with any research, our experiments are not void of limitations that suggest avenues for future research. First, although this paper contributes to theory and the conceptualization of image effects, real-life situations present price stimuli within a shopping context. Additional factors that impact customers' quality and value perception should thus be included in future research. For example, price endings of adjacent products might shape price perception, individual differences in customers (e.g., numeracy, price knowledge, shopping experience) might shape their implicit associations, and implicit associations might also differ as a function of culture and price formatting norms (e.g., results might be different from the implicit associations in our German sample). Second, future research should further explore the interaction between image and level effects. 'Just-below round prices' (e.g., $49.00) may elicit favorable value perceptions through the first digit level effect while avoiding low(er) quality perceptions caused by 9-ending cent digits. Finally, implicit measures also come with some limitations. The IAT is sometimes questioned regarding its predictive power for real-world behavior (Schimmack 2021). Future studies should therefore apply mixed-method designs to generate holistic evidence for price- and quality-image effects (Troll et al. 2023).

Conclusion

In conclusion, the present study aimed to extend prior research on 9-ending vs. 0-ending price associations using implicit measurement methods. We establish implicit evidence for price-image (Exp. 1a–b) and quality-image effects (Exp.2a–b) that are stable and robust across multiple moderation analyses. In contrast to a recent meta-analysis of explicit-measure effects that might fail to grasp implicit associations (Troll et al. 2023), our results indicate a *stronger* cognitive link between price endings and consumers' perceptions of product quality than between price endings and consumers' price-image perceptions. Marketers should thus carefully consider the quality perception impairments of 9-ending prices and weigh them against the benefits of increased price image perceptions and demand. Our results highlight the advantages of implicit measurements and pave the way for further implicit investigations in pricing research.

Supplementary Information The online version contains supplementary material available at https://doi.org/10.1057/s41272-026-00578-5.

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Author contributions L.S. and H.M.P. contributed equally to this work. All authors conceptualized the research idea together. L.S. administered the experiments and analyzed the data. H.M.P. and L.S. wrote the original manuscript. M.S. and D.D.L. provided the resources for conducting the studies. All authors edited and revised the manuscript together.

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Data availability We preregistered all hypotheses, experiments, and analyses on OSF and uploaded all experimental data (https://osf.io/b5avx/?view_only=b0beda82136643f2baad248ffc47e909).

Declarations

Competing Interests The authors declare no competing interests.

Consent to participate All participants gave their informed consent to participate and could revoke their consent and terminate the study procedure at all times.

Ethics approval All experiments were approved by the Faculty Research Commission of the School of Management & Technology at Leuphana University.

Human and animal rights All experiments were conducted in accordance with the APA Ethical Principles (American Psychological Association 2016).

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