Pleasant Ambient Scents: A Meta-Analysis of Customer Responses and Situational Contingencies

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**Web Appendix**

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*Theme 1: List of Included Samples*

| Table W1List of Included Samples |
| --- |
| Samplea |   |   | Dependent variablesb |   | Situational contingency variablesc |   | Effect sized |
| Pleasant ambient scent(s) |   | Mood | Evalu-ations | Mem-ories | Inten-tions | Behav-iors |  | Perc. conc. | Service exchange | Multi-store e. | Music (IC, CO) | Fictitious setting | Imagined offering | Mean age | Prop. fem. |   | n | Min | Max |
| Adams & Doucé (2016) | Coffee, Apple Pie |   | VA | PE, EQ, SAT |  | PUI, IR |  |  | na | Non-service | Multi store | .00, .00 | Actual | Experi-enced | 37.1 |   | .84 |   | 120 | .06 | .45 |
| Bambauer-Sachse (2012) | Lavender |   | VA | EQ |  |  |  |  | na | Non-service | Single store | .00, .00 | Actual | Experi-enced | 35.1 | \* | .83 |   | 112 | .38 | .38 |
| Baron & Thomley (1994) | Lemon, Floral complex |   | AC, VA |  |  |  | LI |  | na | Non-service | Single store | .00, .00 | Fictitious | Experi-enced | na | \* | .26 |   | 96 | .00 | .57 |
| Baron (1997) | Coffee, Bakery |   | VA |  |  |  | LI |  | .64 | Non-service | Multi store | .00, .00 | Actual | Experi-enced | na |   | na |   | 116 | .17 | .32 |
| Bonini et al. (2015) | Lemon, Pine |   | AC, VA |  |  | PUI |  |  | .11 | Non-service | Single store | .00, .00 | Fictitious | Imagined | na | \* | .60 |   | 188 | -.39 | .40 |
| Bosmans (2006 - Study 1) | Citrus complex, Forest |   |  | PE |  |  |  |  | na | Non-service | Single store | .00, .00 | Fictitious | Imagined | na | \* | na |   | 80 | .00 | .41 |
| Bosmans (2006 - Study 2) | Citrus complex, Forest |   |  | PE |  |  |  |  | na | Non-service | Single store | .00, .00 | Fictitious | Imagined | na | \* | na |   | 118 | -.16 | .35 |
| Bosmans (2006 - Study 3) | Banana |   |  | PE |  |  |  |  | na | Non-service | Single store | .00, .00 | Fictitious | Experi-enced | na | \* | na |   | 75 | -.15 | .34 |
| Bouzaabia (2014) | Ylang Ylang |   | AC, VA | PE, EQ |  | PUI | EX, LI |  | na | Non-service | Single store | .00, .00 | Actual | Experi-enced | na |   | na |   | 400 | .12 | .20 |
| Chebat & Michon (2003) | Citrus complex |   | AC, VA | PE, EQ |  |  | EX |  | na | Non-service | Multi store | .00, .00 | Actual | Experi-enced | 42.4 |   | .57 |   | 592 | -.02 | .17 |
| Chebat, Morrin, & Chebat (2009) | Citrus complex |   |  |  |  |  | EX |  | na | Non-service | Multi store | .00, .00 | Actual | Experi-enced | na |   | na |   | 535 | -.05 | .14 |
| de Wijk & Zijlstra (2012) | Citrus complex, Vanilla |   | AC, VA |  |  |  |  |  | .27 | Non-service | Single store | .00, .00 | Fictitious | Experi-enced | 41.6 |   | .59 |   | 22 | -.20 | .19 |
| Doucé & Janssens (2013) | Fresh Office |   | AC, VA | PE, EQ |  | PUI |  |  | na | Non-service | Single store | .00, .00 | Actual | Experi-enced | na |   | .90 |   | 194 | .08 | .22 |
| Doucé et al. (2013) | Chocolate |   |  |  |  |  | LI |  | na | Non-service | Single store | 1.00, .00 | Actual | Experi-enced | na | \* | .69 |   | 201 | .14 | .24 |
| Doucé et al. (2014) | Black Cherry, Lemon with tangerine |   | VA | PE, EQ, SAT |  |  |  |  | na | Non-service | Single store | .00, .00 | Fictitious | Imagined | 19.3 | \* | .49 |   | 198 | -.42 | .23 |
| Doucé et al. (2016) | Hendrik (perfume), Dreams (perfume) |   |  | PE, EQ, SAT |  |  |  |  | na | Non-service | Single store | .00, .00 | Actual | Experi-enced | na |   | .50 |   | 182 | .00 | .22 |
| Errajaa, Lehohérel, & Daucé (2018) | Honey, Wood |   | AC, VA | EQ |  |  |  |  | na | Service | Single store | .00, 1.00 | Actual | Experi-enced | 27.7 |   | .42 |   | 303 | -.06 | .22 |
| Fiore, Yah, & Yoh (2000) | Lily of the Valley, Sea Mist |   | AC, VA | PE |  | PUI |  |  | na | Non-service | Single store | .00, .00 | Fictitious | Experi-enced | 22.5 | \* | 1.00 |   | 109 | -.17 | .22 |
| Gault (2007) | Tangerine, Vanilla |   | AC, VA | EQ |  |  |  |  | na | Non-service | Single store | .00, .00 | Fictitious | Imagined | na | \* | na |   | 689 | .12 | .22 |
| Guéguen & Petr (2006) | Lemon, Lavender |   |  |  |  |  | EX, LI |  | na | Service | Single store | .00, .00 | Actual | Experi-enced | na |   | na |   | 88 | -.06 | .75 |
| Haberland (2010) | Nutmeg with patchouli and amber, Tangerine with sandal and cedar wood, Bergamot, Viola with almond and lemon, Lily of the Valley, Rose with jasmine |   |  |  |  |  | EX |  | na | Non-service | Single store | .00, .00 | Actual | Experi-enced | na |   | na |   | 274 | .01 | .25 |
| Haehner et al. (2017) | Citrus complex, Grapefruit, Rose |   | AC, VA |  |  |  |  |  | na | Non-service | Single store | .00, .00 | Fictitious | Experi-enced | 23.6 | \* | .50 |   | 200 | .03 | .20 |
| Herrmann et al. (2013 - Exp 1) | Orange, Orange-basil with green tea |   |  |  |  |  | EX |  | na | Non-service | Single store | .00, .00 | Actual | Experi-enced | na |   | na |   | 403 | -.03 | .10 |
| Herrmann et al. (2013 - Exp 3) | Orange, Orange-basil with green tea |   |  |  |  | PUI | EX |  | na | Non-service | Single store | .00, .00 | Fictitious | Imagined | na | \* | na |   | 402 | -.02 | .19 |
| Jacob, Stefan, & Guéguen (2014) | Lavender |   |  |  |  |  | EX |  | na | Service | Single store | .00, .00 | Actual | Experi-enced | na |   | na |   | 100 | .24 | .42 |
| Kechagia & Drichoutis (2017) | Citrus complex |   |  |  |  | PUI |  |  | .49 | Non-service | Single store | .00, .00 | Fictitious | Imagined | na | \* | na |   | 160 | .09 | .38 |
| Kim & Shin (2016) | Citrus with mint, Citrus with vanilla |   |  | SAT |  |  |  |  | na | Non-service | Multi store | .00, .00 | Fictitious | Imagined | 24.3 | \* | na |   | 90 | .16 | .70 |
| Kim & Shin (2017) | Citrus with mint, Citrus with vanilla |   | AC, VA |  |  |  |  |  | na | Non-service | Multi store | .00, .00 | Fictitious | Imagined | na | \* | na |   | 60 | -.12 | .83 |
| Knasko (1993 - Female sample) | Lemon, Ylang Ylang |   | AC, VA, CO |  |  |  |  |  | na | Non-service | Single store | .00, .00 | Fictitious | Experi-enced | 23.0 | \* | 1.00 |   | 45 | -.16 | .16 |
| Knasko (1993 - Male sample) | Lemon, Ylang Ylang |   | AC, VA, CO |  |  |  |  |  | na | Non-service | Single store | .00, .00 | Fictitious | Experi-enced | 23.0 | \* | .00 |   | 45 | -.08 | .17 |
| Knasko (1995) | Baby Powder, Chocolate |   | AC, VA | EQ |  |  |  |  | .80 | Non-service | Single store | .00, .00 | Fictitious | Imagined | 26.5 | \* | na |   | 90 | .10 | .54 |
| Krishna, Lwin, & Morrin (2010 - Study 2) | Orange Blossom |   | AC, VA | PE, EQ | REC |  |  |  | .27 | Non-service | Single store | .00, .00 | Fictitious | Experi-enced | na | \* | na |   | 143 | -.12 | .00 |
| Leenders, Smidts, & Haji (2019) | Melon |   |  | PE, EQ, SAT | TE |  | EX, LI |  | .50, .70 | Non-service | Multi store | .00, .00 | Actual | Experi-enced | na |   | na |   | 302 | -.09 | .17 |
| Lehrner et al. (2000 - Female sample) | Orange |   | AC, VA |  |  |  |  |  | .47 | Service | Single store | .00, .00 | Actual | Experi-enced | na |   | 1.00 |   | 40 | .14 | .28 |
| Lehrner et al. (2000 - Male sample) | Orange |   | AC, VA |  |  |  |  |  | .39 | Service | Single store | .00, .00 | Actual | Experi-enced | na |   | .00 |   | 32 | -.18 | .01 |
| Lehrner et al. (2005) | Orange, Lavender |   | AC, VA |  |  |  |  |  | na | Service | Single store | .00, .00 | Actual | Experi-enced | 40.9 |   | .49 |   | 149 | .14 | .34 |
| Ludvigson & Rottman (1989) | Lavender, Cloves |   | VA |  |  | PUI |  |  | na | Non-service | Single store | .00, .00 | Fictitious | Experi-enced | na | \* | .71 |   | 72 | -.18 | .09 |
| Lwin & Morrin (2012) | Rose with sandalwood |   |  | PE | REC | PUI |  |  | .96 | Service | Single store | .00, .00 | Fictitious | Imagined | na | \* | 1.00 |   | 100 | .17 | .80 |
| Madzharov, Block, & Morrin (2015 - Study 3) | Cinnamon, Peppermint |   |  |  |  |  | EX |  | na | Non-service | Single store | .00, .00 | Actual | Experi-enced | na |   | na |   | 246 | -.08 | .17 |
| Marchlewska, Czerniawska, & Oleksiak (2016) | Chocolate |   | VA |  |  |  | LI |  | .81 | Non-service | Single store | .00, .00 | Fictitious | Experi-enced | 21.3 | \* | .70 |   | 77 | -.12 | .07 |
| Mattila & Wirtz (2001) | Lavender, Grapefruit |   | AC, VA | EQ, SAT |  |  | EX |  | na | Non-service | Single store | .33, .33 | Actual | Experi-enced | na |   | .75 |   | 247 | -.29 | .54 |
| McDonnell (2007) | Lavender with sagebrush and nutmeg |   | VA | PE |  |  |  |  | na | Service | Single store | 1.00, .00 | Actual | Experi-enced | 33.7 | \* | .45 |   | 607 | .00 | .15 |
| McGrath, Aronow, & Shotwell (2016) | Chocolate |   |  |  |  |  | EX |  | .80 | Non-service | Multi store | .00, .00 | Actual | Experi-enced | na |   | na |   | 651 | -.02 | .03 |
| Michon & Chebat (2007) | Citrus complex |   |  |  |  |  | EX |  | na | Non-service | Multi store | .50, .50 | Actual | Experi-enced | 41.0 |   | .62 |   | 591 | -.24 | .09 |
| Michon, Chebat, & Turley (2005) | Lavender, Citrus complex |   | VA | PE, EQ |  |  |  |  | na | Non-service | Multi store | .00, .00 | Actual | Experi-enced | na |   | na |   | 279 | -.16 | .34 |
| Mitchell, Kahn, & Knasko (1995 - Exp 1) | Chocolate, Floral complex |   |  |  | REC | PUI |  |  | .90e | Non-service | Single store | .00, .00 | Fictitious | Imagined | na | \* | .49 |   | 77 | .00 | .45 |
| Mitchell, Kahn, & Knasko (1995 - Exp 2) | Chocolate, Floral complex |   | AC, VA |  |  |  |  |  | .90e | Non-service | Single store | .00, .00 | Fictitious | Imagined | na |   | na |   | 78 | .00 | .00 |
| Moore (2013) | Cinnabon rolls |   |  | PE |  | PUI, IR |  |  | na | Non-service | Single store | .00, .00 | Fictitious | Experi-enced | na | \* | .72 |   | 137 | .00 | .29 |
| Moore (2014) | Cinnabon rolls |   |  | PE |  | PUI, IR |  |  | na | Non-service | Single store | .00, .00 | Fictitious | Experi-enced | na | \* | .46 |   | 129 | .14 | .32 |
| Morrin & Chebat (2005) | Citrus complex |   | AC, VA | PE, EQ, SAT |  |  | EX |  | na | Non-service | Multi store | .50, .00 | Actual | Experi-enced | 41.1 |   | .62 |   | 375 | -.61 | .10 |
| Morrin & Ratneshwar (2000) | Geranium |   | AC, VA | PE | REC |  |  |  | .31 | Non-service | Single store | .00, .00 | Fictitious | Imagined | na | \* | na |   | 50 | .00 | .46 |
| Morrin & Ratneshwar (2003 - Exp 1) | Geranium, Cloves |   | AC, VA | PE | REC |  |  |  | .50 | Non-service | Single store | .00, .00 | Fictitious | Imagined | na | \* | na |   | 90 | .00 | .51 |
| Morrin & Ratneshwar (2003 - Exp 2) | Geranium |   | AC, VA | PE | REC |  |  |  | .17 | Non-service | Single store | .00, .00 | Fictitious | Imagined | na | \* | na |   | 60 | .00 | .51 |
| Morrin, Chebat, & Chebat (2010) | Geranium |   | AC, VA | EQ | TE |  |  |  | na | Non-service | Multi store | .50, .00 | Fictitious | Imagined | 22.5 | \* | .54 |   | 160 | .00 | .23 |
| Morrison et al. (2011) | Vanilla |   | AC, VA | SAT |  |  | EX, LI |  | 1.00 | Non-service | Single store | 1.00, .00 | Actual | Experi-enced | 21.5 |   | 1.00 |   | 258 | -.12 | .34 |
| Mors et al. (2018) | Bread, Cucumber |   | VA |  |  |  |  |  | .12 | Non-service | Single store | .00, .00 | Actual | Experi-enced | 32 |   | .87 |   | 37 | -.09 | .14 |
| N. & Menon (2018) | Vanilla, Rose-Maroc |   | AC, VA | PE, EQ |  |  | EX |  | na | Non-service | Single store | .00, .00 | Actual | Experi-enced | na |   | .50 |   | 182 | .00 | .15 |
| Naja et al. (2014) | Lavender, Lemon |   | VA | PE |  |  |  |  | na | Service | Single store | .00, .00 | Actual | Experi-enced | na |   | .41 |   | 78 | .00 | .00 |
| Parsons (2009) | Coffee, Soap Powder, Perfume |   |  | EQ |  | PUI |  |  | na | Non-service | Single store | .00, .00 | Fictitious | Imagined | na |   | na |   | 180 | -.45 | .38 |
| Poon & Grohmann (2014) | Seashore, Firewood |   | AC, VA, CO |  |  |  |  |  | .77 | Non-service | Single store | .00, .00 | Fictitious | Experi-enced | 21.0 | \* | .54 |   | 197 | .00 | .00 |
| Schifferstein, Talke, & Oudshoorn (2011) | Orange, Seawater, Peppermint |   | AC, VA, CO | PE |  | PUI | EX |  | na | Service | Single store | .00, 1.00 | Actual | Experi-enced | 22.1 |   | .50 |   | 849 | -.01 | .25 |
| Spangenberg, Crowley, & Henderson (1996 - Main Study) | Lavender, Ginger, Spearmint, Orange |   |  | PE, EQ, SAT | TE | PUI | LI |  | na | Non-service | Single store | .00, .00 | Fictitious | Experi-enced | na | \* | .46 |   | 298 | -.11 | .35 |
| Spangenberg, Grohmann, & Sprott (2005) | Christmas scent |   | AC, VA, CO | PE, EQ, SAT |  | PUI |  |  | na | Non-service | Multi store | .50, .50 | Fictitious | Imagined | 21.4 | \* | .51 |   | 130 | -.43 | .47 |
| Teller & Dennis (2012) | Citrus complex |   | AC, VA | PE, EQ | TE |  | EX, LI |  | na | Non-service | Multi store | .00, .00 | Actual | Experi-enced | 41.4 |   | .62 |   | 312 | .00 | .23 |
| Vega-Gómez, López, & Buenadicha (2017) | Vanilla |   |  | PE, EQ | TE | PUI, IR |  |  | na | Service | Single store | .00, .00 | Actual | Experi-enced | 21 | \* | .62 |   | 100 | -.01 | .58 |
| Veríssimo & Pereira (2013) | Cola-Lemon |   |  | PE, EQ, SAT |  | PUI | EX |  | na | Service | Single store | .00, .00 | Actual | Experi-enced | 30 |   | .52 |   | 407 | -.13 | .27 |
| Vilaplana & Yamanaka (2015) | Orange, Lavender |   |  | PE, EQ | TE |  |  |  | na | Non-service | Single store | .00, .00 | Fictitious | Experi-enced | na | \* | na |   | 63 | -.12 | .44 |
| Vinitzky & Mazursky (2011) | Chocolate |   |  |  |  |  | EX, LI |  | .90e | Non-service | Single store | .00, .00 | Fictitious | Imagined | na | \* | .30 |   | 57 | .18 | .21 |
| Ward, Davies, & Kooijman (2007) | Apple Pie with Cinnamon, Clean Washing |   |  | EQ |  |  | LI |  | na | Non-service | Multi store | .00, .00 | Actual | Experi-enced | na | \* | na |   | 429 | -.14 | .14 |
| Yuan (2017 - Study 2) | Shampoo |   |  |  | REC |  |  |  | na | Non-service | Single store | .00, .00 | Actual | Experi-enced | na |   | na |   | 809 | .11 | .11 |
| Zemke & Shoemaker (2007) | Geranium |   |  |  |  |  | LI |  | na | Non-service | Single store | .00, .00 | Fictitious | Experi-enced | 53.8 |   | .55 |   | 77 | .00 | .26 |
| aKnasko (1993) and Lehrner et al. (2000) allow the use of both gender populations as separate samples, providing a more nuanced reflection for testing gender effects.bAC, activation; VA, valence; CO, control; PE, product evaluations; EQ, environmental quality; SAT, shopping satisfaction; REC, recall; TE, time elusiveness; PUI, purchase intentions; IR, intention to recommend; EX, expenditures; LI, lingering.csample-level (Level 2) variables; perc.conc., perceived concentration; fem. share, female share; music (IC, CO), proportion of effect sizes when incongruent (first number) and when congruent (second number) is present (music absence is indicated when both values are zero).dRaw effect sizes; n, sample sizeePre-test indicated that respondents generally detected the ambient scent. We therefore approximated perceived concentration with .90.Notes: Student samples are indicated by an asterisk (\*), otherwise the sampling frame used a general consumer sample. |

*Theme 2: Statistical Information on Effect Size Integration*

 The integration of effect sizes proceeded in three steps, which are illustrated for the relationship between ambient scent and mood activation. First, we corrected the effect size r*xy* between ambient scent and mood activation in sample *i* for attenuation from random measurement error by (Hunter and Schmidt 2004, p. 95):

|  |
| --- |
| $r\_{c, i}=\frac{r\_{xy,i}}{ \sqrt{r\_{yy,i}}} $, |

 where rc,i is the reliability-corrected effect size estimate and ryy,i the measurement reliability of mood activation in sample i. Second, a weight factor wi was applied if in sample i multiple effect sizes between ambient scent and mood activation were available. Following procedures described by Eisend (2014), this weight factor is given by:

|  |
| --- |
| $w\_{i}=\frac{1}{O\_{i}} $, |

 where Oi is the number of observed effect sizes between ambient scent and mood activation in sample i. Third, we calculated the sample-size weighted mean, referred to as r, of all available effect size estimates for the relationship between ambient scent and mood activation by (Eisend 2014; Hunter and Schmidt 2004, p. 81):

|  |
| --- |
| $r=\frac{\sum\_{i}^{}N\_{i}×w\_{i}×r\_{c,i}}{\sum\_{i}^{}N\_{i}} $, |

 where Ni is the number of respondents in sample i. The resulting rs for the effect of ambient scent on customer responses are .102 for mood activation, .085 for mood valence, .042 for mood control, .119 for product evaluations, .119 for environmental quality, .128 for shopping satisfaction, .144 for recall, .101 for time elusiveness, .145 for purchase intentions, .193 for intention to recommend, .024 for expenditures, and .081 for lingering.

*Theme 3: Statistical Information on Hierarchical Linear Modelling*

 This theme provides statistical information on the estimated hierarchical linear models. Their formulaic representation is presented next. After that, we discuss the technical details for providing an adjusted value for r, referred to as ra, and for assessing sensitivity of ra for the effect of ambient scent on expenditures. In the final part, we explain how the effect sizes, which were used for testing the effects of perceived concentration, were corrected for the influence of the situational contingencies, sample affiliation, and measured customer response.

*Formulaic Representation of the Models*

 Effect sizes that belong to the same sample may share variance. Hierarchical linear modeling partitions this variance between effect size (Level 1) and sample (Level 2) level variables. For this purpose, a hierarchical linear model comprises two models. The Level 1 model specifies the relationships at the effect size level and is represented by the following equation (i.e., Model 3 from Table 5 in the article):

ESij = β0j + β1jCONij + β2jDIMij + β3jPLEij + β4jFAMij + β5jACTij + β6jSTCij + β7jPLExCONij + β8jPLExDIMij + β9jPLExFAMij + β10jPLExACTij + ∑kβkDUMMYkij

 ES represents the outcome measure, which is the individual reliability-corrected effect size estimate i in sample j, β0j is the intercept, β1j … β6j denote the slopes for the effect size-level variables congruency (CON), dimensionality (DIM), pleasantness (PLE), familiarity (FAM), activation (ACT), and statistical control (STC). Further, β7j … β10j denote the slopes of the interaction effects. Level 1 variables and interaction terms were group mean centered. Group-mean centering provides the appropriate partitioning of within and between sample variance when, as in our case, different characteristics across Level 1 and Level 2 data points are analyzed (Hofmann and Gavin 1998). Finally, βkj denote the slopes for the 11 dummy variables (DUMMY) that controlled for the type of the customer response. They were not centered as variance partitioning is not desired for control factors (Hofmann and Gavin 1998).

 The Level 2 model uses the intercept β0j from the Level 1 model as dependent variable to construct the hierarchical data structure and to incorporate the Level 2 variables. The equations are as follows (i.e., Model 3 from Table 5 in the article):

β0j = γ00 + γ01SEEj + γ02MUEj + γ03INMj + γ04COMj + γ05PRFj + γ06MEAj + γ07FISj + γ08IMOj + γ09PRFxFAMj + γ010FISxCONj + γ011FISxFAMj + γ012IMOxCONj + γ013IMOxFAMj + u0j,

β1j = γ10,

…

βkj = γk0.

 The parameter u0j signifies that the Level 1 intercept varies across studies, which is the mathematical basis for modeling that the effect size estimates originate from different samples. The parameters γ01 … γ08 denote the slopes of the sample-level variables service exchange (SEE), multistore environment (MUE), incongruent music (INM), congruent music (COM) proportion of females (PRF), mean age (MEA), fictitious setting (FIS), and imagined offering (IMO). The parameters γ09 … γ013 are the slopes of the cross-level interactions. They are formed by attaching individual level data points to group level, that is, the group mean of the Level 1 variable is used for forming the interaction terms (Martin and Hill 2012). The interactions with CON and FAM relate to both, FIS and IMO, since both are formed by contrast coding from one variable (Cohen et al. 2003). Further, γ10 … γk0 are the Level 2 intercepts. Finally, the intercept of the model is represented by γ00. For calculation, we used HLM7 with full maximum likelihood estimation, which is often used in consumer research (e.g., Martin and Hill 2012). We also checked the plot of the residuals and found support for the normality, linearity, and homoskedasticity assumptions entailed in the HLM model.

*Calculation of ra and Assessing Sensitivity for ra of Expenditures*

 Based on the HLM results, we calculated values for r that the model predicts under different conditions of the situational contingencies, allowing us to provide ra and assessing sensitivity for ra of expenditures. Sample calculations are provided in Table W2. The estimation of Model 3 in Table 5 of the article yielded the following Level 1 and Level 2 equations:

ESij = β0j + .065CONij – .079DIMij + .008PLEij + .013FAMij + .008ACTij + .089STCij – .020PLExCONij + .076PLExDIMij – .012PLExFAMij – .005PLExACTij + .046MOAij + .037MOVij + .022MOCij + .070PREij + .071ENQij + .093SHSij + .127RECij + .061TIEij + .054PUIij + .048INRij + .027LINij

β0j = −.116 + .137SEEj + .002MUEj – .120INMj – .043COMj + .315PRFj + .002MEAj + .026FISj + .086IMOj + .096PRFxFAMj + .006FISxCONj – .006FISxFAMj – .069IMOxCONj + .039IMOxFAMj + u0j

 The Level 1 equation included the 11 dummy variables that control for the type of customer response, mood activation (MOA), mood valence (MOV), mood control (MOC), product evaluations (PRE), environmental quality (ENQ), shopping satisfaction (SHS), recall (REC), time elusiveness (TIE), purchase intentions (PUI), intention to recommend (INR), and lingering (LIN).

 The ras were calculated as the value of r between ambient scent and customer responses that the model predicts when all situational contingency variables were at their mean. By doing so, the situational contingencies are controlled for their influence and the ras provide a more precise estimate than the rs. A sample calculation for expenditures is found in Table W2 (column “At means”). The calculation omitted the dummy variables since they used expenditures as reference category and therefore reduced to zero. Further, the value for experienced offering was constrained to ‑.33 (= coded value for 'experienced offering') to represent field conditions. The predicted ra equaled .051. In interpretational terms this value represents the integrated r for the presence (vs. absence) of a pleasant ambient scent on expenditures under average field conditions. With expenditures as reference category, the ras for the other customer responses are given by ra of expenditures plus the slope estimate of the respective dummy variable. For example, the ra of mood activation equaled .051 plus its slope estimate of .046, yielding a value for ra of .097.

 For our sensitivity analysis, we calculated the ras between ambient scent and expenditures that the model predicted for different levels of the significant situational contingencies. Two sample calculations are provided in Table W2, one in which more (column “Most favorable condition”) and one in which less favorable conditions are combined (column “Least favorable condition”). It is important to note here, that as the Level 1 variables were group mean centered, they lost their original scale (and also interpretation). We therefore used characteristic values based on the distribution of the group mean centered values that is at ±1.5 SD from the mean. In interpretational terms these values represent ambient scents that are, for instance, above (+1.5 SD) or below average (−1.5 SD) in terms of the respective variable. The same logic was applied to the proportion of females in a sample, given the continuous nature of this variable.

| TABLE W2Sample Calculations for ra of Expenditures |
| --- |
|  |  |  | Variable Values Used To Predict ra Of Expenditures |
| Level: Variable | M, SD | Coding Scheme For Categorical Level 2 Variables | At means | Most favorable condition | Least favorable condition |
| *Scent characteristics* |  |  |  |  |  |
| 1: Congruency | M = .00, SD = .66 |  | .00 | **.99** | **−.99** |
| 1: Dimensionality | M = .00, SD = .21 |  | .00 | **−.32** | **.32** |
|  *Scent properties* |  |  |  |  |
| 1: Pleasantness | M = .00, SD = .47 |  | .00 | .00 | .00 |
| 1: Familiarity | M = .00, SD = .81 |  | .00 | **1.22** | **−1.22** |
| 1: Activation | M = .00, SD = .64 |  | .00 | .00 | .00 |
| *Scent interaction effects* |  |  |  |  |  |
| 1: PL x Congruency | M = .00, SD = .75 |  | .00 | .00 | .00 |
| 1: PL x Dimensionality | M = .00, SD = .25 |  | .00 | .00 | .00 |
| 1: PL x Familiarity | M = .00, SD = 1.01 |  | .00 | .00 | .00 |
| 1: PL x Activation | M = .00, SD = .69 |  | .00 | .00 | .00 |
| *Contextual factors* |  |  |  |  |  |
| 2: Service exchange | M = -.16, SD = .38 | ⅔ = service, −⅓ = non-service | -.16 | **.67** | **-.33** |
| 2: Multistore environment | M = -.20, SD = .41 | ½ = multistore, −½ = single store | -.20 | −.20 | −.20 |
| 2: Incongruent music | M = .08, SD = .23 |  | .08 | **.00** | **1.00** |
| 2: Congruent music | M = .05, SD = .19 |  | .05 | .05 | .05 |
| 2: Proportion of females | M = .60, SD = .18 |  | .60 | **.87** | **.33** |
| 2: Proportion of females x familiaritya | M = -.02, SD = .30 |  | -.02 | -.02 | -.02 |
| 2: Mean age | M = 31.7, SD = 5.89 |  | 31.74 | 31.74 | 31.74 |
| *Methodological characteristics* |  |  |  |  |
| 1: Statistical controlb | M = .00, SD = .11 |  | .00 | .00 | .00 |
| 2: Fictitious setting | M = -.13, SD = .40 | ½ = fictitious, −½ = actual setting | -.13 | −.13 | −.13 |
| 2: Imagined offering | M = -.05, SD = .45 | ⅔ = imagined, −⅓ = experienced  | −.33 | **−.33c** | **−.33c** |
| 2: Fictitious x congruencya | M = -.07, SD = .46 |  | -.07 | -.07 | -.07 |
| 2: Imagined x congruencya | M = .04, SD = .43 |  | .04 | .04 | .04 |
| 2: Fictitious x familiaritya | M = -.11, SD = .80 |  | -.11 | -.11 | -.11 |
| 2: Imagined x familiaritya | M = -.10, SD = .79 |  | -.10 | -.10 | -.10 |
| Predicted ra of expenditures |  | .051 | .364 | −.274 |
| Converted percent change of ra |  | 3.2% | 23.3% | −17.5% |
| aThe respective interactions were not included in the most and least favorable conditions as they are exploratory in nature and occur on the sample level. Thus, due to the variance partitioning, they do not influence Level 1 effects.bStatistical control was not included in the most and least favorable condition as it represents a statistical influence and as such is not of substantial concern.cConstrained to the value of -.33 (= ‘experienced offering’) to represent field conditions.Notes: Numbers in bold represent the values used to predict ra in the most and least favorable condition. |

*Calculations for Correcting the Effect Sizes used for the Analysis of Scent Intensity*

 Our analysis of the effects of perceived concentration used a sub-sample of 165 reliability-corrected effect size estimates (ESij), which were corrected for the influence of the situational contingencies, sample affiliation, and measured customer response. They are referred to as ESc,ij and are given by:

ESc,ij = ESii – .065CONij – -.079DIMij – .008PLEij – .013FAMij – .008ACTij – .089STCij – ‑.020PLExCONij – .076PLxDIMij – -.012PLxFAMij – -.005PLExACTij – .137(SEEj – ‑.16) – .002(MUEj – -.20) – ‑.120(INMj – .08) – -.043(COMj – .05) – .315(PRFj – .60) – .002(MEAj – 31.74)

 – .026(FISj – -.13) – .086(IMOj – **-**.33) – .096(PRFxFAMj – -.02) – .006(FISxCONj – -.07) – ‑.006(FISxFAMj – ‑.11) – ‑.069(IMOxCONj – .04) – .039(IMOxFAMj – -.10) – ∑kβk(DUMMYkij – MEAN\_DUMMYk) – u0j

 This formula uses the mixed model representation of the Level 1 and Level 2 equations, as obtained from Model 3 in Table 5 of the article. Although the formula is lengthy, its logic is easily explained. Each effect size estimate i in sample j is corrected for its relative difference to each variable’s mean (please note: the mean of u0j and of the Level 1 variables and the Level 1 interactions are zero and hence not shown in the formula). For instance, if an effect size of .10 exhibits a group-mean centered value for congruency of 1, the corrected effect size—under average congruency—is .035 (= .10 – .065\*1); all else being equal. To take another example. If an effect size of .10 is observed for a non-service exchange (coded value = ‑.33) its corrected value—under an 'average' setting—is .123 (= .10 – .137\*(-.33 – ‑.16)). So, by subtracting the difference to the mean, the corrected effect size represents the value that would be expected under average conditions of the situational contingencies. The same logic also applies to the customer responses as indicated by the term relating to the dummy variables and to the sample affiliation as indicated by u0j.

Additional References for Theme 3 of the Web Appendix

Hofmann, David A., and Mark B. Gavin (1998), “Centering Decisions in Hierarchical Linear Models: Implications for Research in Organizations,” *Journal of Management*, 24 (5), 623–641.

Martin, Kelly D., and Ronald P. Hill (2012), “Life Satisfaction, Self-Determination, and Consumption Adequacy at the Bottom of the Pyramid,” *Journal of Consumer Research*, 38 (6), 1155–1168.

*Theme 4: Correlations Between Situational Contingencies*

|  |
| --- |
| Table W3Correlations Between Situational Contingencies |
|  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 1. Congruency | --- |   |   |   |   |   |   |   |   |   |   |   |   |    |
| 2. Dimensionality | -.053 | --- |   |   |   |   |   |   |   |   |   |   |   |    |
| 3. Pleasantness | .096 | .120 | --- |   |   |   |   |   |   |   |   |   |   |  |
| 4. Familiarity | .016 | -.124 | .447 | --- |   |   |   |   |   |   |   |   |   |   |
| 5. Activation | -.127 | .200 | .305 | .373 | --- |   |   |   |   |   |   |   |   |   |
| 6. Perceived concentration | .545 | .372 | .469 | .269 | .182 | --- |   |   |   |   |   |   |   |   |
| 7. Service exchange | -.087 | .117 | .146 | .259 | .145 | .327 | --- |   |   |   |   |   |   |   |
| 8. Multistore environment | -.032 | .396 | .093 | .139 | .198 | .298 | .236 | --- |   |   |   |   |   |   |
| 9. Incongruent music | -.264 | -.025 | .096 | .217 | .079 | .406 | .498 | .167 | --- |   |   |   |   |   |
| 10. Congruent music | .092 | .042 | .088 | .070 | .016 | na | -.137 | .176 | .062 | --- |   |   |   |   |
| 11. Statistical control | -.260 | -.025 | .092 | .028 | .020 | .227 | .053 | .157 | .337 | .359 | --- |   |   |   |
| 12. Fictitious setting | .022 | -.267 | -.136 | -.081 | -.206 | -.308 | -.396 | -.529 | -.265 | -.295 | -.239 | --- |   |   |
| 13. Imagined offering | .132 | .049 | -.076 | -.140 | -.068 | -.114 | -.182 | -.111 | -.039 | -.124 | -.163 | .140 | --- |   |
| 14. Proportion of females | .112 | .034 | .153 | -.159 | -.262 | .344 | -.086 | .013 | .248 | -.137 | .096 | -.183 | -.018 | --- |
| 15. Mean age | .013 | .112 | -.280 | -.096 | .033 | -.494 | -.331 | .134 | -.064 | -.393 | -.170 | -.056 | -.160 | .011 |
| aFor correlations with perceived concentration, N = 167 and absolute values greater than .153 are significant at *p* < .05. Perceived concentration was not included in the regression-based assessment of multicollinearity. For this subset of effects, the variable congruent music was constant and hence no correlation could be calculated, which is indicated by 'na' (not available).Notes: N = 671, absolute values greater than .076 are significant at *p* < .05. |

*Theme 5: Graphical Plots of the Exploratory Interactions*

FIGURE W1

Graphical Plots of the Exploratory Interactions

**a** Interaction of Imagined (Versus Experienced) Offering with Congruency

Effect size

More congruent ambient scents (+1 SD)

Less congruent ambient scents (-1 SD)

-.05

.00

.05

.10

.15

Imagined offering

Experienced offering

Notes: A cautionary note seems warranted: While exploring the data for other interactions, many constellations were possible, so that the results should be seen as a first insight. Furthermore, the interactions occurred on the sample level. Thus, due to the variance partitioning, they do not influence Level 1 effects, which add to the shown simple slopes. Using values at ±1 SD follows suggestions by Cohen et al. (2003).

.20

**b** Interaction of Imagined (Versus Experienced) Offering with Familiarity

More familiar ambient scents (+1 SD)

Less familiar ambient scents (-1 SD)

-.05

.00

.05

.10

.15

.20

**c** Interaction of Proportion of Females with Familiarity

Effect size

More familiar ambient scents (+1 SD)

Less familiar ambient scents (-1 SD)

-.05

.00

.05

.10

.15

.20

Higher proportion of females (+1 SD)

Lower proportion of females (-1 SD)

Effect size

*Theme 6: Graphical Plot of the Mood by Scent Pleasantness Interaction*

FIGURE W2

Graphical Plot of the MOOD BY SCENT Pleasantness Interaction

Effect size

More pleasant ambient scents (+1 SD)

Less pleasant ambient scents (-1 SD)

-.05

.00

.05

.10

.15

Mood responses

Expendituresa

aThe other customer responses are for illustrational purposes exemplified via expenditures.

Notes: The results should be seen as a first insight, given that many interactions were tested. Using values at ±1 SD, as suggested by Cohen et al. (2003), and Model 3 from Table 5 in the article.

.20

*Theme 7: Estimated Percent Changes in Relation to the Raw Mean Values*

**a** All Effect Sizes

Frequency

FIGURE W3

Estimated Percent Changes in Relation to the Raw Mean Values

Change in raw means due to the presence (versus absence) of ambient scent

-60%

0%

60%

M = 7.0%

SD = 18.8%

**b** Expenditures

Frequency

-60%

0%

60%

M = 3.9%

SD = 22.9%

23.3%

Estimated percent change under most and least favorable conditions

-17.5%

26.3%

-14.4%

**c** Lingering

-60%

0%

60%

M = 3.8%,

SD = 18.0%

23.2%

-17.6%

Frequency

Normal distribution curve of the raw mean values

Frequency distribution of the raw mean values

Change in raw means due to the presence (versus absence) of ambient scent

Change in raw means due to the presence (versus absence) of ambient scent

*Theme 8: Criteria Used for Ambient Scent Selection*

| TABLE W4Criteria used for ambient scent selection |
| --- |
| Sample | Congruency | Pleasant-ness | Activation | Familiarity | Dimension-ality |
| Adams & Doucé (2016) | PT | PT | PT |   |   |
| Bambauer-Sachse (2012) | PT | PT |   |   |   |
| Baron & Thomley (1994) |   | PT |   |   |   |
| Baron (1997) |   | Q |   |   |   |
| Bonini et al. (2015) |   | PT |   | PT |   |
| Bosmans (2006 - Study 1) | PT | PT | PT |   |   |
| Bosmans (2006 - Study 2) | PT | PT | PT |   |   |
| Bosmans (2006 - Study 3) | PT |   |   |   |   |
| Bouzaabia (2014) | Q | PT | PT | PT |   |
| Chebat & Michon (2003) | Q | Q | Q |   |   |
| Chebat, Morrin, & Chebat (2009) | PT | PT |   |   |   |
| de Wijk & Zijlstra (2012) |   |   |   |   |   |
| Doucé & Janssens (2013) |   | PT | PT |   |   |
| Doucé et al. (2013) | Q | PT | PT |   |   |
| Doucé et al. (2014) | PT | PT | PT |   |   |
| Doucé et al. (2016) | Q | PT | PT |   |   |
| Errajaa, Lehohérel, & Daucé (2018) | PT | PT | PT | PT | PT |
| Fiore, Yah, & Yoh (2000) | PT | PT |   |   |   |
| Gault (2007) |   | PT | PT |   |   |
| Guéguen & Petr (2006) |   |   | Q |   |   |
| Haberland (2010) | PT | PT | PT |   |   |
| Haehner et al. (2017) |   |   |   |   |   |
| Herrmann et al. (2013 - Exp 1) | PT | PT |   | PT | PT |
| Herrmann et al. (2013 - Exp 3) | PT | PT |   | PT | PT |
| Jacob, Stefan, & Guéguen (2014) | Q |   | Q | Q |   |
| Kechagia & Drichoutis (2017) | Q |   |   |   | Q |
| Kim & Shin (2016) |   | Q | Q |   |   |
| Kim & Shin (2017) |   | Q | Q |   |   |
| Knasko (1993 - Female sample) |   | PT |   |   |   |
| Knasko (1993 - Male sample) |   | PT |   |   |   |
| Knasko (1995) |   | PT |   |   |   |
| Krishna, Lwin, & Morrin (2010 - Study 2) | PT | PT |   |   |   |
| Leenders, Smidts, & Haji (2019) | Q | Q |   |   | Q |
| Lehrner et al. (2000 - Female sample) |   |   |   |   |   |
| Lehrner et al. (2000 - Male sample) |   |   |   |   |   |
| Lehrner et al. (2005) |   |   |   |   |   |
| Ludvigson & Rottman (1989) |   |   |   |   |   |
| Lwin & Morrin (2012) | PT | PT |   |   |   |
| Madzharov, Block, & Morrin (2015 - Study 3) |   | PT |   |   |   |
| Marchlewska, Czerniawska, & Oleksiak (2016) |   | PT |   |   |   |
| Mattila & Wirtz (2001) |   | Q | PT |   |   |
| McDonnell (2007) |   |   | Q |   |   |
| McGrath, Aronow, & Shotwell (2016) |   |   |   |   |   |
| Michon & Chebat (2007) | Q |   | Q |   |   |
| Michon, Chebat, & Turley (2005) |   | Q | Q |   |   |
| Mitchell, Kahn, & Knasko (1995 - Exp 1) | Q | PT |   |   |   |
| Mitchell, Kahn, & Knasko (1995 - Exp 2) | Q | PT |   |   |   |
| Moore (2013) |   |   |   |   |   |
| Moore (2014) |   |   |   |   |   |
| Morrin & Chebat (2005) | PT | PT |   |   |   |
| Morrin & Ratneshwar (2000) |   | PT |   |   |   |
| Morrin & Ratneshwar (2003 - Exp 1) | PT | PT |   | PT |   |
| Morrin & Ratneshwar (2003 - Exp 2) | PT | PT |   | PT |   |
| Morrin, Chebat, & Chebat (2010) |   | PT |   |   |   |
| Morrison et al. (2011) |   |   |   |   |   |
| Mors et al. (2018) |   |   |   |   |   |
| N. & Menon (2018) | Q |   |   |   |   |
| Naja et al. (2014) |   |   | PT |   |   |
| Parsons (2009) | PT |   |   |   |   |
| Poon & Grohmann (2014) | PT |   |   | PT |   |
| Schifferstein, Talke, & Oudshoorn (2011) | PT | PT | Q |   |   |
| Spangenberg, Crowley, & Henderson (1996 - Main Study) | Q | PT | PT |   |   |
| Spangenberg, Grohmann, & Sprott (2005) | PT | PT |   | PT |   |
| Teller & Dennis (2012) | Q |   |   |   |   |
| Vega-Gómez, López, & Buenadicha (2017) |   |   |   |   |   |
| Veríssimo & Pereira (2013) | PT | PT |   |   |   |
| Vilaplana & Yamanaka (2015) |   | Q | Q |   |   |
| Vinitzky & Mazursky (2011) |   | Q | Q |   |   |
| Ward, Davies, & Kooijman (2007) | Q |   |   |   |   |
| Yuan (2017 - Study 2) | Q |   |   |   |   |
| Zemke & Shoemaker (2007) |   | Q |   |   |   |
| Pre-tested (PT) | 22 | 36 | 14 | 9 | 3 |
| Qualitatively discussed (Q) | 15 | 10 | 11 | 1 | 2 |
| Sum of pre-tested and qualitatively discussed | 37 | 46 | 25 | 10 | 5 |

*Theme 9: Path Analysis*

 This theme provides an analysis of the causal priorities among the customer response variables from the article. For this purpose, we constructed a meta-analytic correlation matrix, which is shown in Table W5. The matrix is slightly modified to the version from the article to highlight those correlations that may be subject to common method variance, as this issue will be discussed subsequently.

|  |
| --- |
| Table W5Meta-analytic Correlation Matrix |
|  | 1 | 2 | 3 | 4 | 5 |
| 1. Presence (vs. absence) of ambient scent | --- | 195 (8,099b) | 277 (9,269b) | 49 (2,849) | 52 (8,150) |
| 2. Mood | .092\* | --- | 16 (1,634) | 2 (388) | 6 (855) |
| 3. Evaluations | .125\* | .292\* | --- | 10 (624) | 4 (592) |
| 4. Purchase intentions | .105\* | .309\* | .452\* | --- |  naa |
| 5. Expenditures | .051 | .106 | .187 | .320\*a | --- |
| \**p* < .05.aApproximated via the meta-analytic correlation between intention and observed behavior as determined by Kraus (1995).bDue to the combination of two or more customer responses, the total sample size is adjusted for double counts and therefore does not correspond to the values given in Table 3 from the article.Notes: Grey-shaded correlations may be subject to common method variance. Off-diagonal entries in the lower left contain the average sample-size-weighted mean correlations (rs). For the relationships between ambient scent and customer responses, the ras are provided. Off-diagonal entries in the upper right show the number of effect sizes and, in parentheses, the total sample sizes from which the mean correlations were derived. |

 The correlation matrix comprises a subset of the customer responses. The reason lies in the way it is created. To obtain the meta-analytic correlation matrix, the ras, which were available from previous calculations, were supplemented by the sample-size weighted mean correlations (rs) for each pair of constructs (Viswesvaran and Ones 1995). Thus, for a construct to be included, it required multiple study effects that relate a particular construct, such as purchase intentions, to every other construct in the model (Rubera and Kirca 2012). This was the case for only a subset of customer responses. Furthermore, to achieve a full correlation matrix, we combined mood activation and valence to mood (mood control was not significant and therefore not considered) as well as product evaluations, environmental quality, and shopping satisfaction to evaluations. We also approximated the purchase intentions—expenditures correlation with the meta-analytic intention—behavior correlation of .32, as reported by Kraus (1995), due to missing data (Butts, Casper, and Yang 2013).

 From a theoretical point of view, the relation between mood (comparatively more affective) and evaluations (comparatively more cognitive) is of particular interest, as both may follow different causal priorities (e.g., Chebat and Michon 2003; Morrison et al. 2011). To systematically conceptualize the different conceivable constellations for mood and evaluations, the research stream offers little guidance. We therefore use the work by Vakratsas and Ambler (1999), who provide an extensive review for the field of advertising, which is likewise marked by different priorities and conceptualizations of affective and cognitive responses. Thus, adapted from Vakratsas and Ambler (1999), we distinguish four constellations for mood and evaluations, as shown in Figure W4: hierarchical (no parallel effects of mood and evaluations) versus integrative (parallel effects of mood and evaluations) by mood (mood—evaluations sequence) versus evaluations first (evaluations—mood sequence).

.32

PUI

FIGURE W4

CAUSAL MODEL COMPARISONS

Model 1: Hierarchy mood → evaluations

Model 2: Hierarchy evaluations → mood

Model 3: Integrative mood → evaluations

Model 4: Integrative evaluations → mood

Mood

Evaluations

AS

Mood

Evaluations

EXP

Model fit: χ² = 25.14, df = 6, *p* < .01, NFI = .969, SRMR = .036, AIC = 43.1.

Model fit: χ² = 8.76, df = 6, *p* = .19, NFI = .989, SRMR = .016, AIC = 26.8.

PUI

AS

Mood

Evaluations

EXP

AS

EXP

PUI

Mood

Evaluations

AS

EXP

PUI

.09

.13

.28

.19

.40

.32

Notes: Standardized path coefficients. All coefficients are significant at *p* < .01. AS, ambient scent (presence vs. absence); PUI, purchase intentions; EXP, expenditures.

Model fit: χ² = 9.82, df = 6, *p* = .13, NFI = .988, SRMR = .018, AIC = 27.8.

.09

.29

.40

.32

.19

.40

Model fit: χ² = 13.06, df = 6, *p* = .04, NFI = .984, SRMR = .024, AIC = 31.06.

.13

.29

.19

.09

.13

.28

.19

.40

.32

 For the path analysis we used the meta-analytic correlation matrix as model input together with the median sample size of N = 1634 across the effect size estimates from the correlation matrix. In addition, we needed to consider two issues. First, we restricted the immediate ambient scent outcome(s) in the models to the meta-analytically estimated values. This was done because these values were experimentally determined and thus serve as true information for the first causal link, informing the subsequent downstream links. The second issue revolved around common method variance (CMV). CMV refers to the situation in which correlations are inflated because variables were measured with the same instrument (Chang, Witteloostuijin, and Eden 2010). Hence, CMV may be of concern when both variables of a correlation are based on self-reports. This was the case for the correlations indicated by the grey-shaded cells in Table W5. The other correlations were experimentally determined and/or comprised observed behavior for one variable. For our analysis, we consider CMV to be of less concern. This is because the indicated correlations are embraced by correlations for which CMV is of no concern. Thus, if the indicated correlations are suspect to CMV, they would lead to an inconsistent correlational structure as reflected in poor model fit.

 The results of the path model estimation are shown in Figure W4. All path coefficients were significant at *p* < .01 and all four models reflected the data satisfactorily well (Hu and Bentler 1998). Thus, the results indicate that the obtained meta-analytical correlation matrix is largely internally consistent and confirm the general sequence from ambient scent via mood and evaluation responses to purchase intentions and eventually expenditures. Further, the 'integrative' models yielded a better fit than the 'hierarchical' models, which indicates that mood and evaluation responses work along parallel rather than sequential pathways. This supports observations by Bambauer-Sachse (2012), who also found evidence for parallel pathways, and provides a consolidation of different observed causalities in the research domain (Chebat and Michon 2003; Morrison et al. 2011). In light of the article’s finding that ambient scent serves more as a cognitive than affective stimulant, it appears that this priority translates into parallel pathways of different strengths and not necessarily a hierarchy of effects.

Moreover, since mood may influence unplanned purchases, we tested if mood yielded a direct effect on expenditures. In Model 3, as the best fitting model, the path from mood to expenditures was not significant (path coefficient = .01, p = .732), with almost identical results in the other models. The fact that ambient scent does not translate into affectively-charged (unplanned) purchases may be seen as a reflection of the rather cognitive nature of ambient scent.

 The analysis is limited by a small amount of effects, which are integrated for the correlations among the customer responses. A reflection of this may be seen in the relatively small absolute differences in the model fit, for instance between Model 2 (evaluations—mood hierarchy) and Model 4 (evaluations—mood integration), and also in that we had to collapse the response variables. Therefore, the findings should be seen as first insight into the causal priorities of ambient scent effects.

Additional References for Theme 9 of the Web Appendix

Bambauer-Sachse, Silke (2012), “Through Which Mechanisms Does Ambient Scent Affect Purchase Intention in Retail Settings?” in *NA Advances in Consumer Research*, Vol. 40, Zeynep Gürhan-Canli, Cele Otnes, and Rui (Juliet) Zhu, eds. Duluth, MN: Association for Consumer Research, 319–326.

Butts, Marcus M., Wendy J. Casper, and Tae Seok Yang (2013), “How Important Are Work–Family Support Policies? A Meta-Analytic Investigation of Their Effects on Employee Outcomes,” *Journal of Applied Psychology*, 98 (1), 1–25.

Chang, Sea-Jin, Arjen van Witteloostuijin, and Lorraine Eden (2010), “From the Editors: Common Method Variance in International Business Research,” *Journal of International Business Studies*, 41 (2), 178–184.

Hu, Li-tze, and Peter M. Bentler (1998), “Fit Indices in Covariance Structure Modeling: Sensitivity to Underparameterized Model Misspecification,” *Psychological Methods*, 3 (4), 424–453.

Vakratsas, Demetrios, and Tim Ambler (1999), “How Advertising Works: What Do We Really Know?” *Journal of Marketing*, 63 (1), 26–43.

Viswesvaran, Chockalingam, and Denis S. Ones (1995), “Theory Testing: Combining Psychometric Meta-Analysis and Structural Equations Modeling,” *Personal Psychology*, 48 (4), 865–85.