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The Roles of Schema Incongruity and Expertise in Consumers' Wine Judgment

Abstract

Broadening the present understanding of how expertise moderates the schema-incongruity effect (i.e., the notion that a product that is moderately incongruent with the schema evoked for it in memory is associated with a comparatively positive product evaluation), this study argues that people with higher, not lower, degrees of expertise experience incongruity and prefer moderately incongruent products over congruent ones. Because people with low expertise in complex product categories lack a developed schema against which to assess encountered products, they will be insensitive to incongruity. People with high expertise, on the other hand, typically have developed schemata and can, therefore, perceive incongruity and respond accordingly.

Consumers with different levels of wine expertise participated in a study in which they were given congruent or incongruent information, as well as different levels of information elaboration, about a wine prior to tasting and evaluating it. The results of this study support the above argument: Expertise moderates the incongruity effect such that it is prevalent only for experts, and schema-level processing moderates expertise's moderating effect on the incongruity effect.

Keywords: schema incongruity, consumer expertise, complex product categories, wine

1 **1. Introduction**

2 Product liking in sensory analysis is connected to consumers' expectations or schema
3 about the product. A common and empirically supported assumption is that products whose
4 sensory qualities are congruent with consumers' expectations are evaluated more favorably than
5 products exhibiting incongruent sensory qualities (Cardello 2003; Piqueras-Fiszman and Spence
6 2015). Recent results, however, suggest that products with incongruent qualities can be judged
7 more favorably than products with congruent qualities (Silva et al. 2017). These later results are
8 consistent with a stream of research that addresses the incongruity effect, i.e. the notion that a
9 product that is moderately incongruent with the schema evoked for it in memory is associated
10 with a comparatively positive evaluation (e.g., Meyers-Levy and Tybout, 1989; Noseworthy, Di
11 Muro, and Murray, 2014). An important result from schema-incongruity research is that the
12 incongruity effect is limited to novices (Peracchio and Tybout, 1996). For example, novices
13 evaluated an iced, speckled, nutty cupcake-size cake more favorably when it was described prior
14 to taste as a spicy cake (moderate incongruity) then when it was described as a high-calorie cake
15 (congruity). For experts, this effect was not observed. The assumed reason for this is that experts
16 have elaborate and flexible schematic structures that allow them to accommodate a discrepant
17 stimulus and therefore deter incongruity from being perceived, whereas novices have less
18 elaborate and flexible schemata.

19 Although a valid result in its domain or product category (cakes), the premise that novices
20 actually employ schemata may not always hold. Cakes constitute a relatively simplistic product
21 category in which most consumers have considerable experience. In more complex categories
22 and in categories where consumers vary much in terms of experience, this premise is unlikely to
23 hold. In complex product categories, people with limited experience (novices) would arguably

24 have rudimentary schemata compared to consumer with extensive experience (experts). Without
25 well-developed schemata, novices will not experience any incongruity, and the incongruity-effect
26 is therefore not expected to occur. For experts, well-developed schemata exist and incongruity
27 may therefore be experienced. Consequently, the incongruity effect is likely to occur for experts.

28 This research aims to test this hypothesis using wine as the focal complex product
29 category. Specifically, this research investigates whether wine expertise moderates the
30 incongruity effect, but with the presumption that consumers with higher degrees of wine
31 expertise will experience incongruity and prefer moderately incongruent wines over congruent
32 ones, while consumers with lower levels of expertise will not.

33

34 **2. The Incongruity Effect and Expertise**

35 Following the theorizing of Mandler (1982), several studies have examined the effects of
36 schema congruity and incongruity on consumers' product evaluations (Carvalho, Samu, and
37 Sivaramakrishnan 2011; Halkias et al. 2017; Jhang, Grant, and Campbell, 2012; Meyers-Levy
38 and Tybout, 1989; Noseworthy, Di Muro, and Murray, 2014; Peracchio and Tybout, 1996;
39 Stayman, Alden, and Smith, 1992). According to these studies, the very source of product
40 evaluation is the consumer's perceived discrepancy between the product and the representation of
41 it in memory (schema). The human memory can be viewed as a semantic network structure,
42 called schema. Schemata allow us to make sense of, store, and respond to information we
43 encounter in our environment (Anderson, 1988). When incoming information is easily organized
44 into existing schemata, it can be said to be schema-congruent. For example, when a wine label
45 states that the wine is *dry* (schema), and what you actually taste is a dry Riesling, with less than
46 2% of residual sugar, the incoming information (taste) is schema-congruent. On the contrary,

47 when incoming information does not fit easily into existing schemata, the information is schema-
48 incongruent. Information is schema-incongruent if, for example, the wine label states *dry*, but the
49 tasted wine is a medium-sweet Riesling with 30 g/L of residual sugars.

50 Research on schema incongruity has suggested that congruity leads to mild positive
51 product evaluation because of familiarity; moderate incongruity leads to positive evaluation
52 because this incongruity is cognitively resolvable (Jhang, Grant, and Campbell, 2012) and
53 therefore associated with arousal-based pleasure (Noseworthy, Di Muro, and Murray, 2014); and
54 extreme incongruity leads to negative evaluation because it is not easily resolvable and therefore
55 creates tension and discomfort (Mandler, 1982). In the wine example above, the medium-sweet
56 Riesling accompanied by a label stating *dry* constitutes moderate incongruity, whereas a sweet,
57 late-harvest Riesling with more than 45 g/L of residual sugar would constitute extreme
58 incongruity.

59 Although food research has suggested that high schema-congruity leads to more favorable
60 food product evaluation than low schema-congruity (Adams et al. 2014; Lim, Fijimaru, and
61 Linscott 2014), the outcome that moderate incongruity leads to even more favorable evaluation
62 than high congruity has been observed for foods and beverages. Stayman, Alden and Smith
63 (1992) found that consumers who held a soft drink schema in memory and actually tasted a drink
64 that was a blend of 25 percent juice and 75 percent water (moderately incongruent) evaluated the
65 drink more favorably than consumers who held a soft drink schema but actually tasted a 90
66 percent juice–10 percent water blend (strongly incongruent) or a 10 percent juice–90 percent
67 water blend (strongly congruent). Analogous results were recently reported by Silva et al. (2017).
68 In a study of expectations' influence on liking of conventional and nonalcoholic beers, these
69 researchers observed that nonalcoholic beers labeled incorrectly as beers received better taste

70 ratings than nonalcoholic beers correctly labeled as nonalcoholic. Although these researchers
71 attributed this incongruity effect to the name “beer” and how positive expectations associated
72 with “beer” might override the sensory experience, their observation is also consistent with the
73 incongruity effect.

74

75 ***2.1 Expertise***

76 An important finding from schema-incongruity research is that expertise moderates the
77 schema-incongruity effect (Kim, Hahn, and Yoon, 2015 Peracchio and Tybout, 1996). Schemata
78 can be elaborate or unelaborate. Compared to unelaborate schemata, elaborate schemata have
79 extensive content, include many levels of abstraction, and integrate many interrelationships
80 between the different pieces of information (Alba and Hutchinson, 1987; Peracchio and Tybout,
81 1996; Sujan, 1985). People who are equipped with elaborate schemata in a specific category,
82 known as experts (Chi, Feltovich, and Glaser, 1981), are rarely exposed to incongruity because
83 most encountered stimuli will have a well-developed counterpart schema. To the extent that when
84 incongruity actually occurs, experts can engage schemata rich enough to accommodate discrepant
85 stimuli without much cognitive effort. Consequently, the arousal-based pleasure associated with
86 resolving incongruity is unlikely to be experienced by experts. For people with unelaborate
87 schemata, known as novices, the likelihood of encountering discrepant stimuli is larger, and their
88 schemata are not extensive enough to automatically resolve this discrepancy when it occurs. They
89 will, therefore, attempt to resolve the incongruity and, assuming that they succeed, will judge the
90 incongruent stimulus more favorably, in line with the general prediction of the schema-
91 incongruity effect. Based on these differences between elaborate and unelaborate schemata,

92 Peracchio and Tybout (1996) hypothesized and empirically confirmed that moderate incongruity
93 affected novices' product evaluations positively, but had no impact on experts' evaluations.

94 Although valid in certain product categories, the arguments that novices perceive
95 incongruity and that experts accommodate incongruity automatically, and thereby circumvent the
96 perception or feeling of incongruity, may not hold in other categories.

97 The incongruity effect is a schema-level phenomenon. An established schema is required
98 for incongruity to emerge; otherwise, the stimulus has nothing to be incongruent *with*. Equipped
99 with only under-developed or rudimentary schemata, novices are therefore unlikely to take notice
100 of any discrepancy between schema and stimulus. Novices tend to focus on surface information,
101 such as visible product attributes and single attributes, rather than integrated information and
102 attribute interrelationships that characterize a schema (Gregan-Paxton and Roedder, 1997;
103 McKeithen et al., 1981). Novices are likely to interpret information literally and in the order it is
104 presented (Adelson, 1984; Alba and Hutchinson, 1987; Chi, Feltovich, and Glaser, 1981; Johnson
105 and Russo, 1984; Maheswaran and Sternthal, 1990). Their knowledge representation may simply
106 not contain enough relations to enable novices to recognize similarities between a base (schema)
107 and a target (Gentner, Rattermann, and Forbus, 1993).

108 Consistent with this reasoning, observations in psychology and consumer research support
109 the idea that novices are relatively insensitive to discrepancy of information from schema or other
110 corrective feedback (Fiske, Kinder, and Larter, 1983; Kruger and Dunning, 1999; Sujan, 1985).
111 Sujan (1985), for example, found that novices were less likely to respond to match versus
112 mismatch between incoming product information and product category schemata in memory.
113 In light of the view that novices are less likely than experts to notice schema incongruity, how
114 can Peracchio and Tybout's (1996) finding that the incongruity effect is prevalent for novices—

115 even confined to them—be explained? Research has shown that in simpler categories, individual
116 differences in expertise tend to converge (Hunt, 2006). In Peracchio and Tybout's (1996) study
117 the product category was relatively simple (i.e., desserts and cakes), such that both expert and
118 novice participants were likely to have established product category schemata. In noncomplex
119 categories, most people may establish schemata based on extensive experience alone (Ericsson
120 and Lehmann, 1996). Therefore, it is likely that the novice participants in Peracchio and Tybout's
121 (1996) study actually experienced incongruity.

122 Many categories are, however, complex and ill-defined. In wine-tasting, the number of
123 winemakers, styles, vintages, regions, grape varieties, and modes of vinification make wine
124 tasting a complex endeavor. Consequently, predicting and recognizing a set of particular sensory
125 characteristics in a wine are arduous tasks. In the wine category, it is unlikely that anyone can
126 develop schematic structures that are sophisticated enough to process incoming stimuli
127 automatically. The ability to automatically process incoming stimuli develops slowly and
128 requires much practice, as well as stimuli that do not vary much (Alba and Hutchinson, 1987).

129 Additionally, expertise comprises more than experience or familiarity (Alba and
130 Hutchinson, 1987; Ericsson, Krampe, and Tesch-Römer, 1993; Ericsson and Lehmann, 1996).
131 According to Ericsson and colleagues (Ericsson, Krampe, and Tesch-Römer, 1993; Ericsson and
132 Lehmann, 1996), real expertise can be obtained only via deliberate and extensive training in a
133 domain over time. Only up to a certain level will beginners be able to establish schemata and
134 enhance their skills based on experience or domain familiarity alone. After this level, only those
135 exposing themselves to deliberate training will develop their schemata further and continue to
136 improve their skills. Some people may reach the level of sophistication that can be used to
137 automatically accommodate new stimuli, but not all. In the wine domain, professional and

138 scholarly training of experts and consumer wine-tasting courses facilitate the formation of higher
139 levels of expertise. Several empirical studies have suggested that wine experts excel over novices
140 in terms of cognitive and perceptual skills (Ballester et al., 2009 Hughson and Boakes, 2002;
141 Lawless, 1984; Lehrer, 1983; Parr, Heatherbell, and White, 2002; Solomon 1990, 1997). The
142 wine category is therefore likely to comprise both novices and experts in terms of variation in
143 schemata development.

144 In summary, it can be argued that for complex product categories, such as wine, experts
145 will have, through deliberate training and effort, acquired knowledge schemata (Ericsson,
146 Krampe, and Tesch-Römer, 1993). These schemata are probably not sophisticated enough for
147 automatic stimuli accommodation, but are nevertheless necessary for schema-level assessment of
148 stimuli. In these domains, novices do not have, or have only rudimentary, schemata, and therefore
149 lack the prerequisite for schema-level assessment of incoming stimuli. The prediction is therefore
150 that in complex product categories the incongruity effect will be increasingly present for
151 increased levels of expertise. This leads to Hypothesis 1,

152
153 **H1:** For complex product categories, product evaluation associated with incongruity is more
154 favorable than evaluation associated with congruity for higher, but not for lower, levels of
155 expertise.

156
157 Underlying Hypothesis 1 is the contention that experts use well-developed schemata to
158 assess incoming stimuli information. Experts have acquired these schemata and have the capacity
159 to use them. In other words, it is assumed that schema application is the cognitive mechanism
160 that makes experts perceive schema incongruity and respond accordingly. To understand how

161 schemata work to bring about this effect, it is useful to contrast piecemeal-based with schema-
162 based processing of perceived sensory information.

163

164 ***2.2 Piecemeal-based versus Schema-based Evaluation***

165 An incoming stimulus can be evaluated on the basis of the pieces (features or attributes)
166 that make it up, or as a member of a particular stimulus category. A traditional view in consumer
167 research has been that a product is perceived in terms of its discrete attributes, with each attribute
168 having a distinct subjective value. The piecemeal-based evaluation of the product is then arrived
169 at by combining (often by adding or averaging) the products' attributes according to some
170 analytical rule (Sujan, 1985).

171 An alternative evaluation strategy is to recognize the product as a member of an
172 established product category and evaluate it automatically based on this category's schema (Fiske
173 and Pavelchack, 1986; Sujan, 1985). According to Mandler's (1982) account, evaluation arises
174 from the structural congruity or incongruity between the stimulus and the schema representation
175 of it in memory. The moderate incongruity effect occurs in the event that there is a moderate yet
176 resolvable discrepancy between a product and its corresponding product schema in memory.

177 Consequently, for the incongruity effect to occur, an established category schema is
178 required. If no schema can be retrieved, the stimulus must be evaluated on another basis, such as
179 piece by piece using all attribute information (we do recognize the extensive line of research on
180 heuristic-based evaluation). This leads to Hypothesis 2,

181

182 **H2:** For complex product categories, evaluation associated with incongruity is more favorable
183 than evaluation associated with congruity when stimulus evaluation is based on a schema,

184 whereas there will be no difference when the evaluation is based on piecemeal sensory
185 information.

186

187 ***2.3 Expertise, Schema, and the Incongruity Effect***

188 The relationship proposed in Hypothesis 2 also represents the explanation for why the
189 incongruity effect is expected to be observed for experts and not novices (Hypothesis 1). If
190 schema-based stimulus evaluation is the mechanism that makes experts perceive incongruity and
191 novices not, conditions facilitating the use of that evaluation strategy should help novices
192 perceive incongruity, meaning that the incongruity effect should be observed for novices as well
193 as for experts. Under conditions that do not facilitate schema processing, novices are not
194 provided with a basis for experiencing incongruity and should therefore not respond according to
195 the general prediction of the incongruity hypothesis. Experts already have established schemata
196 and should therefore be less helped by how information is structured. Regardless of whether new
197 information is provided in terms of pieces or in terms of a schema, they should perceive
198 incongruity and respond according to the incongruity hypothesis. This leads to Hypothesis 3,

199

200 **H3:** For lower levels of expertise, the incongruity effect occurs for schematic information, but
201 not for piecemeal information. For higher levels of expertise, the incongruity effect occurs
202 for both schematic and piecemeal information.

203

204

205 **3. Materials and Methods**

206 ***3.1 Participants***

207 A total of 227 participants—135 women and 92 men—were recruited among inhabitants
208 in a North American university town by means of flyers distributed in the local wine shop and
209 other shops selling wine, as well as via a note in the local newspaper. Of the participants, 80
210 percent had a four-year college degree or higher education. In terms of age, 11 percent of the
211 participants were in the age group 21–24, 39 percent were 25–34, 15 percent were 35–44, 17
212 percent were 45–54, 11 percent were 55–65, and 7 percent were 65 or over. None of the
213 participants were recruited on the basis of their wine expertise, or lack thereof. Rather,
214 participants' degrees of wine expertise were measured in the experiment by means of a wine-
215 knowledge scale.

216

217 ***3.2 Wines***

218 The two wines used in this study were from the same vineyard in Napa Valley, California,
219 USA; they were from the same brand, made from Cabernet Sauvignon, stored in oak barrels, and
220 from two different vintages. The focal wine, that was subject to participants' evaluation, was
221 from 1999, and the test wine that was part of the manipulation was from 1998. The study took
222 place in 2003, thus the wines that were evaluated were four and five years old at the time.

223

224 ***3.3 Design***

225 The study used a three-factor (schema incongruity: incongruent vs. congruent) x (schema
226 representation: schema vs. no-schema) x (expertise: degrees of wine knowledge) x between-
227 subjects design.

228 Schema incongruity was manipulated by asking participants to form expectations about a
229 wine based on a wine label and subsequently let them taste and smell the wine. In the congruent
230 condition, the participants received a label that correctly specified the wine to be tasted whereas
231 in the incongruent condition they received a label that incorrectly specified the wine. In this
232 manipulation, wine labels (i.e. schema) rather than the tasted wine (i.e. stimulus) were varied.
233 This was done to avoid that unanticipated sensory factors influenced the results. This research
234 does not hypothesize anything with regard to the inverted U-shaped relationship between
235 incongruity and evaluation per se, as this has already been established (e.g., Meyers-Levy and
236 Tybout, 1989). Rather, the focus is on how an evaluation difference between congruent and
237 incongruent stimuli is moderated by expertise. Consequently, the incongruity variable had two
238 levels: incongruity versus congruity.

239 Schema representation was manipulated by providing the participants with either
240 piecemeal only or both piecemeal and schematic information about the focal wine used in the
241 study. The participants in the schema condition received extensive information about the wine's
242 characteristics. For example, the longer the wine was stored in oak barrels, the more pronounced
243 the flavor of oak in the wine would be. The Cabernet Sauvignon wine was also contrasted with
244 the Zinfandel wine. In addition, participants in this condition received a graphic picture (cobweb
245 plot) of the relative intensity of the wine's main sensory characteristics, to help them imagine
246 how the wine would taste when forming their expectations prior to tasting (see Appendix). In the
247 no-schema condition, participants did not receive this extensive information.

248 A post hoc manipulation check was conducted in 2015 to verify that the schema
249 manipulation worked as intended. If the schema condition equips participants with more
250 knowledge than the no-schema condition, as a result of the more extensive and elaborate
251 information the former condition comprises, participants in the schema condition should be better
252 than participants in the no-schema condition at identify correct wine characteristics. Forty-seven
253 participants were randomly assigned to the two schema-conditions. Participants were a mix of
254 consumers intercepted in the same town as was the main sample ($n = 28$) and consumers
255 recruited from Amazon's crowdsourcing platform Mechanical Turk ($n = 19$). All participants
256 were randomly assigned to one of the two schema-conditions. After having completed the
257 involved reading tasks, they were given a list of ten wine characteristics from the information
258 they had just read and asked to check as many correct characteristics as they thought fit. Results
259 from an ANCOVA—with the number of correct characteristics as the dependent measure,
260 schema condition as an independent factor, and time spent to complete the task as a covariate—
261 show that of a total of six correct characteristics, participants in the schema condition ($n = 22$)
262 checked more than did participants in the no-schema condition ($n = 25$) ($M_{\text{schema}} = 4.41$ vs. $M_{\text{no-}}$
263 $_{\text{schema}} = 3.36$, $F(1, 44) = 4.59$, $p = .038$). No difference was observed for incorrect characteristics
264 ($M_{\text{schema}} = 1.2$ vs. $M_{\text{no-schema}} = 1.1$, $F(1, 44) = .16$, $p = .69$). Taken together, these results
265 suggested that the schema and no-schema conditions differed as intended.

266 Expertise was not manipulated, but captured by measuring the participants' objective
267 knowledge. Expertise develops over time and is not easily manipulated within the constraints of a
268 laboratory experiment. Hence, a measure is an ecologically better account than manipulation
269 (Sujan, 1985). Notwithstanding this advantage, a measure does not capture expertise as such.
270 Experts' exceptional schemata are best captured by selecting these experts according to

271 recognized credentials (Shanteau, 1992; Spence and Brucks, 1997). Unfortunately, samples of
272 credential-based experts are difficult to obtain in sufficient sizes. This study therefore capitalized
273 on relationships discovered in previous wine research. Wine knowledge has been found to be
274 positively associated with wine involvement (Cox, 2009), and wine involvement, in turn, is
275 positively associated with frequency of wine consumption (Rahman and Reynolds, 2015). These
276 relationships were supported by Goldsmith and d’Hauteville (1998), who found that those who
277 consume wine frequently (labeled heavy consumers) are both more involved in and more
278 knowledgeable (subjective and objective knowledge) about wine. Consequently, consumers with
279 high levels of wine knowledge are likely to have consumed wine more often and, in this capacity,
280 are more likely to have established expertise schemata than consumers with low levels of wine
281 knowledge.

282 Consumer expertise or knowledge is not unidimensional. In addition to objective
283 knowledge, which is the focused dimension in the present research, consumers have subjective
284 beliefs about their own knowledge (Alba and Hutchinson, 2000). Objective and subjective
285 knowledge are often correlated. Subjective knowledge was therefore measured as a covariate.

286

287 ***3.4 Procedure***

288 The experimental sessions took place during evenings in an enology sensory laboratory at
289 a university. The participants had earlier signed up for a time and date during which they could
290 attend, and the actual testing time lasted from 30 to 45 minutes. Participants were randomly
291 assigned to the four conditions of the manipulated variables (incongruent vs. congruent x schema
292 vs. no-schema) in groups varying in size from 2 to 24. Participants conducted the experimental
293 tasks individually. The four conditions were randomly distributed over sessions and evenings.

294 The test was performed in a room dedicated to wine tasting at the university. The room
295 had desks with wall dividers, so that each participant had privacy when performing their tasks.

296 First, all participants received a glass (12 oz. wine tasting glass) of wine from a test wine
297 (Grape: Cabernet Sauvignon, Vintage: 1998, Region: Napa Valley, Barreled: Stored in Oak
298 barrels for 20 months), along with information about this wine's grape, vintage, region, sensory
299 qualities (i.e., visual appearance, aroma, and taste), and barrel aging. This exercise was included
300 to familiarize participants with connecting verbal and sensory wine information (see Fig .1).

301 Second, participants were randomly assigned to the four experimental conditions. One
302 quarter of the participants were assigned to the schema condition and given elaborate wine
303 characteristics information and a wine label that was congruent (Grape: Cabernet Sauvignon,
304 Vintage: 1999, Region: Napa Valley, Barreled: Old oak barrels) with the wine they were about to
305 taste. Another quarter was assigned to the same schema condition, but given a wine label that was
306 incongruent (Grape: Zinfandel, Vintage: 1994, Region: Napa Valley) with the wine to be tasted.
307 A third quarter was assigned to the no-schema condition and given a wine label that was
308 congruent (Grape: Cabernet Sauvignon, Vintage: 1999, Region: Napa Valley, Barreled: Old oak
309 barrels) with the wine to be tasted. The fourth quarter was assigned to the no-schema condition
310 and given a wine label that was incongruent (Grape: Zinfandel, Vintage: 1994, Region: Napa
311 Valley) with the subsequently tasted wine. In their respective conditions, participants were asked
312 to rate the extent to which they expected to like the wine and to describe the wine's expected
313 aroma and taste, using their own words. Third, all participants were given a glass of the actual
314 wine (Grape: Cabernet Sauvignon, Vintage: 1999, Region: Napa Valley, Barreled: Old oak
315 barrels) for sensory inspection and asked to rate their actual liking, as well as describe the wine's

316 actual aroma and taste in their own words. Participants were then also asked to rate the extent to
317 which they perceived the wine to be congruent or incongruent with their expectations.

318 Finally, the participants completed a quiz designed to measure their objective wine
319 knowledge, responded to two questions that measured subjective knowledge, and provided
320 demographic information about themselves. After the experiment, the participants received a
321 small gift as a token of gratitude for being part of the study.

322

323 **[Insert Figure 1 about here]**

324

325 ***3.5 Measurement***

326 *3.5.1 Expertise*

327 A 20-item quiz-type scale (with three answer alternatives) that captured objective
328 knowledge of wine aspects including grape varieties, sensory characteristics, wine-making
329 procedures, and wine–food combinations (see Supplementary Material), was used as a measure
330 of expertise. The individual participants' number of correct answers to the questionnaire was
331 used as a measure of their degree of objective wine knowledge. Thus, the scale varied from a
332 minimum score of 0 to a maximum score of 20 correct answers. Scores closer to 0 were
333 considered to represent low degrees of objective wine knowledge and scores closer to 20 were
334 considered to correspond to high degrees of objective knowledge. The distribution of correct quiz
335 answers in the analyzed sample approached a normal distribution.

336 The expertise scale was developed uniquely for the present study. A post hoc validation
337 test (2017) of the scale was therefore administered to a known group of experts (people whose
338 profession is winemaking or wine tasting) and novices (people who reported themselves to have

339 no expertise in wine). Experts answered on average 17.37 questions correctly (standard deviation
340 = 1.30; n = 19 participants) and novices answered on average 8.96 questions correctly (standard
341 deviation = 2.92; n = 25 participants; $t = 11.67$, $p = .00$). These results confirm the assumption
342 that scores to the objective wine knowledge quiz provided a proxy measure of participant's
343 degree of wine expertise.

344

345 *3.5.2 Liking and perceived incongruity*

346 Participants rated their actual and expected liking on two nine-point, one-item like/dislike
347 scales. Perceived incongruity was measured by asking participants to rate on a one-item, five-
348 point scale how much better than expected (+2) or how much worse than expected (-2) they
349 perceived the wine to be.

350

351 *3.5.3 Open responses*

352 Open responses were collected to obtain a richer picture of participants' experience with
353 the wine in the experiment. These responses were not related to any of the hypotheses.
354 Participants were asked to write down any descriptors of aroma, flavor, taste and mouthfeel, to
355 describe the expected and actual taste of the wine, using their own words. The participants'
356 descriptions based on their actual smelling and tasting of the wine, were later classified by using
357 the Wine Aroma Wheel (Noble et al., 1984) as a guide. The third tier of the Wine Aroma Wheel
358 contains more detailed descriptors (e.g., blackberry, blackcurrant) than the first (e.g., fruity) and
359 second (e.g., berry) tiers. Only descriptors that could be coded according to this wheel (i.e. aroma
360 descriptors) were considered for further analysis.

361

362 3.5.4 Subjective knowledge

363 Participants were asked to assess, on a 10-point scale, their knowledge of wine as closer to
364 that of a novice (1) or closer to that of an expert (10). In addition, participants were asked to
365 assess the average person's knowledge of wine on the same novice/expert 10-point scale. This
366 projective measure was included because people tend to overestimate their own expertise (Alba
367 and Hutchinson, 2000).

368

369 3.5.5 Analyzes

370 Because two of the hypotheses involved a metrically scaled moderator variable, a
371 regression-based approach (PROCESS; Hayes, 2013) that avoids dichotomization of the
372 moderator was chosen to analyze the data (see, e.g., Fitzsimons [2008] for advocacy of this
373 approach).

374

375 4. Results

376 4.1 Manipulation Check

377 Results from an ANOVA—with perceived incongruity as a dependent measure, and
378 schema incongruity and schema representation as manipulated dichotomous factors—indicated
379 that the participants' (in the main sample) perceived incongruity varied as expected. The schema
380 incongruity–schema representation interaction was statistically significant ($F(1, 222) = 4.497, p =$
381 $.041$). Together with the specific observations (Fig. 2) that difference in perceived incongruity
382 across the congruent and incongruent conditions was significant for participants in the schema
383 condition (Contrast_{schema}: $M_{\text{incongruent}} = .100, M_{\text{congruent}} = -.317, p = .029$), but not for participants in
384 the no-schema condition (Contrast_{no-schema}: $M_{\text{incongruent}} = -.293, M_{\text{congruent}} = -.143, p = .457; F(2,$

385 222) = 3.14), this interaction effect evidences that the manipulations worked properly for the
386 experimental participants.

387 Moreover, the perceived incongruity values in the incongruent condition differed from the
388 extreme values for both the schema ($M_{\text{perceived incongruity}} = .10 < 2, t = -12.69, .10 > -2, t = 14.02$),
389 and the no-schema participants ($M_{\text{perceived incongruity}} = -.29 < 2, t = -17.02, -.29 > -2, t = 12.67$).
390 This suggests that the incongruity was moderate, not extreme.

391

392 **[Insert Figure 2 about here]**

393

394 ***4.2 Test of Hypotheses***

395 To test Hypothesis 1, actual sensory liking was regressed on the manipulated dichotomous
396 factor schema incongruity and the measured metric factor expertise. Subjective and projected
397 knowledge served as covariates. The regression model had an acceptable fit ($R^2 = .09, F(5, 208)$
398 $= 3.9, p = .002$). A significant main effect of schema incongruity on liking was observed
399 ($\beta_{\text{incongruity}} = .72, SE = .26, t = 2.76, p = .003$ [one tailed]). No particular effect on liking from
400 expertise was hypothesized. This main effect was also not significant ($\beta_{\text{expertise}} = -.029, SE = .04,$
401 $t = -.69, p = .25$ [one tailed]).

402 Supporting Hypothesis 1, the interaction effect of incongruity and expertise on actual
403 liking was significant ($\beta_{\text{incongruity} \times \text{expertise}} = .129, SE = .07, t = 1.74, p = .041$ [one tailed]). To
404 probe this interaction, the Johnson-Neyman (JN) technique was applied (see Fig. 3). The JN-
405 technique derives the values of expertise such that the ratio of the conditional effect (i.e. the
406 difference in means between the incongruent and congruent condition) to its standard error is
407 exactly equal to critical t-value associated with $p = .05$ (Hayes 2013, p. 240). Along the

408 continuum of values for expertise the difference in means between incongruent and congruent
409 condition will shift between statistically significant and not significant. The region of significant
410 difference starts at expertise = 8.37 correct answers on the quiz. For participants with an expertise
411 score equal to or higher than 8.37, the schema-incongruity effect is significant. For participants
412 with expertise levels lower than 8.37, the incongruity effect is not significant. Higher levels of
413 expertise were thus associated with the incongruity effect, whereas lower levels were not. For
414 further illustration, Table 1 displays the means for the congruent and incongruity conditions at
415 different values of expertise, both within and outside the region of significance.

416 Expected liking means were not significantly different across schema incongruity
417 conditions at any of levels of expertise (see Table 1). Hence, the effects on actual liking can be
418 attributed to the variables that varied in the experiment.

419

420 ***4.3 Auxiliary Analyses***

421 The participants' aroma descriptions based on their actual smelling and tasting of the wine
422 were analyzed to cast light on the relationship between their sensory experience and expertise. It
423 was expected that experts would be able to use more descriptors from the detailed third tier than
424 would novices. It was further expected that there would be smaller differences between experts
425 and novices regarding the first- and second-tier descriptors, because these tiers contain more
426 general descriptors. Regression analyses with numbers of third-tier aroma descriptors based on
427 participants' smelling of the wine as a dependent variable and expertise as the independent
428 variable revealed a positive relationship ($\beta_{\text{expertise}} = .28$, $SE = .03$, $t = 4.44$, $p = .00$ [one tailed]).
429 The relationship between expertise and number of first-/second-tier aroma descriptors was not
430 significant ($\beta_{\text{expertise}} = -.04$, $SE = .01$, $t = -.56$, $p = .23$ [one tailed]).

431

432 **[Insert Figure 3 about here]**

433

434 To test Hypothesis 2, actual sensory liking was regressed on the manipulated dichotomous
435 factors schema incongruity and schema representation. The fit of the regression model was
436 acceptable ($R^2 = .04$, $F(3, 223) = 2.9$, $p = .037$). A significant main effect of schema incongruity
437 on liking was observed ($\beta_{\text{incongruity}} = .547$, $SE = .26$, $t = 2.13$, $p = .017$). No particular effect on
438 liking from schema representation was hypothesized, and this main effect was also not significant
439 ($\beta_{\text{schema representation}} = -.034$, $SE = .26$, $t = -.13$, $p = .448$).

440 Supporting Hypothesis 2, the interaction effect of incongruity and schema representation
441 was significant ($\beta_{\text{incongruity} \times \text{schema representation}} = 1.03$, $SE = .52$, $t = 2.00$, $p = .023$ [one tailed]).
442 Further analysis (see Fig. 4 and Table 1) revealed that the schema-incongruity effect appeared for
443 participants in the schema condition ($\hat{Y}_{\text{incongruent}} = 6.12$, $\hat{Y}_{\text{congruent}} = 5.08$), but not for participants
444 in the no-schema condition ($\hat{Y}_{\text{incongruent}} = 5.66$, $\hat{Y}_{\text{congruent}} = 5.65$). The condition that facilitated the
445 use of schema-based evaluation was associated with the congruity effect, whereas the condition
446 that did not facilitate the use of a schema was not. Expected liking means were the same for all
447 cells in the experiment (Table 1). Therefore, the effects reported for actual liking were most
448 likely produced by the manipulated variables.

449

450 **[Insert Figure 4 about here]**

451

452 In the regression used to test Hypothesis 3, actual sensory liking was a dependent
453 measure, schema incongruity and schema representation were manipulated dichotomous factors,

454 and expertise was a measured metric factor. Subjective and projected knowledge were covariates.
455 The regression model's fit was acceptable fit ($R^2 = .12$, $F(9, 204) = 3.0$, $p = .003$). The three-way
456 interaction of incongruity, expertise, and schema representation on liking was significant
457 ($\beta_{\text{incongruity} \times \text{expertise}} = -.260$, $SE = .15$, $t = -1.737$, $p = .042$ [one tailed]). The JN-technique was
458 applied to probe this interaction (see Fig. 5). The interaction between incongruity and schema
459 changes from statically significant and not significant at expertise equals to 9.14 correct quiz-
460 answers. Below this expertise level there is a significant two-way interaction between incongruity
461 and schema representation. This means that the incongruity effect occurs for participants in the
462 schema condition, but not for participants in the no-schema condition below this expertise level.
463 For example, Table 1 shows that at the 25th expertise percentile (which corresponds to 8 correct
464 answers), there is a difference in liking between incongruent and congruent wine label for the
465 schema condition (6.17 vs. 5.05, $t = 2.77$), but not for the no-schema condition (5.74 vs. 5.97, $t =$
466 $-.53$). At and above the expertise level of 9.14, schema representation does not moderate the
467 effect of incongruity on wine-liking. For example, at the 75th expertise-percentile (which
468 corresponds to 12 correct answers) there is a difference in liking between the incongruent and
469 congruent conditions, both for the schema (6.14 vs. 5.06, $t = 2.44$) and the non-schema (5.98 vs.
470 5.21, $t = 1.71$) conditions. Taken together, these results support Hypothesis 3. The incongruity
471 effect is moderated by schema representation for lower, but not for higher levels of expertise.

472 The expected liking means were largely equal across schema incongruity conditions for
473 all levels of expertise (Table 1). The effects on actual liking can, therefore, be attributed to the
474 variables that were manipulated in the experiment.

475

476 **[Insert Figure 5 about here]**

477

478 **[Insert Table 1 about here]**

479

480 **5. Discussion**

481 The results of this study suggest that in complex domains, such as wine, expertise
482 moderates the incongruity effect, but differently from what has been found in noncomplex
483 domains. Contrary to previous findings, the results here demonstrate the incongruity effect for
484 consumers with high degrees, but not for consumers with low degrees of expertise.

485 In sensory research, a common assumption is that sensory experiences that confirm
486 consumers' expectations lead to more favorable food product evaluations than disconfirming
487 experiences. The results of the present study suggest that this line of thinking can be expanded.
488 Moreover, the results reported here provide an alternative explanation to Silva et al.'s (2017)
489 account that incongruent food experiences are preferred to congruent ones because expectations
490 may override the incongruent experience.

491 The significant interaction between incongruity, expertise, and schema supports the idea
492 that experts' use of established schemata is key to understanding why expertise moderates the
493 incongruity effect. The incongruity effect was present when schema processing was facilitated,
494 regardless of expertise level, but in the absence of such facilitation, the effect was only present
495 for higher levels of expertise. This result suggests that the incongruity effect is a schema-level
496 phenomenon that should not be expected when piecemeal processing of stimuli information is
497 likely.

498 It can be speculated that an inverted U-shaped relationship between the moderate
499 incongruity effect and expertise reconciles the current results and those of Peracchio and Tybout

500 (1996). For extremely low levels of expertise (i.e., novices) there is no incongruity effect because
501 no schema is developed to assess (in)congruent stimuli. For moderate levels of expertise, a
502 developed schema to assess (in)congruent stimuli exists, and therefore an accompanying
503 incongruity effect exists also. For extremely high levels of expertise, the schema structure is so
504 extensively developed that incongruity is resolved without much cognitive effort and with no
505 incongruity effect as a result. In the domain of desserts, most people have developed at least
506 some schema structure—hence Peracchio and Tybout’s (1996) finding that the incongruity effect
507 occurs for novices. In the wine domain, few people have developed schematic structures that are
508 extensive enough to automatically resolve incongruity—hence the finding that experts can face
509 incongruity and display the incongruity effect. Future research should, therefore, investigate
510 whether the incongruity effect disappears among experts with the highest level of expertise in
511 their complex domain.

512 From the findings reported in this research, we know that the incongruity effect holds for
513 consumers with high degrees, but not for consumers with low degrees of expertise. This means
514 that educating consumers to become experts in a product category, or target existing expert
515 segments, would be a clever strategy for companies launching new and/or incongruent products
516 in complex domains. Moreover, this strategy recommendation is quite opposite from that
517 suggested for product launches in simplistic domains—i.e., avoid educating consumers, or target
518 novice segments.

519

520 **6. Limitations**

521 In this research, expertise was captured using a measure of objective knowledge, rather
522 than via the more valid approach of selecting expert participants by means of credentials

523 (Shanteau 1992; Spence and Brucks 1997). A measured variable might have limited validity as it
524 is likely to share variance with other unmeasured variables. Therefore, the reported effects of
525 expertise on actual liking may have been confounded with effects of variables such as wine
526 interest or task involvement. Future research should therefore use credentials to recruit experts
527 and nonexperts.

528 Schema representation was manipulated by providing participants with elaborate and
529 structured information. On the surface, this manipulation appears to have been successful. A
530 manipulation check suggested that schema-level participants held more relevant information in
531 memory than no-schema participants. In addition, expected liking was the same for both levels of
532 schema representation, whereas actual liking differed in the hypothesized directions. Hence, the
533 effects on actual liking can be attributed to manipulated differences in schema representation.
534 Nevertheless, the effects produced by differences in schema representation may not be enduring.
535 A schema takes time to alter, and the more expertise a person possesses, the more resistant to
536 change his or her schemata are. Therefore, the observed effects on wine liking might have been
537 more a result of temporal expectations than of changes in well-established schemata.

538

539

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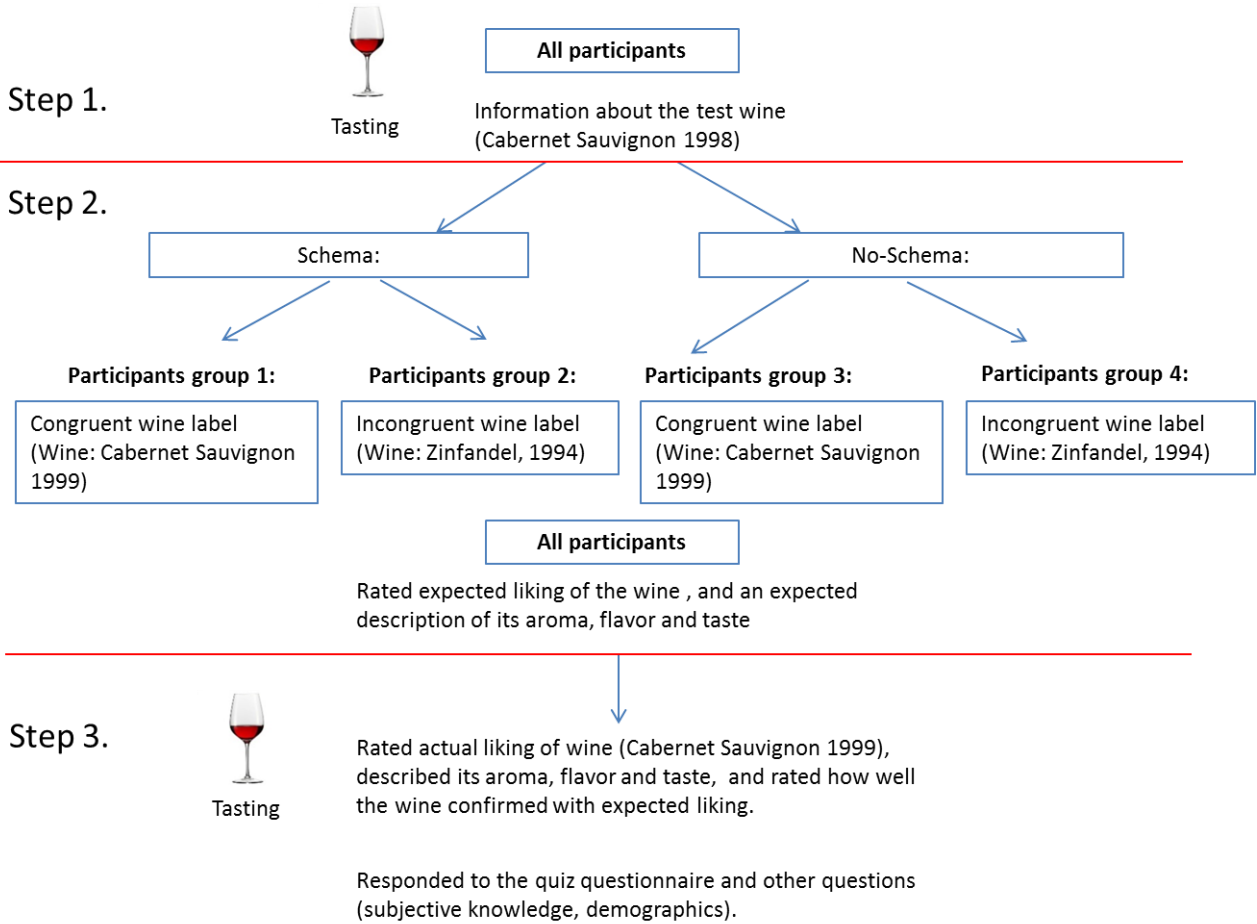
670

FIGURES

FIGURE 1

DIAGRAM OF DESIGN AND PROCEDURE

671



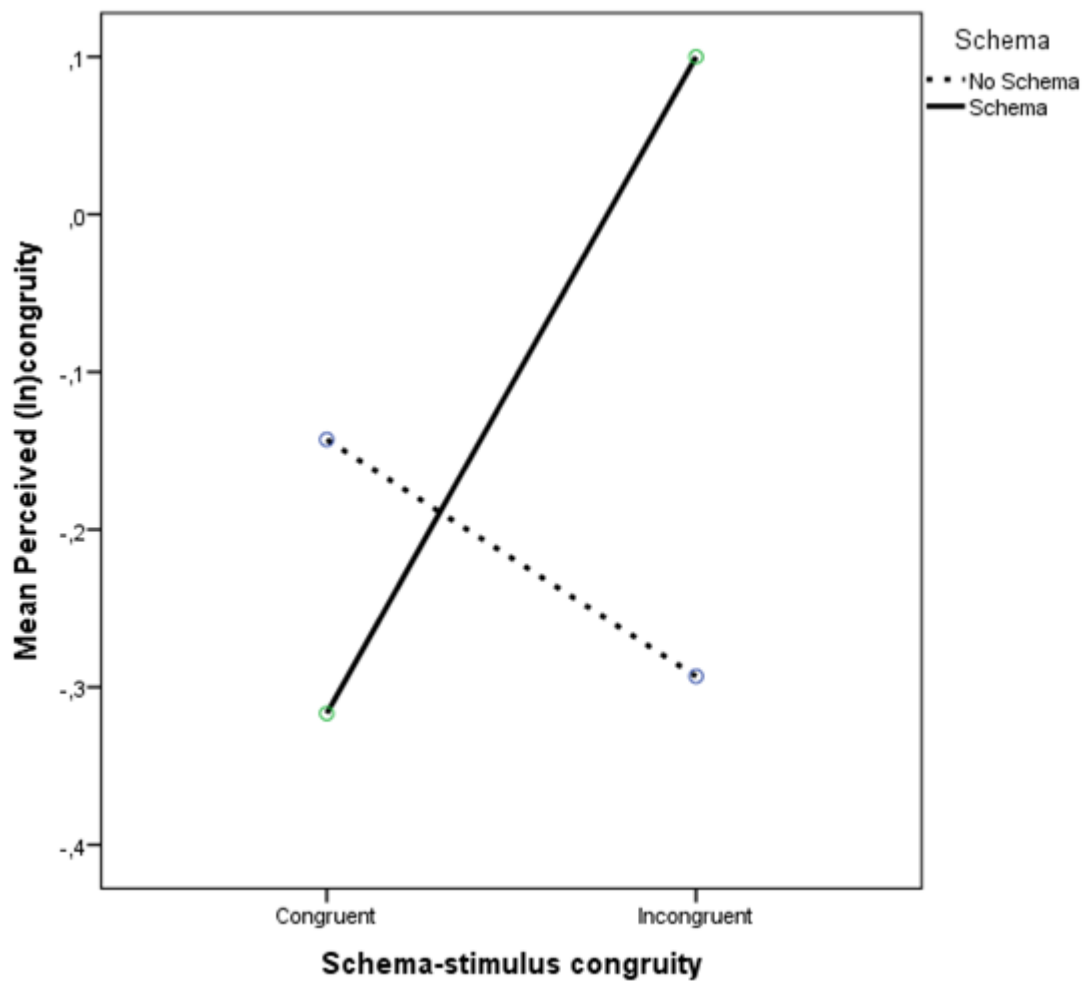
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FIGURE 2

**PERCEIVED IN(CONGRUI)TY OF WINE IN SCHEMA AND NO-SCHEMA
CONDITIONS BY INCONGRUENT AND CONGRUENT WINE LABEL**

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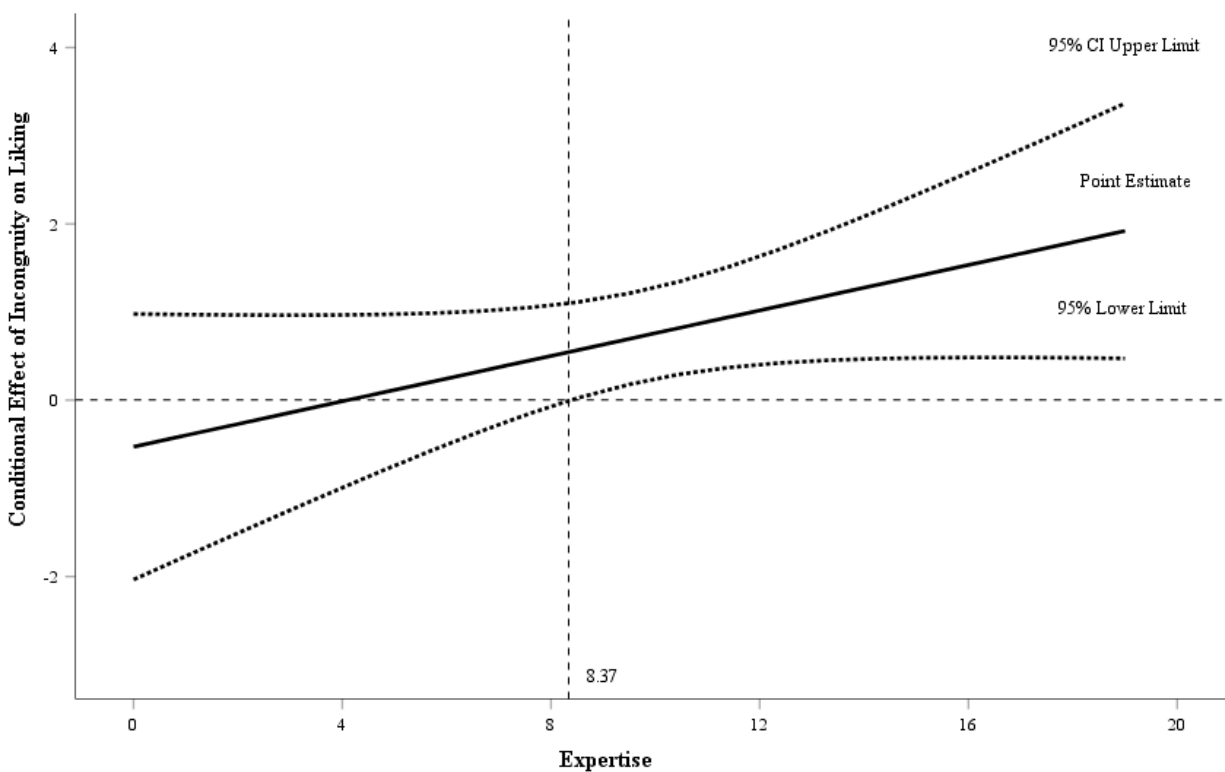


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676 Notes: Perceived incongruity = a five-points scale anchored with “much better than expected (+ 2)” and “much
677 worse than expected (- 2).” Congruent = information that correspond to the wine label, incongruent = information
678 that does not correspond to the wine label. Schema = elaborated wine characteristics information; No-Schema = no
679 elaborated wine characteristics information.

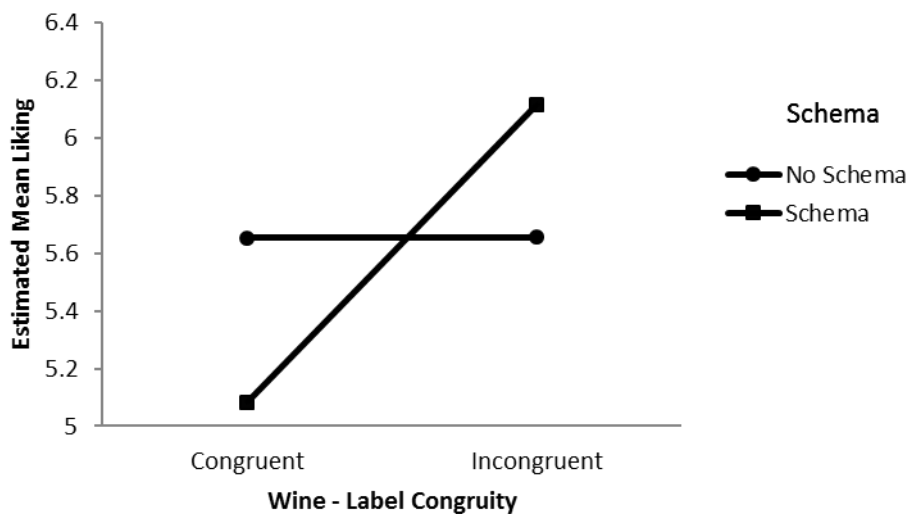
FIGURE 3

THE CONDITIONAL EFFECT OF CONGRUENT VS. INCONGRUENT WINE LABEL ON SENSORY LIKING OF WINE AS A FUNCTION OF EXPERTISE



Note: The Y-axis shows the difference in means on the liking scale between the incongruent and congruent condition (i.e. the incongruity effect). Liking = a hedonic 9-point scale, anchored with 'dislike very much' and 'like very much.' Expertise: Ranges from 0 to 20 correct answers on a quiz. At or above 8.37 correct answers the incongruity effect is significant. Below 8.37 this effect is not significant. The solid line represents point estimates for the incongruity effect. The dotted lines represent the upper and lower limits of the confidence interval for this effect.

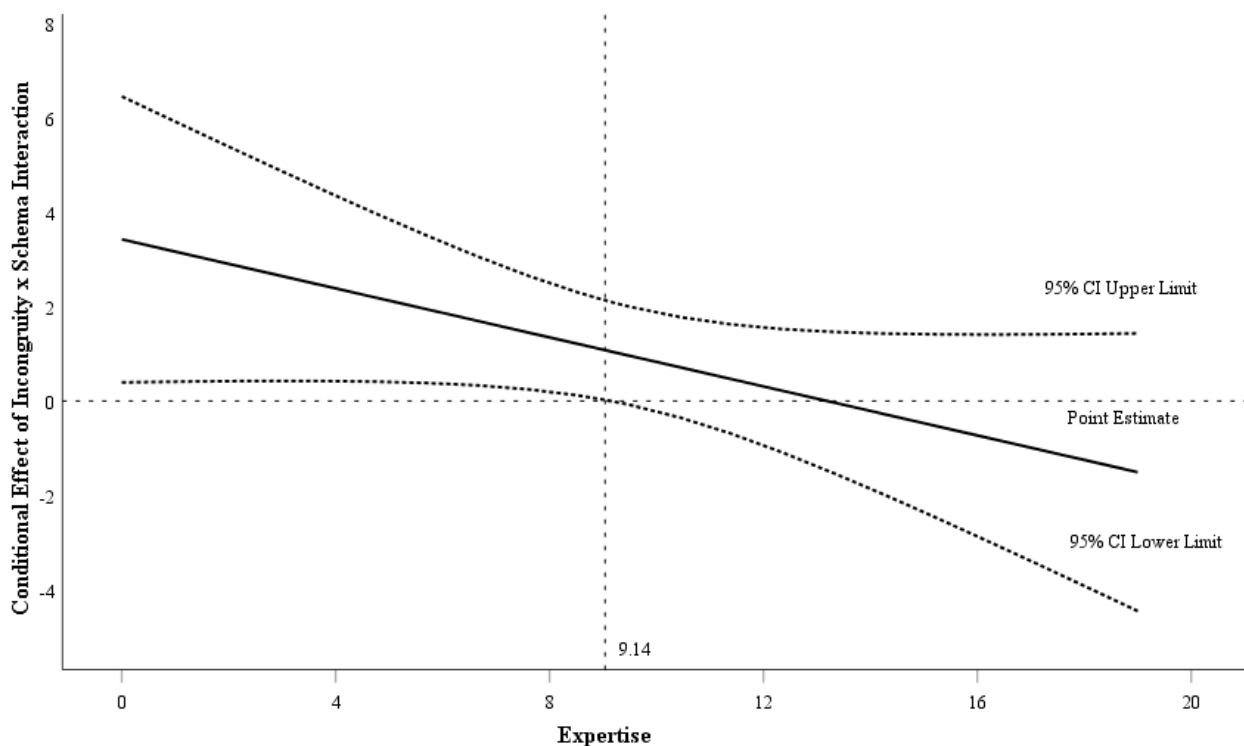
FIGURE 4
SCHEMA VERSUS NO-SCHEMA-BASED SENSORY LIKING OF WINE BY
INCONGRUENT AND CONGRUENT WINE LABEL



Note: Liking = a hedonic 9-point scale, anchored with 'dislike very much' and 'like very much'. Congruent = information that corresponds to the wine label, incongruent = information that does not correspond to the wine label. Schema = elaborated wine characteristics information; No-Schema = no elaborated wine characteristics information.

FIGURE 5

**THE CONDITIONAL EFFECT OF CONGRUENT VS. INCONGRUENT WINE
LABEL X SCHEMA VS. NO-SCHEMA INFORMATION ON SENSORY LIKING OF
WINE AS A FUNCTION OF EXPERTISE**



Note: The Y-axis shows the two-way interaction effect between incongruity and schema-representation on liking (i.e. the moderation of the incongruity effect). Liking = a hedonic 9-point scale, anchored with 'dislike very much' and 'like very much.' Expertise: Ranges from 0 to 20 correct answers on a quiz. At or above 9.14 correct answers the interaction effect is not significant. Below 9.14 the interaction effect is significant. The solid line represents point estimates for the interaction effect. The dotted lines represent the upper and lower limits of the confidence interval for this interaction effect.

TABLE 1
SUMMARY OF MEANS BY EXPERIMENTAL CONDITION

Descriptors	Actual Wine Liking			Expected Wine Liking		
	Mean	SE	t-value	Mean	SE	t-value
H1: Incongruity x Expertise						
10 th Expertise Percentile						
Incongruent	5.80	.37		6.48	.31	
Congruent	5.81	.37	-.02	6.06	.31	.99
25 th Expertise Percentile						
Incongruent	5.93	.20		6.41	.17	
Congruent	5.43	.21	1.73*	6.15	.18	1.03
50 th Expertise Percentile						
Incongruent	6.00	.18		6.38	.15	
Congruent	5.24	.19	2.90**	6.20	.16	.78
75 th Expertise Percentile						
Incongruent	6.06	.22		6.34	.19	
Congruent	5.05	.23	3.28**	6.25	.19	.35
90 th Expertise Percentile						
Incongruent	6.13	.30		6.31	.25	
Congruent	4.85	.31	3.11**	6.30	.26	.03

H2: Incongruity x Schema

Schema

Incongruent	6.12	.25		6.32	.21	
Congruent	5.08	.25	2.93**	6.10	.21	.72

No-Schema

Incongruent	5.66	.25		6.43	.22	
Congruent	5.65	.27	.01	6.25	.24	.58

H3: Incongruity x Schema x
Expertise10th Expertise Percentile

Schema

Incongruent	6.20	.58		6.52	.53	
Congruent	5.04	.53	1.61	5.55	.49	1.39

No-schema

Incongruent	5.50	.47		6.42	.41	
Congruent	6.73	.52	-1.76*	6.48	.36	-.14

25th Expertise Percentile

Schema

Incongruent	6.17	.31		6.37	.29	
Congruent	5.05	.28	2.77**	6.06	.26	.76

 No-schema

Incongruent	5.74	.27		6.47	.21	
Congruent	5.97	.32	-.53	6.29	.25	.52

50th Expertise Percentile

Schema

Incongruent	6.15	.26		6.30	.24	
Congruent	5.06	.27	3.04**	6.31	.25	-.10

No-schema

Incongruent	5.86	.26		6.49	.20	
Congruent	5.59	.27	-.71	6.20	.21	.97

75th Expertise Percentile

Schema

Incongruent	6.14	.30		6.23	.27	
Congruent	5.06	.36	2.44**	6.56	.33	-.86

No-schema

Incongruent	5.98	.33		6.51	.26	
Congruent	5.21	.30	1.71*	6.11	.23	1.18

90th Expertise Percentile

Schema

Incongruent	6.12	.40		6.15	.37	
Congruent	5.06	.50	1.78*	6.81	.46	-1.22

No-schema

Incongruent	6.10	.45		6.54	.35	
Congruent	4.83	.39	2.18**	6.01	.30	1.19

Notes: * = $p < .05$. ** = $p < .01$. 10th means the 10th percentile which corresponds to 4 correct quiz-answers. Further, the 25th percentile corresponds to 8 correct answers, the 50th percentile corresponds to 10 correct answers, the 75th percentile corresponds to 12 correct answers, and the 90th percentile corresponds to 14 correct answers.

APPENDIX

MANIPULATION OF WINE SCHEMA

“No-schema” condition

The wine:

Grape: 100% Cabernet Sauvignon

Region: Napa

Vintage: 1998

The wine has been stored in oak barrels where 37% of the barrels were new. The wine was stored for 20 months in the barrels. It is a reserva.

Description:

The color: Is dark red with brown hints on the side

The aroma: complex:

Dark and light berries (black berry, cherry, raspberry),

Spices, like clove

Sweet notes of chocolate, vanilla, butter and cedar

Taste: rich, relatively low acidity

Berries,

Vanilla, bell pepper

Tannins are soft on the palate

Bitter substances can also be noted

About Cabernet Sauvignon in Napa:

Because of differences in micro-climates, and winemaker personalities, wines from this grape can vary greatly.

Cabernet Sauvignon is a grape with strong character. The wines are often dry and very tannic when young. The aging time in the oak barrel is as important as the aging time in the bottle. The most common descriptors of Cabernet Sauvignon include black berry, raspberry, black currant (cassis), bell pepper, olives, eucalyptus, oak, and soy.

“Schema” condition

Participants in the “schema” condition read the same text as in the “no-schema” condition described over, and in addition the following text:

The dark red color: Is typical for Cabernet Sauvignon. Other grapes give lighter Wines. Zinfandel is for example lighter and has a more transparent color. The color changes during aging from red to more brownish. This happens when the color particles (anthocyanins) precipitate when combining with other particles in the wine over time.

Oak contributes to: The vanilla aroma and taste

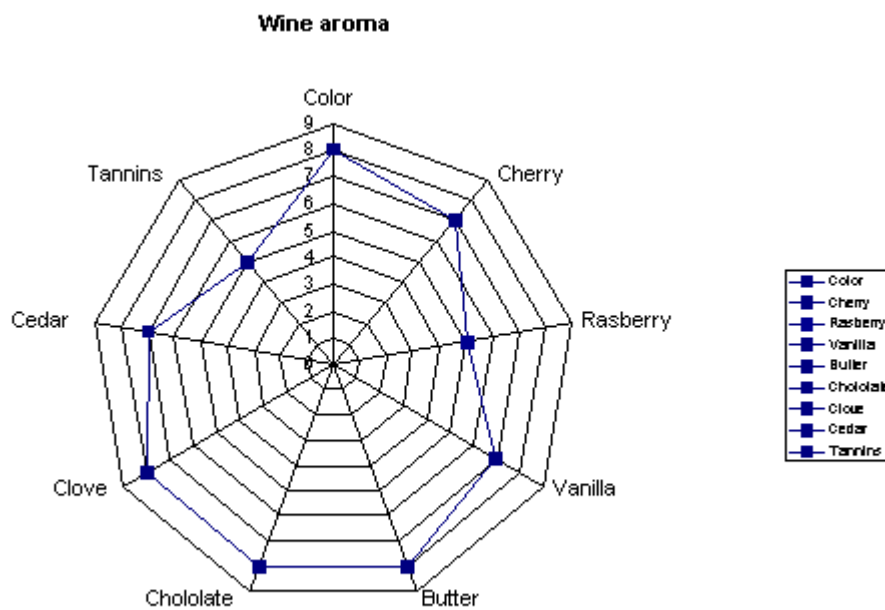
Oak wood characters

Cedar aroma

It allows the wine to breathe more during aging compared to wines stored in stainless steel tanks.

New barrels contribute to stronger oak wood characters.

The wine aroma:



The cobweb can be read like a nine-point scale, with zero intensity (0) in the center and high intensity (9) at the outer ring. The intensity of the typical characteristics of this wine is described on each scale.

MANIPULATION CHECK OF SCHEMA

Which of the following aromas can you expect to sense in a Cabernet Sauvignon wine (check all the ones that you expect)?

- Cherry
- Raspberry
- Vanilla
- Butter
- Chocolate
- Clove
- Cheddar
- Caramel
- Fruit
- Coffee