

1 **The who, where and why of choosing suboptimal foods: consequences for**
2 **tackling food waste in store**

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19

20 **Abstract**

21 Food stores have begun to tackle food waste at the point of sale. They do so by selling
22 ‘suboptimal’ food before it is wasted, typically with a price reduction. However, efficiency of
23 this food waste avoidance action can be improved by knowing for which product category,
24 which store type, which accompanying communication, and which consumer characteristic this
25 action works best. This study uses an experimental online survey conducted in five North
26 western European countries to investigate the effect of communication appealing to either self-
27 versus others-centred motives in either supermarkets or farmers’ markets, for packaged and for
28 fresh food. It is found that both messages – the one communicating budget saving and the other
29 an emotional appeal - are effective in increasing choice likelihood. Store type affects choice
30 likelihood of suboptimal packaged, while others-centred values and trust in the store affects
31 choice likelihood for suboptimal fresh food. Communication improves quality perception of
32 suboptimal fresh food. Findings imply that fresh suboptimal foods lend themselves more to be
33 promoted with others-centred messages, or to be targeted at consumers with others-centred
34 values. In order to tackle food waste in the store, accompanying communication efforts should
35 in particular be focused on attempting to sell suboptimal fresh food.

36

37 **Keywords:** Food waste; Suboptimal food; Communication; Quality perception; Value
38 orientation; Store type

39

40 **Highlights**

- 41 • Selling suboptimal food in store can reduce food waste at the retailer
- 42 • Experimental survey explored the role of communication, store type, and category
- 43 • Communication increases likelihood of choice for suboptimal food
- 44 • Store type plays a role for packaged, but others-centred values and trust for fresh
- 45 • Communication efforts should focus on promoting sales of fresh suboptimal food

46

47 **1. Introduction**

48 Food waste has become a topic of societal concern and research focus in the past decade. The
49 Food and Agriculture Organisation states that about third of world's food is wasted {FAO 2011
50 #49}. There is an increasing body of research dedicated to the topic, looking both at the
51 consumer (e.g. {Block 2016 #616}{Delley 2017 #611}{Visschers 2016 #6}) and the retail
52 level (e.g. {Filimonau 2017 #614}{Cicatiello 2017 #613}{Eriksson 2017 #460}). In addition,
53 there is also a growing research stream exploring food waste from a system-perspective (e.g.
54 {Priefer 2016 #425}{Grainger 2018 #612}{Henz 2017 #615}{Vilariño 2017 #497}). Much
55 research has also been dedicated to quantifying food loss and waste {Edjabou 2016
56 #430}{Parfitt 2010 #77}{Kummu 2012 #68}{Alexander 2017 #441}{Xue 2017 #617}.
57 Statistics, measurements and even the definition of food waste varies according to the source
58 one takes into account {Bellemare 2017 #522}. However, it is rarely disputed that lowering
59 food waste levels is beneficial for environmental {Scherhauser 2018 #792}, social and
60 economic reasons. Consequently, food waste is one of the aims in the UN sustainable
61 development goals {UN 2015 #322}.

62 Food waste is caused by a diverse set of interrelated factors {Hebrok 2017 #427}{Quested
63 2013 #650} and it originates in particular from the downstream end of the supply chain {Parfitt
64 2010 #77}. Causes of food waste are for example rooted in decisions taken by the food supply
65 chain actors on issues such as cosmetic standards {Hooge 2018 #651}{Loebnitz 2015 #354},
66 packaging {Williams 2012 #583}{White 2016 #582}, labelling {van Boxstael 2014 #747},
67 pricing tactics {Mallinson 2016 #570}{Porpino 2015 #537}{Koivupuro 2012 #12} or take-
68 back agreements in supplier-retailer relationship {Eriksson 2017 #460}. At the consumer, food
69 waste often stems from the trade-offs that consumers perceive between the different food-
70 related goals in their daily life {Aschemann-Witzel 2015 #554}, and occur at multiple stages

71 of the consumer's interaction with food {Block 2016 #616}{Richter 2018 #774}{Hebrok 2017
72 #427}.

73 A lot of media focus has been given to the food waste that is caused in the supermarket.
74 Retailers have consequently started to address the issue as part of corporate social responsibility
75 efforts, or allowed their waste streams to be explored {Cicatiello 2017 #613}{Eriksson 2012
76 #436}{Teller 2018 #784}. Retailers have begun to strike agreements for donating unsold food
77 to food banks {Caraher 2014 #748}, or giving shelf space to new packaging formats that are
78 designed to reduce food waste (for example, easy to be emptied, or smaller units targeted to
79 single households {Aschemann-Witzel 2017 #380}.

80 Price strategies play a large and potentially beneficial role in supermarket's efforts to tackle
81 food waste in store. Price reduction is of widespread application for food waste avoidance in
82 supermarkets {Kulikovskaja 2017 #468}. It is used for food items nearing the expiration date
83 – called expiration date-based pricing {Theotokis 2012 #359} - or for products slightly
84 damaged or starting to look unappealing. Such foods are also called 'suboptimal foods', and
85 suboptimal food is defined as food which is edible, but perceived as deviating from normal or
86 optimal food, as for example in appearance or because the food approaches the date label
87 {Hooge 2017 #8}. The advantage of price reduction for suboptimal food is that food waste in
88 the store is reduced - which incidentally also improves employee satisfaction {Gruber 2016
89 #324} - while no additional resources need to be used to transport the food to another
90 alternative store {Aschemann-Witzel 2017 #380}. Thus, the food waste is avoided at its source.
91 This policy can thus be regarded as particularly beneficial in terms of the food waste hierarchy
92 {Papargyropoulou 2014 #793}.

93 However, price reduction for suboptimal food requires additional personnel resources
94 {Aschemann-Witzel 2017 #433}. In addition, given that product characteristics or pricing

95 strategies impacts store image {Hartman 2005 #771}{Chang 2014 #770}, retailers might be
96 concerned about how price reductions and the display of suboptimal and potentially ‘shabby’
97 foods might affect quality perception and/or store image. Therefore, greater in-depth
98 knowledge is needed to alleviate these concerns, and to explore how to apply the action of
99 offering price-reduced suboptimal food to combat food waste most efficiently.

100 On this background, the goal of the current study was firstly, to assess the effect of different
101 types of additional communication to support the choice of suboptimal price-reduced food, as
102 well as to explore how choice differs depending on store type, product category, and consumer
103 characteristics. The communication appealed to either self-centred or others-centred motives,
104 assuming that supermarkets might either appeal to consumers own interest in saving money,
105 or highlight to consumers that they are promoting a ‘good cause’, when accompanying price-
106 reduced suboptimal food with additional communication. The store type was either a
107 supermarket or a farmer’s market context, as it was expected that consumers might react
108 differently in these store types. Secondly, the goal of the study was to explore how different
109 communication or store type context might influence consumer’s subjective product quality
110 perception. The study contributes to understanding consumer behaviour and perception at the
111 point of sale when faced with suboptimal foods reduced in price, allowing to improve business
112 decisions on effective actions to tackling food waste.

113

114 *1.1 Consumer’s motives when responding to responsible marketing in retail*

115 When consumers buy food in retail, the motives connected to why they purchase the item in
116 question which drive choice {Steptoe 1995 #773}{Sautron 2015 #772}. For example, a snack
117 might be bought for satiety, a chocolate for hedonic reasons, and a wine to be served to guests
118 for status reasons. Others-centred motives come into play when ethical foods are concerned,

119 e.g. caring for the environment through choosing eco-labelled food {van Loo 2015 #778} or
120 for marginalised small farmers when selecting fair trade-labelled food {O'Connor 2017 #779}.
121 Research has been looking into the drivers of choice of ethical food, and oftentimes it is found
122 that both self- and others-centred motives play a role {Nguyen 2016 #776}{Hughner 2007
123 #777}. In responsible marketing covering 'ethical' or 'green' food or 'cause-related' marketing
124 {Mendini 2018 #780}, communication might often voice either/or self- and others-centred
125 reasons to buy, in order to appeal to the respective motives. Communication makes the
126 respective motive more salient at the point of decision. If communication space is restricted, it
127 is important to know which is the most important 'unique selling point' or which motive is
128 most relevant for which segment of consumer {Grunert 2019 #794}.

129 With regard to suboptimal food, consumers have been found to be hardly willing to choose
130 such imperfect food unless the price is reduced {Hooge 2017 #8}, and this is not surprising
131 given consumers assess benefit versus cost during purchase {Aschemann-Witzel 2018 #781}.
132 The budget saving achieved through the price reduction of the item appears thus is an important
133 self-centred motive. However, suboptimal food is also communicated as a food avoidance
134 action. This can be regarded as a cause-related marketing example {Theotokis 2012 #359}.
135 Indeed, it has been found that consumers think food waste is highly unethical {Richter 2018
136 #774}. Thus, the food waste avoidance can be an important others-centred motive.
137 Interestingly, some initiatives against food waste use a rather emotional approach to portraying
138 suboptimal food, therewith creating a feeling of pity and sympathy: One can see that in for
139 example the famous Intermarché campaign for the 'inglorious fruit and vegetables', where
140 anthropomorphism is used, while the company Imperfect is depicting the items as underdogs
141 or anti-heroes {Aschemann-Witzel 2017 #380}. These appeals are about contributing to a good
142 cause or helping a 'person', thus essentially an others-centred motive. On this background, we
143 hypothesize the following:

144 H1: **Communication** focused on the budget saving effect and/or an emotional appeal has a
145 stronger effect on **likelihood of choice** of suboptimal food reduced in price, compared to a
146 mere price-reduction.

147 H2: Consumers characterized by *others-centred values* react more strongly to the message with
148 an emotional appeal, and consumers characterized by *self centred values* react more strongly
149 to the communication on the budget saving effect.

150

151 *1.2 The role of the store context and trust for consumer choice and product perception*

152 It is long known that the store image and store type might influence consumer expectation and
153 perception {Grewal 1998 #782}. Different types of store formats such as e.g. discounters
154 versus supermarkets have a different store price image {Chang 2014 #770}. The type of store
155 determines store equity, and equity is defined as the ‘differential effect of store knowledge on
156 customer response to the marketing activities of the store’ ({Hartman 2005 #771}, p. 1112).
157 Both a store with a lower quality image, as well as a reduced price can influence quality
158 perception as well as perceived value, and ultimately purchase intent, via unfavourable
159 negative quality inferences {Grewal 1998 #782}.

160 However, a store type that enjoys a favourable image might more easily convince consumers
161 to accept and choose price-reduced suboptimal food. Especially when the quality of the
162 suboptimal food cannot be assessed before purchase, consumers need to trust the store in order
163 to believe that the food is fine enough to be eaten. A general favourable image towards a
164 specific store type might increase the likelihood that consumers make favourable inferences
165 from the store type to the product quality. A favourable image of a store might be furthered by
166 consumers seeing that the store engages in responsible business practices, as for example
167 fighting food waste {Lombart 2014 #361}. This might hold true in particular for waste - the

168 feeling of discomfort about a waste incident can have negative consequences for the brand
169 involved {van Herpen 2019 #797}. Turning this around, one can assume that learning about
170 the supermarket's efforts in avoiding food waste incidents can create a positive feeling that has
171 positive consequences for the store.

172 Most suboptimal food is offered in retail, but the increasingly popular direct sales of local food
173 in farmers markets enjoys a favourable image {Feldmann 2015 #783}{Yu 2017 #785}. In
174 addition, food categories which are often wasted – as fruit and vegetables as well as bakery
175 products {Hebrok 2017 #427}{Schanes 2018 #795}{Priefer 2016 #425} – can be found sold
176 on farmers markets in particular. Farmers markets can thus be a potentially important point of
177 sale for suboptimal food, as well as a case to study the potential differential effect of store type.
178 On this background, we hypothesize the following:

179 H3: Consumers choose suboptimal food offered at reduced price more likely at the **store type**
180 of the farmers market compared to the supermarket.

181 H4: Consumers express **greater likelihood of choice** for suboptimal food reduced in price
182 when the store in which consumers are told to imagine shopping is assessed with a high *degree*
183 *of trust*.

184 As outlined above, both communication and store type can be expected to influence quality
185 perception of products offered in the store of accompanied by the communication. Thus, we
186 hypothesize:

187 H5: The context – both communication and store type – favourably improves perceived
188 dimensions of **product quality perception**.

189

190 **2. Material and methods**

191 The research design consisted of a survey experiment studying the effect of product category,
192 communication, and store type on first, choice likelihood for price-reduced suboptimal food
193 and second, on the perceived quality dimensions of the food. The sample, the design of
194 experiment including choice of experimental stimuli, and the survey measures are explained in
195 the following.

196

197 *2.1 Sample*

198 A sample of 3114 consumers of the representative online panel of a market research agency
199 (the company Userneeds, member of ESOMAR) was surveyed in May 2017. The study was
200 conducted in the five countries Germany, The Netherlands, Sweden, Norway and Denmark.
201 Respondents were sampled using quotas for age, gender and region of residence in each
202 country. Respondents who used less than the mean interview duration minus two standard
203 deviations were excluded from analysis under the assumption that it is an unrealistically short
204 duration, resulting in a final sample of 3098 (see table 1 for a sample characterization).

205 Insert table 1 here

206

207 *2.2 Experimental design and stimuli*

208 Respondents were randomly allocated to the following experimental groups: 2 product
209 categories x 3 communication variants (including a control with no communication) x 2 store
210 type, resulting in 12 experimental groups (see table 2 for the experimental design).

211 Insert table 2 here

212 *2.2.1 Product categories and images*

213 The product categories were firstly, fresh food which shows sub-optimality in terms of
214 appearance and represented by potato, and secondly, packaged food which shows sub-
215 optimality in terms of the date or the age of the product, and represented by bread. These two
216 categories were chosen because fruit and vegetables as well as bakery products make up the
217 largest share among household food waste {Cicatiello 2017 #613}{Edjabou 2016 #430}. The
218 potato was suboptimal in appearance in that the shape was deformed, and the bread close to
219 expiration date or from the day before – depending on the custom for the location and country,
220 given there were differences in whether there is an expiry date on most bread, or the majority
221 of bread is sold on the day and in bake-off or fresh bread shelves.

222 The optimal and the suboptimal potato was presented with the same images in all countries and
223 for both the supermarket and the farmers’ market. For the bread, four images of breads were
224 shown together, spanning different types of breads. These were jointly presented in all
225 countries in order to represent the assortment of the bread category - a single bread image that
226 would have represented the most typical bread type in all countries was not possible due to
227 country differences in bread culture. The suboptimal variant of the breads was explained as
228 text, but with the same image. All suboptimal products were indicated to be reduced in price
229 by 50% (a reduction determined as being of frequent practice in stores according to previous
230 research, {Kulikovskaja 2017 #468}) compared to the ‘optimal’ food. All respondents where
231 shown an image of the suboptimal versus the optimal variant of the product.

232 *2.2.2 Communication*

233 The communication conditions were firstly, a control with no additional communication,
234 secondly, a communication underlining the customer benefit of budget saving (‘reduced item /
235 low price, save more!’), and thirdly, a communication emotionalising the choice and appealing
236 to the societal benefit of food waste avoidance (‘My shape might not be, but I taste perfect!’

237 and ‘Don’t make me go to food waste!’, for the fresh and packaged food, respectively). The
238 communicational texts were selected based on a previous study that had tested a range of such
239 messages study in the same set of countries {Hooge 2017 #8}.

240 The texts were chosen to either appeal to the self-centred motive of saving money, or to the
241 others-centred motive of avoiding food waste and taking pity of the sub-optimal food. The
242 communication appealing to the self-centred motive was the same for both product categories,
243 while the communication appealing to the others-centred was differently phrased for each
244 category, as the sub-optimality of shape is a characteristic of fresh product, but the sub-
245 optimality date of the packaged product. Thus, the phrasing had to differ in order to refer to the
246 sub-optimality and related food waste avoidance. For an example, see Figure 1.

247 Insert figure 1 here

248 *2.2.3 Store type*

249 Finally, the locations were described as being either a supermarket or a farmers’ market. An
250 image representing the location was included to support respondents in imagining the context
251 (see figure 1). The colour of the sign indicating the price-reduction as well as the sign showing
252 the message was chosen in accordance with the store type. Colours can have an impact on
253 consumer perception and reaction {Helmert 2017 #796}. However, in this case this choice was
254 done in order to increase the realistic representation of the store type and mimic the design of
255 stickers on suboptimal food reduced in price, as they are used in stores {Kulikovskaja 2017
256 #468}.

257

258 *2.3 Survey measures*

259 Respondents were presented with the optimal versus a price-reduced sub-optimal item
260 presented as images, and asked to indicate the likely choice of the suboptimal as percentage on
261 a 0-100% scale. Then, they assessed the quality of the suboptimal item compared to the optimal
262 on a range of quality dimensions, as well as overall {Oude Ophuis 1995 #2}{Grunert 2005
263 #1}. These measures served as dependent variables (see table 3).

264 Insert table 3 here

265 In the further survey, a number of psychographic variables as well as respondents'
266 sociodemographic characteristics were measured. Self-centred and others-centred value
267 orientations were measured by de Groot and Steg's (2007) instrument of egoistic, altruistic,
268 and biospheric value orientations, but only using the first two dimensions. The measure thus
269 consisted of eight statements, four for each of the two dimensions. The possible answers
270 include -1 (opposed to my values); 0 (not important at all) to 7 (extremely important) {Groot
271 2007 #787}. Trust in the store was measured using the sub-dimension 'perceived integrity and
272 benevolence' of the overall trust measure towards commercial entities, consisting of four
273 statements {Lombart 2014 #361}. These items were measured on a 7-point disagree/agree
274 scale. The value and trust scales showed satisfactory or good reliability and were averaged to
275 compute an index (see table 4 an overview and description of the measures). As socio-
276 demographics, the variables gender, age in years, and education (binary, indicating high
277 education finalized yes/no) were included, and it was controlled for the country of study.

278 Insert table 4 here

279

280 *2.4 Analysis*

281 For comparing the effect of the experimental conditions, we used SPSS 24 and applied
282 ANOVA analysis with respective post-hoc test, as well as independent samples t-test for
283 subsequent comparisons.

284

285 **3. Results**

286 *3.1 Likelihood of choice of suboptimal food*

287 We calculated ANOVA with all main effects and two-way interaction for the dependent **choice**
288 **likelihood**, exploring the experimental conditions, the hypothesised consumer variables, as
289 well as controlled for country, gender, age, education, and perceived quality. In the final model
290 presented (see Table 5 and 6), only the main effects are shown given the interactions did not
291 prove to be significant. A ANOVA for each product category is shown, given category
292 differences emerged in the pattern of results.

293 Insert table 5 and 6 here

294 The results show that there is a significant main effect of **communication**. Choice likelihood
295 is significantly lower in the control group (M=44.4, SD=33.5 for fresh, M=49.8, SD=32.4 for
296 packaged product), compared to both the budget saving message (M=51.8, SD=31.2; M=53.2,
297 SD=32.8) and the emotional appeal (M=51.9, SD=32.0; M=56.5, SD=31.2). H1 is thus
298 confirmed. No significant interaction between value orientations of respondents and the type
299 of communication is found. Therefore, H2 is *not* confirmed.

300 However, a main effect of **value orientations** emerged. There is a main effect of expressing
301 self-centred values on choice for both product categories. The parameter estimates are
302 insignificant, but tend to show a negative direction for fresh but a positive direction for the
303 packaged product category. Only for the fresh product category, thus for potato, there is also a

304 main effect of expressing others-centred values, with a positive direction ($B=2.000$ ($t=3.458$),
305 $p=.001$).

306 The results further show that there is a significant main effect of **store type**, but only for the
307 packaged product category. For the packaged product, thus the bread, choice is more likely in
308 the supermarket condition ($M=54.4$, $SD=32.7$) than in the farmers market condition ($M=51.9$,
309 $SD=31.7$). Thus, H3 is *disconfirmed*, as the opposite is found. No significant interaction
310 between store type and trust reported for the respective store is observed. Thus, H4 is *not*
311 confirmed. However, there is a main effect of **trust** for the fresh product only, thus the potato,
312 with a positive direction ($B=2.850$ ($t=4.248$), $p=.000$).

313 In addition, the results show that there are **country** differences in choice likelihood. Inspecting
314 this further, it is observed that in the fresh product category, Swedish respondents were less
315 likely to choose the suboptimal product (with on average 38.0% compared to 49.8-56.6% in
316 the remaining countries), while in the packaged product category, Dutch respondents were least
317 likely to choose the suboptimal product (with on average 48.7%) and German respondents most
318 likely (with on average 57.3%). From among the sociodemographic variables, **age** emerges as
319 significant. With higher age, respondents were *less* likely to choose the suboptimal food item
320 ($B=-.269$ ($t=-7.393$), $p=.000$; across both categories). Finally and not surprisingly, **perceived**
321 **quality** of the respective item is of crucial influence, as the high partial eta-square value
322 indicates. With more positively assessed quality, respondents were more likely to state higher
323 choice likelihood for the suboptimal food ($B=8.324$ ($t=24.519$), $p=.000$; across both
324 categories).

325

326 *3.2 Perceived quality of suboptimal food*

327 To explore H5, the perceived quality dimensions were inspected for each product category,
328 comparing the effect of communication condition and store type. Inspecting the quality
329 dimensions per **communication** (see table 7), it can be seen that only for one dimension, a
330 significant difference is observed for both fresh and packaged suboptimal product: The *price-*
331 *value relation* is significantly higher in both communication conditions compared to the
332 control, for both fresh and packaged product. For the fresh suboptimal product, three further
333 quality dimensions are assessed more favourable when in a communication condition, and
334 these are *appearance*, *taste*, and *freshness*. The means shows a trend of the emotional
335 communication being assessed as most favourable.

336 Inspecting the quality dimensions per **store type** (see table 8), it can be seen that only for two
337 dimensions, a significant difference is observed for both fresh and packaged suboptimal
338 product: The *taste* and the *healthiness* quality dimensions are assessed more favourable when
339 in the farmer's market condition. For the fresh product, again, all other quality dimensions -
340 with exception of *appearance* - are significantly more favourably assessed in the farmers
341 market: *taste*, *convenience*, *production process*, *health*, *freshness*, and *price-value relation*.

342 Based on these observations for both communication and store type, H5 can be confirmed for
343 a range of product quality dimensions, and in particular for the product category of a fresh
344 suboptimal food product.

345 Insert table 7 and 8 here

346

347 **4. Discussion**

348 The goal of the study was to assess the effect of different types of additional communication
349 and store type on likelihood of choice of suboptimal price-reduced food, for two different
350 product categories and exploring different consumer value orientations and trust towards the

351 store type. Further, the goal was to explore how different communication and store type context
352 might influence consumer's subjective product quality perception across a variety of
353 dimensions of food quality. Results of this kind can contribute to improving strategies to tackle
354 food waste in food stores, in that they allow to derive recommendations for targeting the right
355 consumers. Findings provide insights into the 'who, where and why' of suboptimal food
356 choice.

357 The results show that the additional communication increased choice likelihood. The messages
358 chosen might have improved salience of the self-centred or others-centred motive, and the
359 effect was similar for both types of communications tested. Interestingly, previous similar
360 studies showed mixed results for the effect of such communication: a study in Denmark found
361 no effect for a food waste avoidance nor for a budget message, compared to the control with
362 only the price-reduction {Aschemann-Witzel 2018 #789}. However, the communication
363 messages and their presentation as on-pack stickers were already widely used in the country,
364 and the respondents knew which precise retailer they were imagining shopping in. Thus, the
365 high familiarity with the communication and store might have resulted in the textual variations
366 not making any additional difference to consumer's likelihood of choice. Another study in
367 South America, though, did indeed find a differential effect of the communication, and here,
368 other than in the current study, the food waste avoidance message had a stronger effect than
369 the budget saving {Aschemann-Witzel 2018 #763}. It is unclear whether the fact that food
370 waste had been a topic of societal discussion in the European countries of study but not in
371 South America potentially created more attention and curiosity, or whether a cultural difference
372 is underlying this observation. That consumers react positively to the communication
373 associating the action with a cause of avoiding food waste, however, is in line with an earlier
374 study on expiration date-based pricing {Theotokis 2012 #359}.

375 Neither the store type of supermarket versus farmers market, nor whether the respondent in
376 question had high trust in the respective store format showed to have a strong impact on
377 likelihood of choice across the product categories. Previous research of a favourable image and
378 product quality expectation on farmers markets are confirmed, though {Yu 2017 #785}.
379 However, a product category difference becomes apparent for these two variables, as both store
380 type and trust is if relevance for only one, but not the other product category. The packaged
381 food is more likely chosen in the supermarket, while trust in the store is more important for the
382 fresh produce. This might be explained by the fact that the first is a staple food likely bought
383 in supermarkets or their bakeries or bake-off stations on a regular basis, thus a familiar action.
384 For the fresh suboptimal product, quality might be very much a question of credence quality
385 {Oude Ophuis 1995 #2}, and this would explain why the trust in the store format becomes
386 relatively more relevant. For the packaged suboptimal product, closeness to expiration date or
387 freshness of the packaged food is visible for respondents and thus a search quality {Oude
388 Ophuis 1995 #2}.

389 Even more product category differences emerge when inspecting the effect of the experimental
390 conditions on perceived quality dimensions. A differential effect is observed for the fresh
391 product in particular, both for communication and for store type. This might show that the
392 communication alleviates the perception of sub-optimality, and even enhances quality
393 perception, thus showing that consumers are either convinced of the argument, or subject to a
394 halo effect {Sörqvist 2015 #790}. To alleviate the potential negative effect of the price-
395 reduction by a cause-marketing related image is in fact, what the previous study by Theotokis
396 et al. (2012) suggested. The enhanced quality perception that this study finds might confirm
397 their assumption. That it ‘works’ more for the fresh produce might have a number of reasons
398 which can be speculated upon. One of these is that the sub-optimality can be more effectively
399 countered by the message, as it is a mere convenience, but not an inherent difference in quality

400 which is at stake. Another interesting explanation could be that the fresh produce lends itself
401 more to the emotional message. In fact, it is typically fruit and vegetable which are portrayed
402 in a emotionalising way and appealing to pity and care, in the cases of food waste avoidance
403 communications in the market {Aschemann-Witzel 2017 #380}.

404 As a limitation, it has to be noted that research with a certain product example as well as a
405 certain choice of communication is impacted by the specific product in question and the words
406 chosen. Thus, even though the choice of design was carefully considered, results have to be
407 interpreted with the exact context of study in mind. Further, the likelihood of choice is self-
408 reported and hypothetical, and the quality perception is only perceived and not experienced.

409

410 **5. Conclusions and implications**

411 The findings allow a number of conclusions, both across the two categories, and regarding
412 category differences. First and foremost, it can be concluded that accompanying the price-
413 reduction of suboptimal food in-store with a further communication can be expected to increase
414 likelihood of choice for sub-optimal food. Both types of benefits communicated in the message
415 appear equally effective, and the effect is independent from whether or not it matches with the
416 respective respondent's value orientation.

417 Secondly, a pattern of difference emerges between the two categories, and these lead to the
418 conclusion that marketing efforts to support sales of suboptimal food are in particular merited
419 for suboptimal fresh products. This is based on a number of findings: Trust in the respective
420 location and that respondents more likely express others-centred values play a positive role for
421 choice when it is about fresh food. The communication – in particular the emotional one –
422 improved perception of a range of dimensions of quality for fresh suboptimal food, and
423 perception of a range of dimensions of quality for suboptimal food is more favourable at the

424 farmers market, in particular for fresh products. With regard to the store type, it thus appears
425 that the farmers market is more advantageous for promoting sales of suboptimal fresh food,
426 while communication efforts overall are more effective for fresh suboptimal products.

427 Thirdly, a range of findings emerge that show how those consumers are characterized who
428 more likely can be expected to choose suboptimal food: Consumers who assess perceived
429 quality of the suboptimal food as relative better and who are younger more likely stated they
430 would choose the suboptimal variant of the food.

431 As an implication, the results suggest that supporting the sales of price-reduced suboptimal
432 food with additional communication is an effective tool to increase sales in store or at the point
433 of sale. The pattern of category differences indicates that such efforts in promoting choice and
434 perception of suboptimal food is more effective when it comes to fresh produce. In addition,
435 the store format of the farmers market is particularly promising in this regard. Further,
436 supporting quality perception through marketing efforts overall is key. The likely target group
437 for suboptimal food products reduced in price is among the younger consumers. The study thus
438 shows that selling suboptimal food in store as a contribution to tackling food waste in the supply
439 chain can be effectively improved by additional communication, and by focusing efforts on
440 fresh fruit and vegetables.

441 **Table 1. Sample and measure characterization per country**

	NL	DE	SE	NO	DK
Sample size (n)	623	621	620	625	609
Share of gender, female (%)	49.5	48.6	49.3	49.0	50.0
Age in years (mean /SD)	47.9	47.1	47.9	45.3	49.2
	(16.5)	(14.7)	(16.2)	(15.2)	(16.5)
Education, higher (%)	35.5	24.3	33.1	57.6	54.0
Likelihood of choice (%)	49.3	54.7	45.5	53.9	52.9
Perceived quality ‘overall’	4.89	5.01	4.75	4.84	4.68
Value orientation, self-centred	2.46	2.84	2.46	2.38	2.57
Value orientation, others-centred	4.80	4.91	5.15	5.25	4.96
Trust	4.91	4.98	4.50	4.52	4.28

442 *Notes.* NL = The Netherlands, DE = Germany, SE = Sweden, NO = Norway, DK = Denmark.

443 If not indicated otherwise, the mean is given for the psychographic variables.

444 **Table 2. Experimental design**

	Control	Price reduction communicated	Emotional message communicated
Fresh food	Supermarket n=259	Supermarket n=281	Supermarket n=264
	Farmers market n=251	Farmers market n=254	Farmers market n=258
Packaged food	Supermarket n=255	Supermarket n=257	Supermarket n=251
	Farmers market n=260	Farmers market n=253	Farmers market n=255

445 *Notes.* n = 3098.

Table 3. Measure and variable characterisation, likely choice and perceived quality

Variable	Question / Item and scale	Mean (SD)
Likelihood of choice	Likelihood of choice for the fresh product: Imagine you are in/at [supermarket / farmers market]. You have potato on your shopping list. You see these products on the shelf. How likely will you choose the product below instead of above? 0% likely that I choose the product below - 100% likely that I choose the product below [slider scale]	49.4 (32.4) n=1567
	Likelihood of choice for the packaged product: Imagine you are in/at [supermarket / farmers market] at the bakery. You have bread on your shopping list. You see these products on the shelf. How likely will you choose the product below instead of above? 0% likely that I choose the product below - 100% likely that I choose the product below [slider scale]	53.1 (32.2) n=1531
Perceived quality	Compared to the product above, how do you assess or expect the quality of the <u>product below</u> to be, with regard to ...?	
	... how well it looks	4.43 (1.68)
	... how good it tastes	4.91 (1.49)
	... how convenient it is for you to use	4.36 (1.79)
	... the quality of its production process	5.04 (1.32)
	... the healthiness of the product as such	5.19 (1.21)
	... how fresh it is	4.47 (1.73)
	... the price-value relation of the product	5.69 (1.98)
	... taking everything together, its quality overall	4.83 (1.57)
	1 = quality is clearly below 5 = quality is the same 9 = quality is clearly above	

447 *Notes.* n = 3098.

Table 4. Measure and variable characterisation, value orientation and trust

Variable	Question / Item and scale	Mean (SD)
Value orientation:	Below we have enlisted a number of aspects that people value in life. We are interested in the values that are most important in your personal life. Therefore, please indicate for every value to what degree it is a guiding principle in your personal life. The possible answers include -1 (opposed to my values); 0 (not important at all) to 7 (extremely important).	
... self-centred	Control over others, dominance Material possessions, money The right to lead or command Having an impact on people and events	2.54 (1.43) Cronbach alpha =.740
... others-centred	Equal opportunity for all A world free of war and conflict Correcting injustice, care for the weak Working for the welfare of others	5.01 (1.70) Cronbach alpha =.823
Trust: integrity and benevolence sub-dimension	To what extent do you agree or disagree on these statements? I think that [location name] is sincere and honest towards its consumers. I think that [location name] is interested in its consumers. [location name] regularly renews itself to meet the needs of its customers. I think that [location name] tries to meet the expectations of its customers on an ongoing basis. 1 = strongly disagree 7 = strongly agree	4.68 (1.41) Cronbach alpha =.912

449 *Notes.* n = 3098.

450 **Table 5. ANOVA results explaining choice likelihood for suboptimal fresh food**

Independent variables	<i>F</i> value	<i>p</i> value	Partial η^2
Message (control vs price vs food waste)	6.616	.001	.008
Location (supermarket vs farmers market)	.136	.713	.000
Country	14.323	.000	.036
Gender (female vs male)	.249	.618	.000
Education (low vs high)	.019	.889	.000
Age	48.613	.000	.030
Others-centred values	7.284	.007	.005
Trust in the location	7.309	.007	.005
Self-centred values	9.651	.002	.006
Perceived quality of the suboptimal food	325.714	.000	.174

451 *Notes.* $n = 1564$. ANOVA. $R^2 = .248$ (adjusted: .242).

452

453 **Table 6. ANOVA results explaining choice likelihood for suboptimal packaged food**

Independent variables	<i>F</i> value	<i>p</i> value	Partial η^2
Message (control vs price vs food waste)	3.350	.035	.004
Location (supermarket vs farmers market)	5.141	.024	.003
Country	5.545	.000	.014
Gender (female vs male)	.263	.608	.000
Education (low vs high)	1.010	.315	.001
Age	50.696	.000	.032
Others-centred values	2.909	.088	.002
Trust in the location	.122	.727	.000
Self-centred values	5.956	.015	.004
Perceived quality of the suboptimal food	299.376	.000	.165

454 *Notes.* $n = 1527$. ANOVA. $R^2 = .200$ (adjusted: .192). ANOVA.

455

456 **Table 7. Influence of message on perceived quality dimensions of suboptimal food**

	Potato	Bread
Perceived quality dimensions, mean		
... how well it looks	3.82 ^c , 3.90 ^{a,b} , 4.16 ^a	4.87, 4.86, 5.00
... how good it tastes	5.13 ^c , 5.24 ^{a,b} , 5.38 ^a	4.51, 4.53, 4.64
... how convenient it is for you to use	3.70, 3.89, 3.79	4.96, 4.92, 4.97
... the quality of its production process	4.97, 4.98, 5.16	5.04, 4.99, 5.09
... the healthiness of the product as such	5.15, 5.21, 5.29	5.11, 5.09, 5.27
... how fresh it is	5.04 ^b , 5.04 ^b , 5.29 ^a	3.71, 3.85, 3.82
... the price-value relation of the product	5.36 ^c , 5.68 ^a , 5.69 ^a	5.72 ^c , 5.70 ^{a,b} , 6.02 ^a

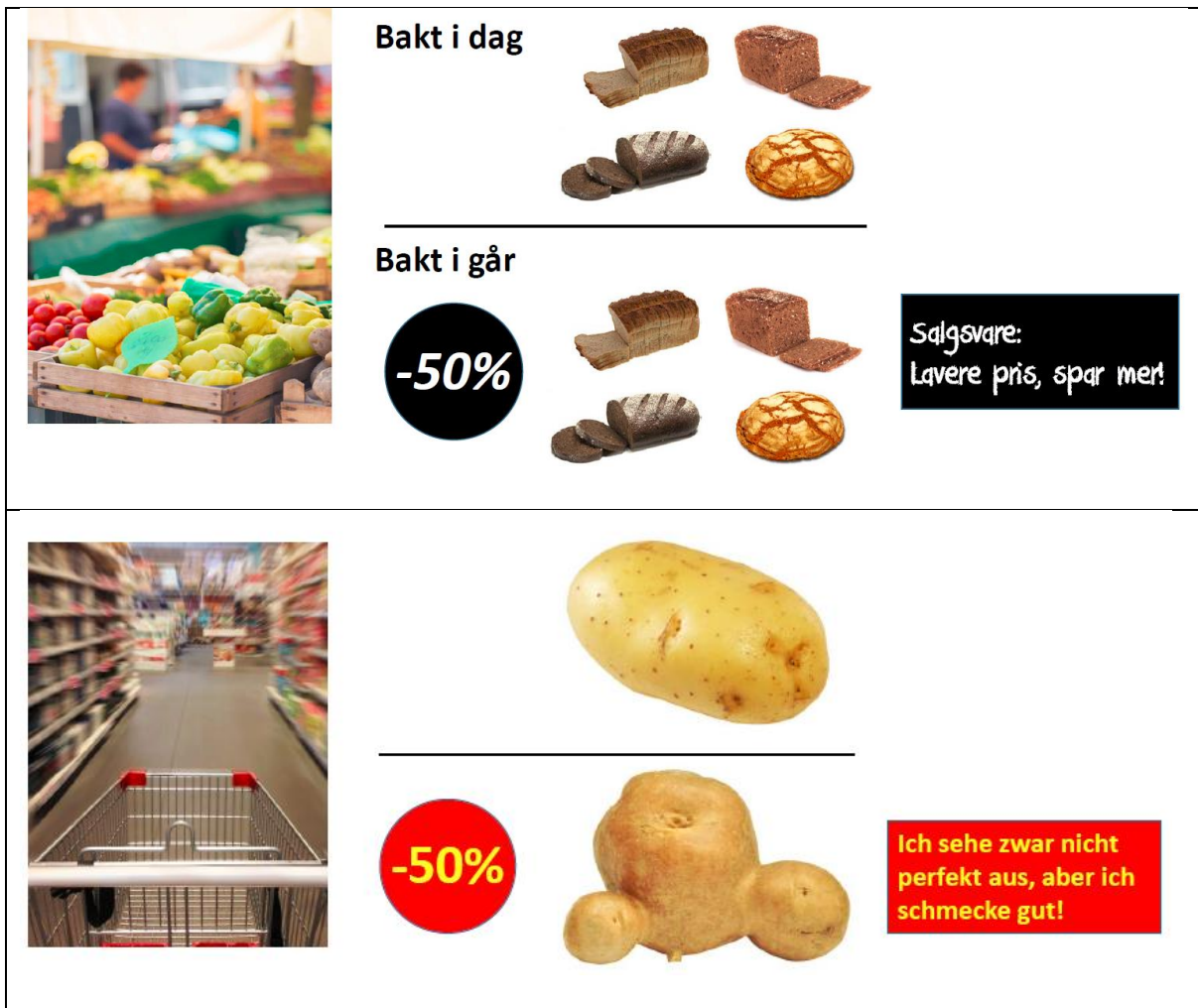
457 *Notes.* Statistical test: One-way ANOVA ($p < .001$) with post-hoc Tukey test. Significant
 458 mean differences between the control, the price, and the emotional message (with $p \leq .001$)
 459 are indicated by different superscript letters.

460 **Table 8. Influence of store type on perceived quality dimensions of suboptimal food**

	Potato	Bread
Perceived quality dimensions, mean		
... how well it looks	3.94, 3.98	4.88, 4.94
... how good it tastes	5.19, 5.31**	4.48, 4.64*
... how convenient it is for you to use	3.71, 3.88*	4.90, 5.00
... the quality of its production process	4.94, 5.14**	5.01, 5.08
... the healthiness of the product as such	5.16, 5.27*	5.09, 5.23**
... how fresh it is	5.04, 5.21**	3.74, 3.85
... the price-value relation of the product	5.47, 5.69**	5.78, 5.85

461 *Notes.* Statistical test: Independent samples t-Test. Significant mean differences between the
 462 supermarket versus the farmers market (with ** = $p \leq .05$; * = $p \leq .10$) are indicated.

463 **Figure 1. Example of the presentation of the choice in the experimental survey**



464 *Notes.* Example above from Norway, farmers market, bread category, message price
465 reduction, example below from Germany, supermarket, potato category, emotional message

466

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