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Situated food safety behavior

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21 **Situated food safety behavior**

22

23 **Abstract**

24 Previous studies indicate that many consumers eat rare hamburgers and that information
25 about microbiological hazards related to undercooked meat does not necessarily lead to changed
26 behavior. With this study we aim to investigate whether consumers' willingness to eat hamburgers,
27 both risky and safe, depends on the situation where they are confronted with the food.

28 A representative sample of 1046 Norwegian consumers participated in a web experiment.
29 Participants were randomly divided into four groups. Each group was told to imagine a specific
30 eating situation (at their friend's place, at home, at a restaurant abroad, at a domestic restaurant).
31 Four pictures of hamburgers (rare, medium rare, medium, well-done) were presented in
32 randomized order, and participants rated their intentions to eat each hamburger. Situated risk
33 perception was measured as the stated likelihood of food poisoning from consuming hamburgers
34 in eight different situations.

35 The results show that both risk perception and risk taking vary depending on the situation. In
36 general, participants perceive their own home to be the safest place to consume a hamburger, but
37 they are significantly more likely to consume an undercooked hamburger when at a friend's place.
38 These findings indicate that situations play an important role for consumers' likelihood of eating
39 unsafe food, and that risk taking does not always follow risk perception. That risk taking is elevated
40 in situations that may have social consequences should be taken into consideration when
41 developing food safety strategies.

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43 **Key words:** Perceived risk, situated risk, food behavior, hamburger risk.

44 1. Introduction

45
46 Consumption of undercooked hamburgers contaminated with *E.coli* (Escherichia coli
47 O157:H7 and other shigatoxigenic E.coli, STEC) can result in severe illnesses, hospitalization and,
48 in worst case, death (Kiermeier, Jenson, Sumner, 2015; Kassenborg et al, 2004). Despite past
49 outbreaks with fatal outcome in both US and Europe (Omer, Alvarez-Ordenez, Prieto M, Skjerve,
50 Asehun, 2018; Alvseike; King et al., 2005), and widespread news coverage informing consumers
51 of the importance of heating their hamburgers to above 68°C to inactivate the bacteria, many
52 consumers still make and eat undercooked hamburgers (Røssvoll, Lavik, Ueland, Jacobsen,
53 Hagtvedt, Langsrud, 2013; Taylor, Holt, Mahon, Ayers, Norton, Gould, 2012; Olsen, Røssvoll,
54 Langsrud, Scholderer, 2014). Studies show that education and food safety information do not
55 always result in proper food handling behavior (Brennan, McCarthy, Ritson, 2007). To be able to
56 develop better prevention strategies, we need to understand the mechanisms that make some
57 consumers eat potentially hazardous foods.

58 Consumers behave differently in different situations. Already 40 years ago, Belk described
59 the situational effect on buying behavior (Belk, 1974; Belk, 1975). We know that consumption of
60 food not only depends on the product, but also on the person, the place and the time where the
61 product is to be consumed (Jaeger et al. 2011, Scholderer et al. 2013). What we do not know much
62 about, is if these situational factors also influence consumption of risky food. Are there situations
63 where people are more likely to consume products that might make them sick? One of the few
64 studies investigating this is Veflen, Scholderer, & Langsrud (2020), which found that both risk
65 perception and social norms influence risk taking.

66 There has been a considerable research interest in investigating people's perception of risk
67 under various choice domains, and perception of risk has been shown to be influenced by whether

68 the risk is voluntary, whether the distribution of risk and benefit is equitable, the extent to which
69 the risk is unknown, the degree of personal control, individual dread etc. (Slovic, 1987). One
70 seminal example of the *domain-specific* aspects of risk is the framing effect of prospect theory,
71 stating that people code the possible outcomes as gains and losses rather than as final states
72 (Kahneman and Tversky, 1979; 1981, 2000). Kahneman and Tversky argue that a person's
73 perception of financial options can be changed, even reversed, with changes of perspective. A
74 given change in a value may be viewed as a gain or a loss depending on the framing (Wang &
75 Johnston, 1995). Weber, Blais, Betz (2002) and Blais and Weber (2006) did also report, in their
76 investigation of five content domains (financial decisions, health/ safety, recreational, ethical, and
77 social decisions), that respondents' degree of risk taking was highly domain specific. People may
78 be risk averse in one domain and risk seeking in others.

79 Although previous studies have shown that consumers' food choices are influenced by
80 context and that risk perception is domain specific, few studies have investigated how different
81 situations influence consumers' decision to eat risky food. In this study, we want to investigate if
82 consumers' inconsistency in preferences for risky food may have a deeper reason. We propose that
83 different situations may change the social meaning of the problem and thereby influence
84 consumers' decisions.

85

86 *1.1 Situated risk perception*

87 Risk perception, how vulnerable to danger or harm people consider themselves to be, is
88 typically defined as a function of two factors: perceived likelihood of experiencing the harm and
89 perceived severity of the harm (Slovic, 1987). The first of these factors, the perceived likelihood
90 of experiencing harm, may vary in different situations. A kitchen's perceived hygiene level and
91 ability to prepare food, may influence the perceived risk of consuming the same product (Tiozzo

92 et al 2017). The lower perceived quality of the kitchen, the higher perceived risk of consumption.
93 Accordingly, we hypothesis that the perceived risk of consuming a hamburger from a not so good
94 kitchen (e.g. a takeaway or petrol station) will be higher than the perceived risk of consuming the
95 same burger from a good kitchen (e.g. at a restaurant).

96
97 *H1: The perceived likelihood of food poisoning from consuming a hamburger is higher at a*
98 *takeaway than at a restaurant.*

99
100 Another factor that may influence risk perception is familiarity. Since Zajonc (1968)
101 published his seminal work on “mere exposure”, illustrating that “*mere repeated exposure to a*
102 *stimulus object enhances his attitude toward it*”, many empirical studies have demonstrated that
103 people prefer the familiar to the unfamiliar. Familiarity seems to create warm feelings (Garcia-
104 Marques & Mackie, 2000) and people often use affect as a heuristic in everyday judgment
105 (Schwarz, 1990). In relation to risk perception, Slovic (1987) shows that unknown risks, like DNA
106 technology and satellite crashes, are more dreaded by laypersons than known risks, like downhill
107 skiing and smoking. Since familiarity has been found also to influence consumers’ evaluation of
108 restaurants’ service quality (Patterson & Mattila, 2007), we propose that consumers will be biased
109 and perceive eating in a familiar setting to be less risky than eating in a more unfamiliar setting.

110
111 *H2: The perceived likelihood of food poisoning from consuming a hamburger is higher at a*
112 *restaurant than at home.*

113
114 *1.2 Situated risk taking*

115 According to numerous theories in social and health psychology, risk perception plays a
116 central role in determining behavior. In the health belief model (Rosenstock, 1974), behavior is a
117 trade-off of risk perception, motivation (defined as the perceived benefits minus the perceived
118 barriers of conducting the behavior) and volitional aspects (cues that prompt action). In protection
119 motivation theory (Rogers, 1983), perceived risk is traded off against the reward offered by the
120 behavior (this is labeled “threat appraisal”). Together with “coping appraisal” (defined as
121 motivational and volitional resources minus response cost) “threat appraisal” forms people’s
122 protection motivation. In both these theories and in many extensions, perceived risk explains
123 behavior. The higher the perceived risk, the less likely the behavior. Some meta-analyses conclude
124 that risk perception is enough to trigger safer behavior (Brewer et al. 2007; Floyd, Prentice, Roger,
125 2000), while others claim the process is more complex. In their meta-analysis of experimental
126 studies of risk behavior, Sheeran, Harris and Epton (2014) found only a small main effect from risk
127 perception. However, risk perception had a stronger effect on behavior when it also triggered
128 emotions such as fear, worry, regret and guilt.

129 One reason that the findings for risk perception on behavior, differ in strength, may be that
130 most studies of risk taking investigate risk taking on an individual level. Both expected utility
131 theory (Van Neuman and Morgenstern, 1944) and prospect theory (Kahneman and Tversky, 1978),
132 to mention two very influential theories, look at individual decision-making. In real life, risk taking
133 is usually made in a social context where other people’s opinions may influence the decision
134 (Friedl, Pondorfer, and Schmidt, 2019). While risk perception may have a strong effect on behavior
135 when people make individual decisions, especially when these behaviors are easy to carry out, this
136 may not be the case in social situations. Not all risks and benefits related to food are health related.
137 Environmental sustainability, economic, cultural and social factors need also to be considered
138 (Rideout and Kosatsky, 2017). As for the social aspect, the fear of interpersonal rejection has been

139 found to improve the effect of health communication. Emphasizing the social consequences of
140 negative health outcomes, increases perceived vulnerability and affects both risk perception and
141 behavioral intention (Murdock and Rajagopal, 2017). Feeling isolated and ostracized is one of the
142 greatest sufferings in life and something people will go to great length to avoid. Individuals may
143 accordingly perceive a behavior to contain a food safety risk, but choose to accept it due to social
144 factors (Wachinger, Renn, Begg, and Kuhlicke, 2013).

145 Evolutionary psychology suggests that the decision between entering or not entering social
146 relationships has been so important to our ancestors' evolutionary success that natural selection has
147 designed domain specific cognitive architecture for how to behave in social settings (Johnson,
148 Myagkov, Orbell, 2013). The fear of a solitary life or to be expelled from your in-group is so
149 overwhelming that humans are biased towards entering social relationships regardless of the
150 possible losses from doing so. A review of the social facilitation of eating shows that people eat
151 more food in groups than when alone (Herman, 2015). This social facilitation effect has often been
152 explained by the fact that social meals have a longer duration than individual meals (Pliner, Bell,
153 Hirsch, and Kinchlab, 2006). Herman (2015) proposes that expectations and impression
154 management might be alternative explanations. In some situations it is a matter of common
155 courtesy to serve guests a lot of food, and for guests to eat what is offered. Studies have found that
156 it is not only the size of the group, but also whom the group consists of that matters. We eat more
157 with family and friends, than with strangers (Herman, Roth, & Polivy, 2003). This can be explained
158 by impression management. We become highly self-conscious when we eat with strangers, since
159 we know they will evaluate us. Such self-consciousness may suppress eating that might be
160 interpreted negatively (see Vartanian, Herman, & Polivy, 2007). These explanations are supported
161 by Veflen, Scholderer, & Langsrud (2020) who found that the pressure to eat disliked food, varied
162 across situations. The expected consequences of non-compliance and the average empathy

163 participants felt with the imagined other were factors found to explain the pressure to comply with
164 the social norm in a particular situation were.

165
166 Based on these findings, we propose that consumers will be more willing to eat risky food,
167 such as an undercooked hamburger, if it is offered by a friend than by a stranger. To turn down a
168 food offer may feel like declining a request for friendship, and may for some people be perceived
169 as riskier than a foodborne illness. In such a situation the fear of hurting your friend, which may
170 negatively affect your relationship, is weighted against the fear of food poisoning. We propose that
171 while risk taking will follow risk perception in a situation where avoiding the risk will have no
172 social consequences (such as at home or at a restaurant), risk taking will diverge from risk
173 perception and be significantly elevated when avoiding the risk may have social consequences
174 (such as at a friend's place).

175
176 *H3: Both perception of the product and perception of the situation influence the intention to eat a*
177 *hamburger.*

178
179 *H4: Intention to consume a risky hamburger (Risk taking) follows perceived likelihood of food*
180 *poisoning (Risk perception) at home and at a restaurant, but increases and diverges from risk*
181 *perception at a friend's place.*

182

183 **2. Materials and methods**

184

185 *2.1 Participants*

186

187 A representative sample of 1046 Norwegian consumers was randomly selected from a
188 consumer panel maintained by TNS Gallup, a professional market research company. The
189 consumer panel consists of 49,000 people living in Norway (about 1% of the Norwegian
190 population). A sample of respondents 18 years or older, with gender and age (average: 45 years)
191 proportional to the population in Norway, was selected (Table 1). All respondents who completed
192 the web survey were awarded 10 points from the market research company's own incentive
193 program (TNS Gallup, 2012).

194

195 *2.1 Stimuli*

196 Hamburgers were made from vacuum-packed ground meat and cooked to four different core
197 temperatures of 55°C (rare), 65°C (medium rare), 73°C (medium well-done) and 80°C (well-done).
198 Immediately after reaching the predefined core temperature, the hamburgers were sliced
199 perpendicular across the center of the flat surface of the patty to reveal the internal color and
200 arranged together with hamburger buns, salad and French fries. Pictures were taken of each of the
201 four different hamburgers (Figure 1).

202

203

204 *2.3 Procedure*

205 We conducted an online experiment with a between sample design for situation. To measure
206 situated risk taking, the participants were randomly divided into four groups and asked to imagine
207 that they had ordered a hamburger in a specific situation (either at their friend's place (n=246), at
208 home (n=266), at a domestic restaurant (n=269), or at a restaurant abroad (n=266). Confronted with
209 a picture of all the four hamburgers (rare, medium rare, medium well-done, well-done) in a
210 randomized order they were asked "What is the likelihood that you would eat this hamburger if

211 served in this situation”?”. They answered on a five-point scale with response categories “very
212 low”, “low”, “neither high nor low”, “high” and “very high”. A “do not know” alternative was also
213 included.

214 To measure situated risk perception, all respondents were asked to indicate their perceived
215 likelihood of being food poisoned by eating a hamburger under different situations (Take-away,
216 petrol station, catering, fast food chain, restaurant/café, garden party, friend’s place and at home).
217 No information related to the hamburgers’ core temperature was given. They answered on a five-
218 point scale with response categories “very unlikely (1)”, “unlikely (2)”, “neither unlikely nor likely
219 (3)”, “likely (4)”, “very likely” (5), or “do not know”. Since data for perceived risk at a restaurant
220 abroad was not collected, we decided to conduct the comparative analysis of risk perception and
221 risk takings for the three specific situations where we had both risk perception and risk taking data
222 (at home, at a friend’s place, at a restaurant).

223

224 2.3 Statistical analysis

225 To test H1, H2 and H3 the data from the experiment were analyzed by means of a mixed
226 model ANOVA, with *hamburger* (rare, medium rare, medium well-done, well-done) as a fixed
227 effect within subjects factor, *situational context* (at their friend’s place, at home, at a domestic
228 restaurant, at a restaurant abroad) as a fixed effect between subjects factor, and *participant* as a
229 random factor.

230 After reporting the mean results for the situated risk perception, the data from three of the four
231 between sample groups in the experiment were analyzed by means of a mixed-model ANOVA,
232 with dimension (risk perception, risk taking) as a within-subjects factor, situational context (at
233 home, at a friend’s place, at a restaurant) as a mixed within-between subjects factor (within subjects

234 for the risk perception dimension, between subjects for the risk taking dimension), and participant
235 as a random factor. This analysis was done to test H4. All analyses were conducted in SAS 9.3.

236
237 **3. Results**
238

239 In this study, we find that people perceive the likelihood of food poisoning from consuming a
240 hamburger to vary under different situations. As illustrated in Figure 2, the least squares mean
241 scores for perceived risk of consuming a takeaway hamburger is higher than when the hamburger
242 is from a restaurant (support for H1), and higher at a restaurant than at home (support for H2). We
243 also find significant differences both between the intention to eat the different hamburgers and
244 between intended consumption of a hamburger under different situations (support of H3), but no
245 interaction effect between these two factors. The parsimonious model tested explained 67% of the
246 variance in intention to eat a hamburger. From Figure 3 we can see that out of the four hamburgers,
247 the respondents are least likely to consume the rare hamburger, while the medium rare hamburger,
248 cooked to 65 °C core temperature and therefore still a risky hamburger, is the hamburger with the
249 highest likelihood of intended eating ($p < 0.001$). We can also see that out of the four situations the
250 respondents are most likely to eat all hamburgers when offered at their friend's place, followed by
251 at home, at a domestic restaurant, and least likely when offered at a restaurant abroad ($p < 0.001$).
252 No interaction effects between doneness and situation were found ($p = 0.4$).

253 There was a significant main effect of situational context (see Table 3): risk perception and risk
254 taking were generally lower in the situational context of participants' own homes than in the two
255 social contexts of a friend's place or a restaurant ($p < .001$). The effect was qualified by a significant
256 interaction between situational context and dimension ($p < .001$). As hypothesized in H4, a
257 significant effect was only found in the situational context of a friend's place: here, risk perception

258 and risk taking were significantly increased relative to participant's own homes, whereas in the
259 context of a restaurant, risk perception was increased but risk taking was not (Figure 4).

260

261 **4.Discussion**

262

263 To improve our understanding of why some people consume potentially hazardous foods, we
264 investigated how both perception of the product and perception of the situation influence risk
265 perception and risk taking. We find that the likelihood of eating hamburgers varies with both the
266 products' doneness and the situation (Support for H3). The perceived likelihood of food poisoning
267 from consuming a hamburger also varies across situation. That the risk of consuming a hamburger
268 is perceived higher at a takeaway place than at a restaurant, and lowest at home, indicates that both
269 the perceived quality of a kitchen and familiarity of a place matters for the perception of a product's
270 safety (supports H1 and H2).

271 Our finding that consumers are more likely to eat a risky hamburger when this is offered
272 by a friend, indicates that the social context influences consumers' risk behavior. That the decision
273 to eat a hamburger is influenced by who offers it, is in line with previous research showing that
274 people eat more in a social situation (Herman, 2015), and when together with friends (Herman,
275 Roth, & Polivy, 2003). They even eat risky food in situations with a pressure to comply with the
276 social norm (Veflen, Scholderer, Langsrud, 2020). In this study, we find that social aspects of a
277 situation influences people's consumption of risky food. As an explanation we propose, based on
278 the findings from Veflen, Scholderer, & Langsrud (2020), that people consider the social risk of
279 hurting their friend, which may negatively affect the friendship, when deciding to eat an
280 undercooked hamburger or not. This is why consumers are less likely to eat a hamburger with the
281 same degree of doneness when they are at their own home compared to when they are at their

282 friend's place. That consumers are more likely to eat hamburgers, both rare and well-done, at a
283 domestic restaurant than at a restaurant abroad, indicates that familiarity removes skepticism. The
284 warm feeling, evoked by something familiar, bias consumers and make them more likely to
285 consume risky food from a restaurant in their own country than from a restaurant in a less known
286 country (Patterson & Mattila, 2007).

287 Our finding that situation has an effect on risk taking independent of risk perception,
288 supports our proposition that situational context influences the risk perception—risk taking
289 relationship. That the decision to eat an undercooked hamburger is influenced by where it is
290 offered, is in line with previous research showing that situation specific social norms influence the
291 consumption of risky food (Veflen, Scholderer, & Langsrud, 2020). In some situations, the
292 anticipated social consequences become more salient than the food safety risk, and risk taking does
293 not follow risk perception. We observe that even though people perceive hamburgers offered at
294 their friend's place to be more risky than the hamburgers served at home (Figure 2, 3, 4), they are
295 still more likely to consume the hamburgers offered by their friend's. Accordingly, we find support
296 for our hypothesis (H4) that in the absence of social consequences, differences in risk taking follow
297 differences in risk perception, while risk taking diverges from risk perception and becomes
298 significantly elevated in situations that may have social consequences. These findings support the
299 idea proposed by Sjøberg (2000) that "*risk perception is a reflection of the social context an*
300 *individual finds him- or herself in (p. 9)*". But while Sjøberg (2000) claims it is risk perception that
301 is influenced by the social context, we find that it is risk taking that is mostly affected. We can of
302 course only speculate why. Is it because they are afraid of being evaluated negatively? Is it because
303 they are afraid of hurting their friends? Is it because the social setting triggers positive emotions
304 and inhibits their skepticism? More studies are needed to investigate these different explanations.

305

306 *4.1 Limitations and future studies*

307 That people perceive it less risky to eat hamburgers at home, compared to at a restaurant or at
308 a friend's place, indicates that familiarity removes skepticism. The positive affect evoked by
309 something familiar appears to bias consumers and make them perceive undercooked hamburgers
310 from their own kitchen to be safer than the same hamburgers when served by friends or when
311 bought at a restaurant. In future studies, the well-known familiarity effect observed here needs to
312 be investigated in more depth. How does interaction between the familiarity of the product, the
313 place (situation) and the presence of people influence the risk taking? We might expect that an
314 undercooked hamburger, which is a familiar food, will be perceived safer than a raw salmon tartar,
315 but we do not know how risk taking will vary under different familiar and unfamiliar situations.
316 The interaction effects between familiarity and social context deserve further investigation. How
317 will risky products offered by friends at an unfamiliar situation affect risk taking?

318 Another factor that deserves more attention in future studies of risk taking is perceived control.
319 Previous research has found that people tend to see hazardous behavior as less risky if they have
320 some control of the risk (Slovic, 1986; Klein and Kunda, 1994). Although considerable amounts
321 of research have emphasized the importance of perceived control and even suggested that the desire
322 to have an influence on our environment is a universal preference (Langer and Rodin, 1976), little
323 attention has been paid to understand what is meant by control (Harris, 1996). In an attempt to
324 conceptualize perceived control in risk perception, Nordgren, van der Pligt, and van Harreveld
325 (2007) distinguish between two distinct aspects: command over exposure to the risk (volition) and
326 command over the outcome (control). In three studies, they demonstrate that volition and control
327 exert opposing influences on risk perception: control decreases perceived risk while volition
328 increases perceived risk. The latter prediction, which may be seen as counterintuitive, is explained
329 in relation to regret. They propose that a voluntary appraisal elicits anticipated regret, which

330 increases perceived risk. We found in this study that the intention to eat an undercooked hamburger
331 at home was at the same level as the intention to eat the same hamburger at a restaurant. One
332 explanation for why perceived control had no substantial effect on risk taking may be that the two
333 contradictory aspects of perceived control, volition and outcome control neutralize each other.
334 Future studies should therefore investigate these two aspects of perceived control separately to be
335 able to see if they interact.

336 In a parallel study (Røssvoll, Sørheim, Heir, Møretrø, Olsen, Langsrud (2014), the inactivation
337 of STEC was determined for hamburgers cooked to the same temperatures as in the pictures used
338 in this study. For the rare and medium rare hamburger, the inactivation did not meet the
339 performance criteria for cooking meat (99.999% reduction) and they should be regarded as unsafe
340 to eat. From a food safety perspective it is very worrying that consumers tend to prefer undercooked
341 hamburgers, despite several outbreaks and subsequent risk communication from food safety
342 authorities. The present study demonstrates that not only do many consumers prefer hamburgers
343 that are unsafe, those who prefer well-done hamburgers tend to eat rare hamburgers in certain social
344 situations. It has been estimated that STEC causes 2.8 mill acute illnesses annually, and the impact
345 is highest in infants and children (Majowicz, Scallan, Jones-Bitton, Sargeant, Stapleton, Angulo,
346 et al. (2014). One possible path for future studies, would be to elaborate on the social pressure
347 people feel in specific situations and focus on investigating behavioural change where it will have
348 most impact: Target people that prepare and serve food to children.

349

350 **5. Conclusion**

351 We found that a rare, risky hamburger that may cause an *E.coli* infection was more likely
352 to be eaten if offered at their friend's place, and less likely when offered at a foreign restaurant or
353 at home. These findings indicate that situation plays an important role for consumers' likelihood

354 of eating unsafe food, and that social factors and familiarity should be taken into consideration
355 when food safety strategies are developed.

356 This study shows that the effect of the situational context influences the relationship
357 between risk perception and risk taking. By conducting an experiment where risk taking was
358 measured under different situations, and comparing the results with risk perception for the same
359 situations, we were able to demonstrate that risk taking does not follow risk perception in situations
360 influenced by possible social consequences. All hamburgers, also undercooked hamburgers that
361 may cause an *E.coli* infection, were significantly more likely to be eaten if served at a friend's
362 place and less likely when served at a restaurant or at home. This indicates that a situation with
363 social consequences influences risk taking. These findings can help us understand why risk taking
364 not always follow risk perception and why information, which may affect risk perception, is not
365 enough to change risk behavior. If we are to contribute significantly to the understanding of risk
366 behavior, future studies need to move beyond the individualistic level and develop a more
367 ambitious socially-oriented agenda for risk behavior research. Studies that explain the mechanisms
368 for what we observe here (e.g. is risk taking explained mostly by the social aspects of a situations
369 or a situations familiarity?) are also needed.

370

371 **6. References**

372 Belk, (1974) An exploratory assessment of situational effects in buyer behavior, *Journal of*
373 *Marketing Research*, 11 (2) (1974), pp. 156–163

374 Belk, R.W. (1975) Situational variables and consumer behavior, *Journal of Consumer Research*,
375 2 (3) (1975), pp. 157–164

- 376 Blais, A.R., Weber, E.U. (2006) A domain-specific risk-taking (DOSPERT) scale for adult
377 populations. *Judgment and Decision Making*, 1, 373-298
- 378 Brennan, M., McCarthy, M., Ritson, C. (2007) Why do consumers deviate from best
379 microbiological food safety advice? An examination of “high-risk” consumers on the
380 island of Ireland. *Appetite*, 49, 405-418.
- 381 Brewer, N.T., Chapman, G.B., Gibbons, F.X., Gerrard, M., McCaul, K.D., Weinstein, N.D. (2007)
382 Meta-analysis of the relationship between risk perception and health behavior: The
383 example of vaccination. *Health Psychology*, 26 (2), 136-145
- 384 Floyd, D.L., Prentice, Dunn, S., Rogers, R.W. (2000) A meta-analysis of research on protection
385 motivation theory, *Journal of Applied Social Psychology*, 30 (2), 407-429.
- 386 Friedl, A., Pondorfer, A., & Schmidt, U. (2019) Gender differences in social risk taking, *Journal*
387 *of Economic Psychology*, doi.org./10.1016/j.joep.2019.06.005, in press.
- 388 Garcia-Marques, T. & Mackie, D. (2000) The positive feeling of familiarity: mood as an
389 information processing regulation mechanism, in Bless, H. and Forgas, J (Eds) *The*
390 *Message Within: The role of subjective Experience in Social Cognition and Behaviour*,
391 Psychology Press, Philadelphia, PA, pp. 240-61.
- 392 Harris, P (1990) Sufficient grounds for optimism? The relationship between perceived
393 controllability and optimistic bias, *Journal of Social and Clinical Psychology*, 15, 9-52.
- 394 Herman, C.P., Roth, D. A. & Polivy, J. (2003) Effects of the presence of others on food intake. A
395 normative interpretation. *Psychological Bulletin*, 129, 873-886.
- 396 Herman, C.P. (2015) The social facilitation of eating. A review. *Appetite*, 61-73

397 Jaeger, S.R., Bava, C.M., Worch, T., Dawson, J., Marshall, D.W. (2011) The food choice
398 kaleidoscope. A framework for structured description of product, place and person as
399 sources of variation in food choices, *Food Quality and Preference*, 56(2), 412–423

400 Johnson, T., Myagkov, M.G., Orbell, J.M. (2013) Distinctive Preferences Towards Risk in the
401 Substantive Domain of Sociality, *Political Psychology*, 34 (1), 1-22

402 Kahneman, D, Tversky, A. (2000) *Choices, values, and Frames*, New York: Cambridge Press and
403 the Russel Sage Foundation,

404 Kahneman, D., Tversky, A. (1979) Prospect theory: An analysis of decision under risk.
405 *Econometrica*, 47, 263-291

406 Kassenborg, H.D., Hedberg, C.W., Hoekstra, M., Evans, M.C., Chin, A., Marcus, R., Vugia, D.J.,
407 Smith, K., Ahuja, S.D., Slutsker, L., Griffin, P.M., for the Emerging Infections program
408 FoodNet Working Group (2004) Farm Visits and Undercooked Hamburgers as Major
409 Risk Factors for Sporadic *Escherichia coli* O157:H7 Infection: Data from a Case-Control
410 Study in 5 FoodNet Sites, *CID* 2004:38 (Suppl 3), 271-278

411 Kiermeier, A., Jenson, I., Sumner, J. (2015) Risk Assessment of *Escherichia coli* 0157 Illness
412 from Consumption of Hamburgers in the United States Made from Australian
413 Manufacturing Beef, *Risk Analysis*, 35 (1), 77-89

414 King, L.A., Mailles, A., Mariani-Kurkdjian, P., Vernozy-Rozand, C., Montet, M.P., Grimont, F.,
415 Pihier, N., Devalk, H., Perret, F., Bingen, E., Espié, E., Vaillant, V. (2009) Community-
416 wide outbreak of *Escherichia coli* O157:H7 associated with consumption of frozen beef
417 burgers. *Epidemiology and Infection*, 137, 889-886

418 Klein, W.M. & Kunda, Z. (1994) Exaggerated self-assessments and the preference for
419 controllable risks. *Organizational Behavior and Human Decision Processes*, 59,410-427.

420 Langer, E.J. & Rodin, J. (1976). The effects of choice and enhanced personal responsibility for
421 the aged: A field experiment in an institutional setting. *Journal of Personality and Social*
422 *Psychology*, 34, 191-198

423 Majowicz, S.E., Scallan, E., Jones-Bitton, A., Sargeant, J.M., Stapleton, J., Angulo, F.J., et al.
424 (2014) Global Incidence of Human Shiga Toxin-Producing Escherichia coli Infections
425 and Deaths: A Systematic Review and Knowledge Synthesis. *Foodborne Pathogens and*
426 *Disease*. 11(6), 447-55.

427 Murdock, M.R. & Rajagopal, P. (2017). The Sting of Social: How Emphasizing Social
428 Consequences in Warning Messages Influences Perceptions of Risk, *Journal of*
429 *Marketing*, 81 (March), 83-98.

430 Nordgren, L.F., Van der Pligt, J., Van Harreveld, F. (2007) Unpacking Perceived Control in Risk
431 Perception: The Mediating Role of Anticipated Regret, *Journal of Behavioral Decision*
432 *Making*, 20, 533-544.

433 Omer M.K., Alvarez-Ordóñez, A., Prieto, M., Skjerve, E., Asehun, T., Alvseike, O.A. (2018). A
434 Systematic Review of Bacterial Foodborne Outbreaks Related to Red Meat and Meat
435 Products. *Foodborne Pathogens and Disease*. 15(10), 598-611.

436 Patterson, P.G. & Mattila, A.S. (2008) An examination of the impact of cultural orientation and
437 familiarity in service encounter evaluations, *International Journal of Service*, 19 (5), 662-
438 682.

439 Pliner, P., Bell, R., Hirsch, B., Kinchlab, M. (2006) Meal duration mediates the effect of “social
440 facilitation” on eating in humans, *Appetite*, 46 (2), 189-198.

441 Rideout, K & Kosatsky, T. (2017) Fish for Dinner? Balancing Risks, Benefits, and Values in
442 Formulating Food Consumption Advice, *Risk Analysis*, 37 (11), 2041-2052

443 Rogers, R.W. (1983) Cognitive and physiological processes in fear appeals and attitude change:
444 A revised theory of protection motivation, *Social psychophysiology*, 153-176. London:
445 Guildford Press.

446 Rosenstock, I.M (1974) Historical origins of the health belief model, *Health Education*
447 *Monographs*, 140 (2), 328-335

448 Røssvoll, E., Lavik, R, Ueland, Ø., Jacobsen, E, Hagtvedt, T. and Langsrud, S. (2013) Food
449 Safety Practices among Norwegian Consumers, *Journal of Food Protection* 76 (11),
450 1939-1947

451 Røssvoll, E., Sørheim, O., Heir, E., Møretrø, T., Olsen, N.V., Langsrud, S. (2014) Consumer
452 preferences, internal color and reduction of shigatoxigenic *Escherichia coli* in cooked
453 hamburgers. *Meat Science*. 96(2), 695-703.

454 Scholderer, J., Kugler, J., Olsen, N.V., Verbeke, W. (2013) Meal Mapping, *Food Quality and*
455 *Preference*, 30, 47-53.

456 Schwarz, N. (1990) Feelings as information: Informational and motivational functions of
457 affective states, in Higgins, E. and Sorrentino, R. (Eds), *Handbook of Motivation and*
458 *Cognition: Foundations of Social Behavior*, Guildford, New York, NY.

459 Sheeran, P., Harris, P.R., Epton, T. (2014) Does heightening risk appraisals change people's
460 intentions and behavior? A meta-analysis of experimental studies. *Psychological Bulletin*,
461 140 (2), 511-543.

462 Slovic, P. (1987) Perception of risk, *Science*, 236, 280-285

463 Taylor, E. V., Holt, K. G., Mahon, B. E., Ayers, T., Norton, D., & Gould, L. H. (2012) Ground
464 Beef Consumption Patterns in the United States, FoodNet, 2006 through 2007. *Journal of*
465 *Food Protection*, 75(2), 341-346

466 Tiozzo, B., Mari, S., Ruzza, M., Crovato, S., Ravarotto, L. (2017) Consumers' perception of food
467 risks: A snapshot of the Italian Trivento area. *Appetite*, 111, 105-115.

468 TNS Gallup (2012) Market research company. Available at: <http://www.tns-gallup.no/>

469 Tversky, A. & Kahneman, D. (1981) The framing of decisions and the psychology of choice,
470 *Science*, 211, 453-458

471 Vartanan, L., Herman, C.P. & Polivy, J. (2007) Consumption stereotypes and impression
472 management. How you are what you eat. *Appetite*, 48, 265-277.

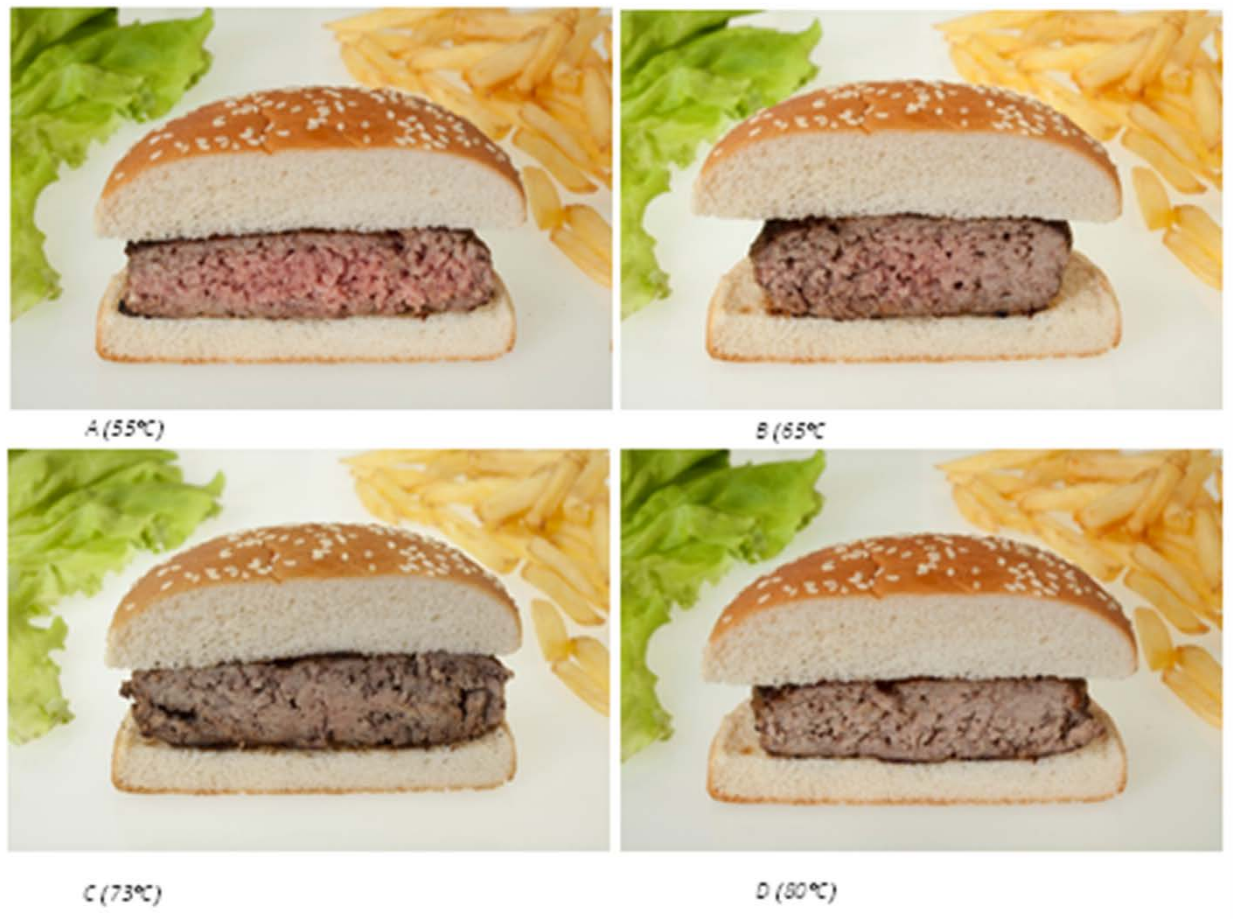
473 Veflen, N., Scholderer, J. & Langsrud, S. (2020): Situated Food Safety Risk and the Influence of
474 Social Norms, *Risk Analysis*, In press.

475 Von Neumann, J. & Morgenstern, O. (1944) Theory of Games and economic behavior. Princeton
476 University Press.

477 Wachinger, G., Renn, O., Begg, C., Kuhlicke, C. (2013) The risk perception paradox—
478 implications for governance and communication of natural hazards, *Risk Analysis*, 33(6),
479 1049-1065

480 Wang, X.T. & Johnston, V. (1995) Perceived Social Context and Risk Preferences: A Re-
481 examination of Framing Effects in a Life-Death Decision Problem, *Journal of Behavioral*
482 *Decision Making*, 8, 279-293

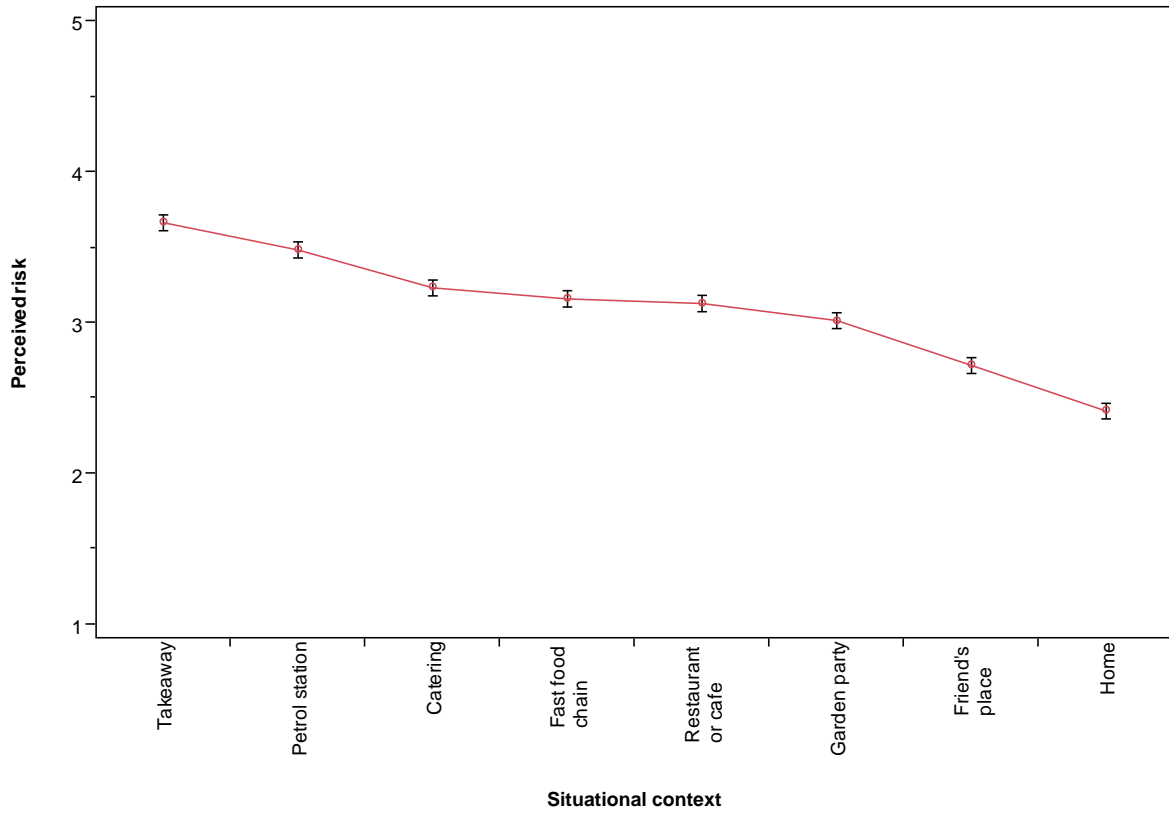
483 Weber, E.U., Blais, A.R., Betz, N.A. (2002) A domain-specific risk attitude scale: Measuring risk
484 perceptions and risk behaviours. *Journal of Behavioral Decision Making*, 15, 263-290



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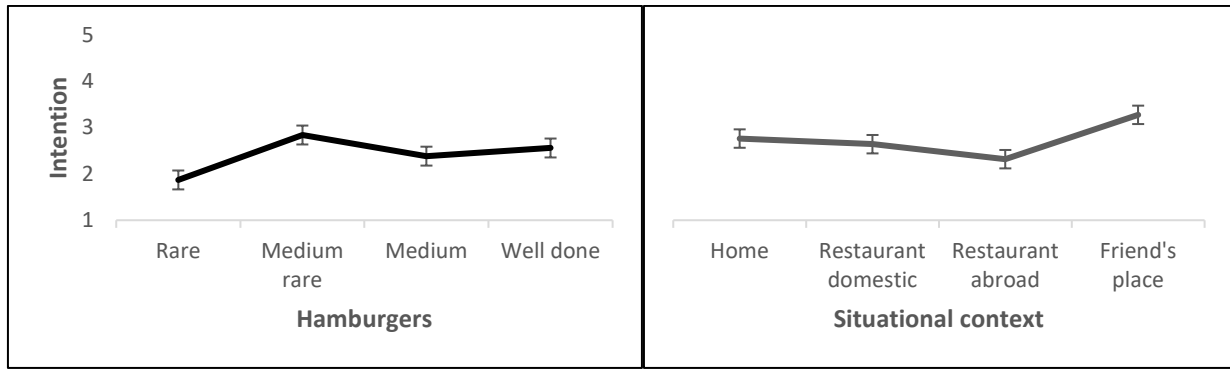
Fig. 1. The four hamburger pictures used as stimuli in the experiment. The respondents of the survey were asked not to take the shape and thickness of the hamburgers into account when considering the pictures, but to look at the meat color and texture.

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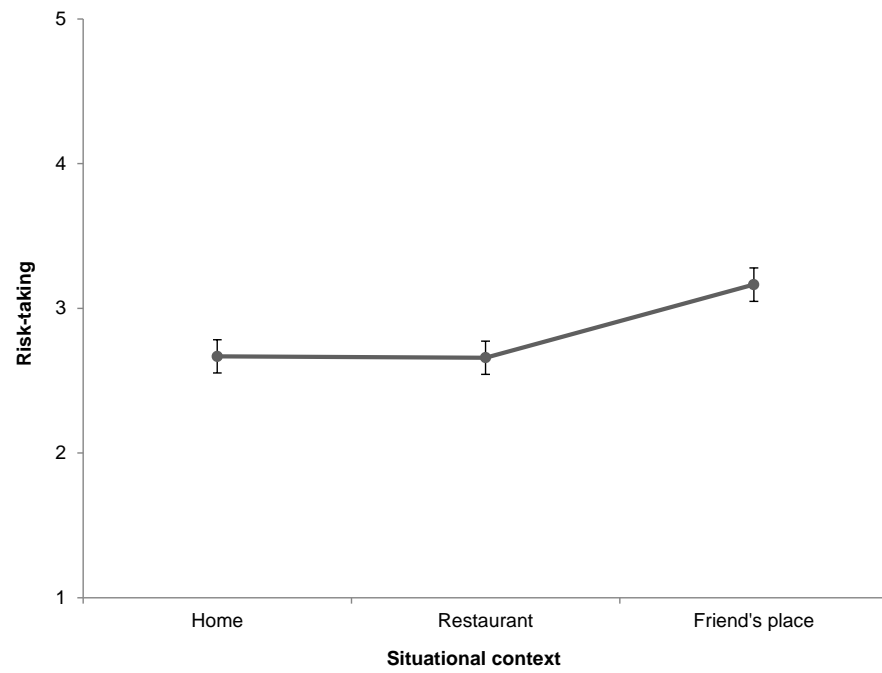
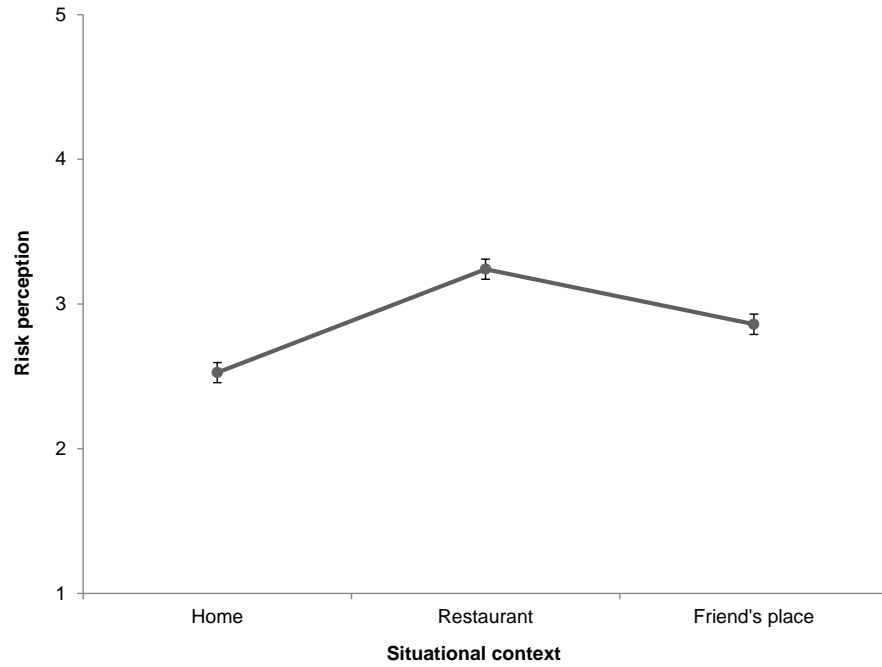
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Figure 2: Least squares mean scores for perceived risk to eat hamburgers in different situational contexts, $R^2: 0.604$ (error bars indicate 95% confidence intervals).



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Figure 3: Mean scores for intention to eat hamburgers with different core temperatures (left) and in different situational contexts (right).



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510 *Figure 4. Risk perception and risk taking as a function of situational context (error bars indicate*
511 *95% confidence intervals).*
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