

1 **Emotional congruence among solo diners**

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Abstract

15 By taking into consideration Chinese cultural characteristics, this study examines how
16 emotional congruence with other diners affects the experiential outcome of solo diners. The
17 study additionally tests the moderating effect of ‘generation’ on the relationship between
18 emotional congruence and solo dining experiential outcome. A total of 637 responses obtained
19 from solo diners in Macao were analyzed using polynomial regression with response surface
20 analysis. Results show that when solo diners are emotionally congruent, both positively and
21 negatively, with other diners, they had better experiential outcome. Furthermore, Generation Z
22 solo diners were found to be more affected by their own emotions than any other solo diners.
23 This study indicates implications for foodservice providers that will enable them to cater for
24 the growing solo dining market through greater understanding of the emotions of solo and other
25 diners.

26 Keywords: Chinese solo diners; emotional congruence; social comparison theory; solo dining
27 experiential outcome; Generation Z

28

29 **1. Introduction**

30 The growing trend of solo dining has been consistently reported in the media (e.g., Sun,
31 2019; Wei, 2020) and recent studies (e.g., Her & Seo, 2018; Hwang et al., 2020). The increased
32 visibility of solo diners has been observed in diverse countries, including China (e.g., Wei,
33 2020) and the United States (e.g., Sidman, 2020). For instance, in China, solo dining has
34 become increasingly popular, driven by internal migration to cities, a growing single
35 population, and growing single-person households (China Food News, 2020; Chinanews, 2020;
36 Zhang, 2019). There were 240 million single Chinese adults in 2020, and the solo living
37 population is expected to increase to 92 million people by 2021 (Chinanews, 2020). As a result,
38 solo dining has been highlighted as one of the growing trends in China (China Food News,
39 2020). Social acceptance of and changing attitudes towards solo dining have been observed in
40 China, especially among the younger generations (Zhang, 2019).

41 In response to the rising solo dining trend, the academic hospitality literature has begun
42 to investigate solo diners' experiences and emotions (Brown et al., 2020) and specifically,
43 social dining environment (Her & Seo, 2018; Hwang et al., 2020). However, little research has
44 considered the effect of restaurant social servicescape and the presence of other solo diners on
45 solo dining experience. While one study has examined how other diners affect the perception
46 and loneliness of solo diners (Her & Seo, 2018), gaps remain in terms of different types of
47 emotions, valence (i.e., extent of their positivity and negativity) and one's perceptions about
48 other diners' emotions in relation to one's own and their impacts on diners' experiential
49 outcomes. In particular, compared with hospitality studies about employee-consumer
50 interactions on consumers' emotions (Lin & Mattila, 2010), there is still a lack of understanding
51 of emotions felt about other solo diners in relation to the solo diners themselves. More
52 specifically, most literature on solo dining has considered emotions aroused from other diners

53 (Brown et al., 2020; Stephenson, 2020), but such research has not considered the interplay of
54 the emotions between one's own and those of others. Research gaps remain regarding how
55 emotional congruence between oneself and others may result in different attitudinal and
56 behavioral responses to solo dining.

57 Using the psychological theories of emotional congruence (Atzil-Slonim et al., 2018;
58 Zilcha-Mano et al., 2016), this study examines the emotions of solo diners vis-à-vis other solo
59 diners, and the effect of emotional congruence on solo dining experiential outcomes. The study
60 considers solo dining in a Chinese context, with a focus on Generation Z. Generation Z, also
61 known as post-90s (*jiulinghou*) in China, has strong purchasing power and a distinctive lifestyle
62 and world view that are different from those of older generations (Chow, 2019). Anecdotal
63 evidence suggests that this consumer group has a proclivity to eat out due to their hectic
64 lifestyles (Chinanews, 2020). Specifically, this study addresses the following research
65 questions: (1) How does the solo diners' (positive and negative) emotional congruence with
66 other solo diners influence solo dining experiential outcomes? (2) How does 'generation'
67 moderate the relationship between emotional congruence and solo dining experiential outcome?

68 By investigating the role of 'generation', specifically of Generation Z vis-à-vis other
69 generations in shaping the outcomes of solo dining emotional congruence, this study sheds
70 light on how one's emotions and the perceptions of others' emotions interact. Furthermore, this
71 study will deepen the understanding of the recent rapid changes in Chinese society and, in
72 particular, Chinese dining culture, which is traditionally characterized by group dining (Ma,
73 2015). The outcomes of the study are expected to provide implications for foodservice
74 providers in China in catering to the growing solo dining market, especially among the younger
75 generation.

76

77 **2. Literature review**

78 *2.1. Social servicescape*

79 ‘Social servicescape’ captures the engagement of consumers with the social
80 environment and co-creation of dining experiences through social interactions (Rosenbaum &
81 Massiah, 2011). It considers active and passive personal encounters, including interactions
82 among the diners and observations of others during the dining experience (Baker & Kim, 2020;
83 Lin et al., 2020). The notion of congruence emerges from perceiving and interacting with others
84 in the social servicescape (Baker & Kim, 2020). Prior research has examined diners’
85 observations of employees and other diners, focusing on the demographic profile, appearance,
86 attitudes, and behaviors of others to capture the level of (in)congruence (Baker & Kim, 2020;
87 Line & Hanks, 2018). Few studies have investigated emotional responses arising from the
88 social interactions in a social servicescape. Some exceptions include the work of Line and
89 Hanks (2018), which studied the impact of social servicescape on emotional responses in a
90 general dining setting, and that of Her and Seo (2018), which examined a specific emotion (i.e.,
91 loneliness) in a solo dining context.

92 Prior solo dining research has used social impact theory to explain the influence of other
93 diners on solo diners’ experience through social interactions (e.g., Her & Seo, 2018; Hwang et
94 al., 2018). According to social impact theory, the influence of other diners on solo diners’
95 experience is determined by strength (i.e., age, social class, depth of relationship, hierarchical
96 relationship), immediacy (i.e., spatial and/or temporal distance), and number of other people
97 (Latané, 1981). Informed by social impact theory, this study will add to this stream of literature
98 by focusing on how solo diners perceive the congruence of emotions between themselves and
99 other solo diners, and how this perception of emotional congruence affects the solo dining
100 experience and outcome.

101

102 *2.2. Emotional congruence in solo dining*

103 Emotional congruence, also known as emotional empathy (Duan & Kivlighan, 2002),
104 is integral to understanding one's own emotions in relation to others. It concerns how and to
105 what extent one's emotions correspond with those of others and how that translates into
106 sympathy with the counterpart (Atzil-Slonim et al., 2018). Emotional congruence in
107 foodservice research can be examined from two aspects: emotional congruence between the
108 service provider and the diners, and that between the diners themselves. However, most studies
109 have focused on the former – the impact of diners' emotional expressions on employees'
110 emotions and behavioral outcomes (Kashif et al., 2017) or employee-diner interactions on
111 diners' emotions (Lin & Mattila, 2010). The diners' emotions about other diners in relation to
112 themselves have been overlooked in the existing literature.

113 Social comparison theory (Festinger, 1954) hints that individuals feel congruence of
114 emotions by comparing one's emotions with those of others. Social comparison theory explains
115 how individuals evaluate their own opinions and abilities by comparing them with those of
116 others, with emotion as the evaluation outcome. The assumption of emotional congruence, that
117 is, that one tends to consider others' emotions in addition to one's own, is also supported by
118 the concept of emotional contagion, which emphasizes that one's emotions or emotional
119 expressions affect others' emotions and vice versa (Barsade, 2002). Researchers have
120 acknowledged diverse interpersonal impacts on one's emotions such as emotional contagion
121 and resultant behavioral outcomes such as bodily reactions (Parkinson & Manstead, 2015).

122 With the emergence of the 'relational turn' in the field of psychology (Aron & Harris,
123 2014), researchers have highlighted the importance of understanding one's emotions in relation
124 to others' emotions to provide more desirable customer service outcomes (Drèze & Nunes,

125 2008; Goor et al., 2019; Namkung & Jang, 2010; Stuppy et al., 2019). In the hospitality context,
126 past studies have focused on diners' emotions aroused by the comparison of oneself with others
127 in relation to fairness (Namkung & Jang, 2010) or superiority (Drèze & Nunes, 2008). The
128 notion of fairness comparison suggests that diners tend to compare themselves with other diners
129 and that the diners are affected by and react to the perceived fairness (e.g., service levels, other
130 diners' attitudes and reactions to the dining situations) (Namkung & Jang, 2010). Drèze and
131 Nunes (2008) investigated the sense of superiority among hotel consumers and perceived status
132 as the outcome of comparisons made by the consumers in the context of hotel loyalty programs.
133 However, such studies have not considered the perceived congruence of emotions all together,
134 which goes beyond the mere comparison of one's consumption situation with that of others
135 based on fairness or superiority. An investigation into emotional congruence between diners in
136 solo dining situations will enable researchers to understand diners' emotions not only in terms
137 of comparison but also in terms of empathy. In sum, despite the interest in consumption
138 emotions in general, limited hospitality and solo dining studies have compared emotions and
139 specifically, emotional congruence, in a restaurant social servicescape environment.

140 Furthermore, the valence of the emotional states (i.e., the extent of positive and negative
141 emotions) of oneself and others also needs to be considered in solo dining research. Most
142 literature on solo dining has suggested negative emotions aroused by others as the main issue
143 with solo dining (Brown et al., 2020; Stephenson, 2020). Different from such previous studies,
144 Choi et al. (2020) suggested that solo diners can also associate positive emotions with solo
145 dining. However, their study was limited to understanding solo diners' own emotions. Kim and
146 Choi (2019) is the only study to the best of the authors' knowledge, which has measured both
147 the positive and negative emotions of solo diners and their emotions towards other solo diners.
148 However, in their study, there is little discussion of the theoretical background that underpins

149 the development of their methods for measuring emotions. Furthermore, their study did not
150 compare solo diners' own emotions with those of other diners.

151 This study conceptualizes the emotional congruence of solo diners as the degree to
152 which the emotions of a solo diner correspond to their perceptions of other solo diners'
153 emotional states. Emotional congruence can thus be captured by comparing a solo diner's
154 emotional state and their feelings when they observe other solo diners in the same dining space.
155 Studies have suggested that emotional congruence predicts better experiential outcomes of the
156 empathizer (Koole & Tschacher, 2016), including familiarity and satisfaction (Ha & Perks,
157 2005) and behavioral intention (Ryu et al., 2012) in the dining context. In other words,
158 emotional congruence is expected to be associated with solo diners' experiential outcome.
159 Synthesizing the notion of valence in emotional congruence between how a solo diner feels
160 about their own dining situation and how they perceive the emotions of other solo diners, the
161 following hypothesis was developed:

162 **Hypothesis 1:** Emotional congruence (both positive and negative) between solo diners and
163 other diners is positively associated with the solo diner's experiential outcome.

164

165 *2.3. Chinese solo diners and Generation Z*

166 In contrast to the general perception of the deep-seated social meaning of group dining
167 in China (Ma, 2015), the Chinese solo dining market has grown rapidly (Choi et al., 2020). The
168 contribution of the younger generation, especially Generation Z, to single consumption is
169 remarkable, especially in China, mainly because of their market size, purchasing power, and
170 their distinct behavioral characteristics. Generation Z, a demographic group born after the mid-
171 1990s (Turner, 2015; Priporas et al., 2017), accounts for 30% of the global population and 22%
172 of the population of China as of 2019 (OC&C Strategy Consultants, 2019). As part of this

173 demographic group has reached its adult years and entered the workforce, members of
174 Generation Z are emerging as primary consumers with purchasing power (Song et al., 2020).
175 Furthermore, while there is a notion that Generation Z is expected to have unique attitudinal
176 and behavioral characteristics and thus are acknowledged as the future challenge for marketing
177 due to their distinct behaviors (Priporas et al., 2017), there still are a dearth of studies on this
178 generation especially in the hospitality and tourism contexts (Jiang & Hong, 2021). Particularly,
179 while it is generally known that this generation is interested in digital technology and pursuing
180 escapism from the realities (Priporas et al., 2017), it is still not known how these traits are
181 reflected in their dining traits, one of the most important elements of a person's lifestyle, and
182 Chinese solo dining, as an emerging social trend, in specific.

183 In the Chinese society, a combination of social transition and individuals' increased
184 familiarity to the online environment are expected to have shaped Generation Z's solo dining
185 attitudes and behaviors. As Chinese society has experienced a rapid societal transition,
186 triggered by the economic reform and the one-child policy, younger generation has been found
187 to be more individualistic than older generation and to focus on personal pleasure in their
188 consumption experience (Peng, 2019). In addition to this, according to Du (2019), the younger
189 population is likely to enjoy living alone. Thus, the demand for solo living as well as solo
190 dining for this generation is expected to be increasingly significant in the future. Thus, it is
191 expected that the social acceptance of solo dining is notable among the Chinese Generation Z.
192 Furthermore, Generation Z is the first generation native to digital technologies and social media
193 (Turner, 2015; Zhou & Worku, 2019), and that is likely to contribute to escapism during the
194 consumption process, such as going online and playing with mobile phones rather than
195 communicating with other diners and employees during their solo dining (Choi et al., 2020).

196 Therefore, for Chinese Generation Z, the socioeconomic environment is also expected
197 to have shaped their personal characteristics and be reflected in their solo dining emotions.
198 Relatively free from cultural traditions, economic worries and political turmoil, and mostly
199 being the only child, Chinese Generation Z persons are known to be independent, confident,
200 and individualistic (Chow, 2019). Thus, they tend to prioritize their own feelings and
201 experiences over those of others (Chow, 2019). As Chinese Generation Z are likely to pay less
202 attention to others' emotions than their own, being emotionally congruent with others is
203 unlikely to lead to different dining experiences and outcomes. This may suggest that,
204 Generation Z being relatively more self-centered than other generations, any emotional
205 congruence experienced during their solo dining would be more weakly connected to
206 experiential outcome than for other generations. Considering the unique ways in which
207 members of Generation Z's emotions and dining experiential outcomes are interwoven,
208 Hypothesis 2 is presented as follows:

209 **Hypothesis 2:** Emotional congruence between solo diners and other diners would be more
210 weakly associated with solo dining experiential outcomes among Generation Z members than
211 among members of older generations.

212

213 **3. Methods**

214 *3.1. Data collection and sampling*

215 This study was part of a larger project which explored Macao Chinese people's solo
216 dining behavior. Exploratory sequential mixed methods (Creswell & Plano Clark, 2018) were
217 used, with qualitative and quantitative studies conducted sequentially. In addition to the
218 literature review about solo dining emotions, semi-structured interviews with ten solo diners
219 enabled insights into the spectrum of emotions of diners when dining alone and when observing

220 other solo diners. The interviews were followed by a survey that was conducted from June to
221 August 2018.

222 The population of this study was diners from Macao, which has a population of around
223 600,000. A total of 15 trained undergraduate interviewers majoring in hospitality and tourism
224 who were able to speak the local official language, were hired for data collection. Using a
225 combination of purposive and mall-intercept sampling methods, 1,773 Macao Chinese
226 residents were approached and a screening question on solo dining experience was asked.
227 Residents who have had solo dining experience, irrespective of the recency of that experience,
228 were invited to complete the survey. The screening criterion aligned with existing literature,
229 which focuses on the overall and accumulated solo dining experience rather than on a specific
230 dining event (Kim & Choi, 2019; Koponen & Mustonen. 2020). The survey was completed in
231 the format of in-person interviews to maximize the quality of the data (Lavrakas, 2008). The
232 interviewers read out the questions to the respondents who then verbally answered the
233 questions. This approach allowed the interviewers to clarify and thereby validate the responses.
234 No incentive was provided for participation. A total of 663 responses was collected, with a
235 37.39% response rate, and from among them, 637 valid responses were used for the analysis.
236 With a 95% confidence level, the confidence interval for the sample size was 3.88. Tests were
237 conducted at the significance level of 0.05 (two-tailed).

238

239 *3.2.Characteristics of the study sample*

240 About 43% of the respondents were male, 57% female. Generation Z respondents,
241 accounting for 31.1% of the respondents, were classified as those who were between the ages
242 of 18 and 24. Around 32.7% of the respondents had a monthly individual income of less than
243 10,000 MOP. Among the respondents, 21.7% were students, while most were either

244 professionals (26.2%) or service workers (30.9%). Most had a bachelor’s degree (48.0%; See
245 Table 1 for details).

246 [Insert Table 1]

247

248 *3.3.Measures*

249 The questionnaire consisted of three sections. The first section asked about solo dining
250 characteristics to explore the respondents’ solo dining profiles. The main variables used for the
251 present study were included in the second section. As presented in Table 2, items measuring
252 positive and negative emotions of solo diners were adapted from Cho et al. (2015), Bianchi
253 (2016), and the interviews. To be specific, the positive emotional items such as pleased,
254 liberated, and negative emotional items such as bored, were directly adopted from Cho et al.
255 (2015). Items such as relaxation, enjoyment, and confident were adapted from Bianchi (2016),
256 where emotional key words were derived from the context of solo traveling. The interview
257 results in particular provided insights into additional emotional items to include in the survey
258 questionnaire as well as the valence of each item. Items such as isolated, stressful, and being
259 gazed at by other diners, were included in the questionnaire based on the results from the
260 interviews. For instance, some interviewed solo diners expressed that **they** had experienced
261 unpleasant emotions on sensing they were being observed or gazed at by others, which was
262 congruent with findings in previous literature such as that by Cho et al. (2015) and Nakata and
263 Kawai (2017).

264 The surveyed solo diners were asked about their emotions with the question “How do
265 you feel about the following when you dine alone...?” The surveyed solo diners’ perceptions
266 about the emotions of other diners were measured with the question, “What impressions for
267 each item do you have when you see a person eating alone...?” Among the measurement items

268 for experiential outcome, familiarity was measured based on the interview results: According
269 to the interview results, accumulated solo dining experiences were linked to the familiarity
270 with solo dining. Satisfaction with dining experience and behavioral intentions were adopted
271 and modified from Ryu et al. (2012).

272 An 11-point scale was used to measure the questionnaire items measuring emotions,
273 ranging from 0 to 10 (0=not at all, 10=extremely). The 11-point scale was justified following
274 Preston and Colman (2000), who emphasized that the more response categories they were, the
275 better the reliability and validity of the items. We also referred to studies such as that by Wu
276 and Leung (2017) who claimed that increased number of response scale can increase
277 confidence in treating items as an interval scale, which was the precondition for the statistical
278 technique we used in this study. The questionnaire was first developed in English and then was
279 translated into Chinese, and both questionnaires were further compared and checked by a native
280 speaker of both languages and another author, proficient in both languages. Following that
281 process, the translated questionnaire was reviewed by ten Macao residents and checked with a
282 pilot test.

283 [Insert Table 2]

284

285 *3.4.Data analysis*

286 This study's analysis incorporated polynomial regression with response surface
287 analysis by following recent studies that had investigated how the relationships between two
288 predictors (X and Y) affect an outcome (Z) (Atzil-Slonim et al., 2018). This process allows for
289 a more comprehensive examination of how different combinations of two predictors (solo diner
290 emotions (X) and solo diner perceptions of other solo diner emotions (Y)) affect solo dining

291 experiential outcome (Z), while simultaneously discovering those different roles of solo diners
292 and their perceptions of other diner emotions upon solo dining experiential outcome.

293 This study's data analyses were undertaken using a two-step procedure. First,
294 polynomial regression models were developed to investigate how emotional congruence
295 between solo diners and their perception of other diners affect solo dining experiential outcome.
296 The polynomial regression equation included two independent variables (X and Y) and two
297 quadratic terms (X^2 and Y^2) for each independent variable, along with the interaction term (XY)
298 expressed as follows:

$$299 \quad Z \text{ (solo dining experiential outcome)} = b_0 + b_1X \text{ (solo diner emotions)} + b_2Y \text{ (solo diner} \\ 300 \quad \text{perceptions of other diner emotions)} + b_3X^2 + b_4XY + b_5Y^2 + e$$

301
302 In this study, the moderating effect of generation was also hypothesized. More
303 specifically, the association between the emotional congruence of solo diners and other diners
304 and solo dining experiential outcome was expected to be weaker in Generation Z compared
305 with the older generation group. In doing so, the moderating variable (W : Generation Z) along
306 with three interaction terms (XW , YW and XYW) were added to our original polynomial
307 regression models as follows:

$$308 \quad Z \text{ (solo dining experiential outcome)} = b_0 + b_1X \text{ (solo diner emotions)} + b_2Y \text{ (solo diner} \\ 309 \quad \text{perceptions of other diner emotions)} + b_3X^2 + b_4XY + b_5Y^2 + b_6W \text{ (Generation Z)} + \\ 310 \quad b_7XW + b_8YW + b_9XYW + e$$

311
312 In the second step, a response surface analysis was conducted to explore and display
313 the dynamic relationships between the combinations of the two independent variables (X and
314 Y) and the dependent variable (Z) in three-dimensional space using the SYSTAT 13 statistical
315 tool. Scale-centered measures of all variables using five as the midpoint on an eleven-point
316 scale (0–10) were employed in order to reduce potential multicollinearity issues in accordance
317 with Edwards & Parry's (1993) recommendation.

318

319 **4. Results**

320 *4.1. Common method bias test*

321 The study data were collected using a single and self-reported survey including both
322 independent and dependent variables at the same time, and common method bias was checked
323 using a confirmatory factor analysis (CFA) with a common latent factor method. The single-
324 latent model in which all the 21 items were loaded onto the one-latent construct showed a
325 relatively poor fit to the data ($\chi^2/df = 5.179, p < 0.001$; CFI = 0.675; IFI = 0.676; GFI = 0.642;
326 RMSEA = 0.124). This result proposed that common method bias was not a serious issue within
327 our data set (Paek et al., 2015; Podsakoff et al., 2003).

328

329 *4.2. Reliability and validity assessment of the measures*

330 Confirmatory factor analysis was conducted to test reliability and validity of the
331 measures. Goodness-of-fit statistics showed a good fit ($\chi^2/df = 2.344, p < 0.001$; CFI = 0.939;
332 IFI = 0.927; GFI = 0.913; RMSEA = 0.065; see Table 2). All composite construct reliability
333 values ranged from 0.813 to 0.882, exceeding the recommended threshold of 0.70. Cronbach's
334 alpha coefficients ranging from 0.798 to 0.877 were acceptable, supporting internal consistency
335 of the measurement items (Hair et al., 2009). All standardized factor loadings ranged from
336 0.619 to 0.873 and were significant. All average variance extracted (AVE) values ranged from
337 0.535 and 0.612, exceeding the suggested cutoff of 0.50. Thus, convergent validity of the
338 measurement items was supported (Hair et al., 2009). Additionally, Table 3 shows that the
339 largest correlation between the variables was smaller than all the square roots of the AVE
340 values for the paired latent variables. This result supports the discriminant validity of the
341 measurement items (Fornell & Larcker, 1981).

[Insert Table 3]

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4.3. Polynomial regression analysis: the effect of positive and negative emotions on solo dining experiential outcome

As presented in Table 4, two polynomial regression models (Models 1 and 2) were developed. Model 1 focused on positive emotion, and it included two predictors: “solo diner positive emotion (PE)” (X) and “solo diner perceptions of the PE of others” (Y), two quadratic terms (X^2 and Y^2) of each predictor, and one interaction term (solo diner PE \times PE of others, XY), along with two control variables (gender and frequency of solo dining). Model 2 was developed to test the effect of negative emotion (NE) on solo dining experiential outcome (see Table 4). Among our two control variables, only one factor, “frequency of solo dining” was found to be significantly and positively related to solo dining experiential outcome in both models. Specifically, Model 1 tested the effects of solo diner PE and the PE about others upon solo dining experiential outcome (see Table 4). Solo diner PE associated with solo dining experiential outcome was significantly positive ($b_1 = 0.348, p < 0.001$); however, the PE of others did not have such a relationship ($b_2 = 0.004, p > 0.05$).

In addition, Model 2 tested solo diner NE and the NE of others and demonstrated that the NE of solo diners was significantly and negatively associated with their solo dining experiential outcome ($b_1 = -0.098, p < 0.05$). However, the NE of others had no significant relationship with solo dining experiential outcome ($b_2 = 0.054, p > 0.05$). Our findings provide evidence that higher PE and lower NE of solo diners lead to better solo dining experiential outcomes. Conversely, neither the PE nor NE of other diners was significant in shaping solo dining experiential outcome. The R^2 values of both Model 1 ($R^2 = 0.195^{***}$) and Model 2 ($R^2 = 0.109^{**}$) were significantly different from zero, supporting the claim that our polynomial

366 regression models were appropriate to be used for a response surface analysis (Shanock et al.,
367 2010).

368 [Insert Table 4]

369

370 *4.4. Response surface analysis: the effect of emotional congruence on solo dining*
371 *experiential outcome*

372 Hypothesis 1, expecting a significant relationship between emotional congruence and
373 solo dining experiential outcome, was tested using response surface analysis. As seen in Table
374 4, the PE surface showed that along the congruence line ($Y = X$), representing “congruence in
375 PE between solo diners and other diners,” the slope ($b_1 + b_2 = 0.337, t=7.285^{***}$) and the
376 curvature ($b_3 + b_4 + b_5 = 0.071, t=5.142^{***}$) were both significant and positive. These findings
377 indicate that congruence in PE between solo diners and other diners was significantly and
378 positively related to solo dining experiential outcome along a convex surface. Thus, Hypothesis
379 1 was supported.

380 Figure 1 depicts more detailed relationships between emotional congruence and solo
381 dining experiential outcome in three-dimensional space. The left graph shows the relationships
382 between solo diner PE, the PE of others, and solo dining experiential outcome. The graph
383 shows the highest level of solo dining experiential outcome at the back corner of the surface,
384 where solo diner PE and the PE of others are both highest; while solo dining experiential
385 outcome decreases at the front of the surface where solo diner PE and the PE of others are both
386 low. More specifically, the graph displays that solo dining experiential outcome is higher at the
387 right corner of the surface (solo diner PE > the PE of others) than at the left corner of the surface
388 (solo diner PE < the PE of others). These results indicate that when solo diners feel that their
389 PE is stronger than their perception of the PE of other diners, they will be more satisfied with

390 their solo dining. However, solo dining experiential outcome will significantly diminish when
391 solo diners feel that the PE of others is stronger than theirs.

392 [Insert Figure 1]

393
394 As presented in Table 4, the results from testing the NE surface found that along the
395 congruence line ($Y = X$), representing congruence in NE between solo diners and others, the
396 slope was insignificant ($b_1 + b_2 = -0.048$, $t = -1.352$); however, the curvature was significant
397 and positive ($b_3 + b_4 + b_5 = 0.059$, $t = 4.251^{**}$). These findings indicate that congruence in NE
398 between solo diners and others was significantly related to solo dining experiential outcome
399 along a convex surface. Thus, in terms of the congruence of negative emotions between solo
400 diners and others and its effect on solo dining experiential outcome, Hypothesis 1 was also
401 supported.

402 The right graph in Figure 1 depicts the associations between solo diner NE, the NE of
403 others, and solo dining experiential outcome. Although solo diners who felt strong NE were
404 less satisfied with their solo dining, the graph shows that solo dining experiential outcome
405 decreases less at the back corner than the front corner of the surface where solo diner NE and
406 the NE of others are both high and similarly at the front corner of the surface, where solo diner
407 NE and the NE of others are both very low. These results imply that solo dining experiential
408 outcome is still relatively high when solo diners feel that the NE of others is congruent with
409 their NE. Additionally, the graph shows that solo dining experiential outcome is higher at the
410 left corner of the surface (solo diner NE < the NE of others) than at the right corner of the
411 surface (solo diner NE > the NE of others). This implies that solo dining experiential outcome
412 will significantly diminish when solo diners feel that their NE is stronger than that of others.

413

414 4.5. Moderating Effects of Generational Groups: Generation Z vs. Older Generations

415 Hypothesis 2 expected the moderating effects of generations on the relationships
416 between emotional congruence and solo dining experiential outcome. Model 1 in Table 5
417 shows that the interaction term of (solo diner PE \times Generation Z) as it relates to solo dining
418 experiential outcome, was found to be significant and positive ($b_7 = 0.362, p < 0.001$); in
419 contrast, the interaction term of (the PE of others \times Generation Z) was significantly and
420 negatively related to solo dining experiential outcome ($b_8 = -0.277, p < 0.001$). These results
421 imply that the positive effect of solo diner PE on their solo dining experiential outcome was
422 significantly stronger in the Generation Z group than in the older generational group.

423 Model 2 in Table 5 indicates that the interaction term (solo diner NE \times Generation Z)
424 was significant and negative ($b_7 = -0.229, p < 0.05$). This shows that the negative effect of solo
425 diner NE on solo dining experiential outcome was stronger in the Generation Z group than in
426 the older generational group. Both models showed that the values of R^2 in Step 2 significantly
427 increased by 0.017 ($\Delta F = 3.469^{**}$) and by 0.015 ($\Delta F = 2.815^*$) when adding the moderating
428 variable (Generation Z) and those interaction terms. Accordingly, surface tests were conducted
429 for further response surface analyses.

430 [Insert Table 5]

431
432 The left graph in Figure 2 shows that, for PE, solo dining experiential outcome for both
433 the Generation Z and the older generational group increases when solo diner PE and the PE of
434 others are positively congruent (e.g., $X = 5, Y = 5$) along the surfaces. The graph also presents
435 higher solo dining experiential outcome at the right corner of the surface where solo diner PE
436 is greater than the PE of others (e.g., $X = 5, Y = -5$) in the Generation Z group than the older
437 generational group. However, the surface on the left corner where solo diner PE is smaller than

438 the PE of others (e.g., $X = -5$, $Y = 5$) shows much lower solo dining experiential outcome for
439 Generation Z than for the older generational group. These results indicate that solo diners'
440 experiential outcome for the Generation Z group is more likely to be determined by their PE,
441 regardless of others' PE levels. In contrast, among the older generational group, solo diners'
442 experiential outcome is more likely to be determined by combining the PE of others with their
443 PE.

444 [Insert Figure 2]

445
446 The right graph in Figure 2 shows that solo dining experiential outcome decreases less
447 when the NEs of solo diners and others are congruent for both the Generation Z and the older
448 generational group. Solo dining experiential outcome greatly decreases at the right corner of
449 the surface where solo diner NE is greater than the NE of others (e.g., $X = 5$, $Y = -5$) for both
450 Generation Z and the older generational group. Also, in the older generational group, solo
451 dining experiential outcome greatly decreases at the left corner of the surface where their NE
452 is less than the NE of others (e.g., $X = -5$, $Y = 5$). However, among Generation Z, solo diners'
453 experiential outcome is still relatively high at the left corner of the surface where their NE is
454 weak, but the NE of others is strong. These findings support that among Generation Z, the
455 negative effect of solo diner NE on their experiential outcome would be stronger than the same
456 for the older generational group. However, the older generational group and their solo dining
457 experiential outcome would be more affected by the NE of others combined with their NE.
458 Therefore, Hypothesis 2 was supported.

459

460 **5. Discussion**

461 Overall, the results supported Hypothesis 1 that both positive and negative emotional
462 congruence exert significant and positive impacts on solo dining experiential outcome. The
463 data showed the highest experiential outcome when the solo diners had the highest levels of
464 positive emotional congruence with other diners. Experiential outcome significantly increased
465 with the curved line as the solo diner had stronger PE together with their perception of the
466 emotions about other diners. Similarly, the experiential outcome level increased along with the
467 curved line when the solo diners had stronger NE together with their perception of the emotions
468 about other diners. The results are in line with the theoretical consideration of emotional
469 congruence in psychology, where emotional congruence predicts better experiential outcomes
470 (Koole & Tschacher, 2016). Additionally, the curvature in the opposite direction along the
471 congruence lines (Figure 1) suggests that the stronger the negative emotion for both the solo
472 diner and other diners, the higher the experiential outcome. The results suggest that stronger
473 emotional congruence leads to higher solo dining experiential outcome in either valence of
474 emotions.

475 Higher experiential outcome was consistently revealed when the solo diner had PE
476 about their solo dining and when the solo diner felt similarly positive about their own and
477 others' solo dining situation rather than when the solo diner perceived their emotions were
478 more positive than the emotions of other diners. Contrastingly, in the situation where the solo
479 diner felt negatively about their dining situation but felt more positive about other diners, the
480 solo diner had a drastically lower level of experiential outcome. According to similar previous
481 studies such as Drèze and Nunes (2008) and Goor et al. (2019), the results of such analyses
482 might be the outcome of the emotions opposite to a sense of superiority in comparing the solo
483 diner's situation with others.

484 Regarding testing the moderating role of generation, the results showed a distinct
485 difference in the way emotions were associated with solo dining experiential outcome for
486 Generation Z in contrast to other generations. Compared with other generations, Generation
487 Z's solo dining emotions, both positive and negative, were significantly less affected by the
488 projected emotions of other solo diners. The results imply that the members of Generation Z
489 tend to be self-centered in the solo dining experience and they focus on their own feelings more
490 than those of others during solo dining. This reflects some of the self-centered tendency among
491 the Chinese younger generation (Chow, 2019). Considering the influence of a solo diner's
492 perceptions of other solo diners is more relevant for older generations than Generation Z in
493 restaurant servicescape design catering to solo dining in Chinese culture.

494

495 **6. Theoretical Implications**

496 This is the first study to examine the notion of emotional congruence in the context of
497 solo dining. Applying the psychological concept of emotional congruence (Atzil-Slonim et al.,
498 2018) to the solo dining context and advancing the application of the theory of social
499 comparison in hospitality research (Drèze & Nunes, 2008; Namkung & Jang, 2010), this study
500 highlights the significance of understanding the emotions of others in relation to oneself. In
501 doing so, this study advances the existing knowledge about social servicescape. Prior
502 hospitality research on social servicescape has theorized the influence of others by the strength
503 of social interactions, immediacy, and the number of other people (e.g., Her & Seo, 2018;
504 Hwang et al., 2018). Only a few studies have examined the role of emotion, specifically the
505 impact of social servicescape, on the diner's own emotional responses (e.g., Line & Hanks,
506 2018). Furthermore, previous foodservice research has predominantly focused on comparing
507 the emotions of the service providers and the diners. In addition to this stream of literature that

508 has urged managers to understand the emotions of solo diners (Bae et al., 2018; Her & Seo,
509 2018; Hwang et al., 2020), this study considers emotional congruence between oneself and
510 other diners, thereby expanding existing understanding of the role of other diners' emotions in
511 co-creating social servicescape and subsequently, dining experiences. Specifically, this study
512 sheds light on how the diners feel in congruence with how they perceive others' emotions
513 positively affects experiential outcome. As such, it advances the hospitality research stream
514 since the 'relational turn' of psychology (Aron & Harris, 2014) in that it goes beyond the mere
515 comparison of emotions based on superiority and/or fairness (Drèze & Nunes, 2008; Goor et
516 al., 2019; Namkung & Jang, 2010; Stuppy et al., 2019) and provides implications on how
517 emotional congruence results in perceptual and behavioral responses. Such an extension of the
518 spectrum of scholarly understanding of solo dining emotions calls for future studies which can
519 further reveal the moderating role of other social servicescape variables such as social density
520 (how crowded the restaurant is, and how physically close a diner is to others) in the linkage of
521 solo dining emotions, emotional congruence, and experiential outcome. Also, to advance the
522 theoretical contribution of this study, follow-up qualitative studies are suggested to enrich
523 understanding of how and why the emotional congruence of solo diners with other diners leads
524 to different levels of experiential outcome.

525 Further, the investigation of the valence of emotions reveals positive emotions
526 associated with solo dining in addition to the negative emotions which have been commonly
527 assumed in prior solo dining literature (Her & Seo, 2018). The current study contributes to the
528 existing knowledge of solo dining emotions in relation to the perceived social servicescape by
529 considering both positive and negative emotions as well as emotional congruence in the context
530 of solo dining. In doing so, this study expands the existing understanding of emotions

531 associated with solo dining and lays the theoretical foundation for future research on solo
532 dining emotions.

533 Lastly, despite an increasing interest in solo dining in China and among Chinese
534 Generation Z, there has been a dearth of scholarly research on this group of solo diners. This
535 study advances the theoretical understanding of the current sociocultural environment in
536 combination with historical background in shaping the traits of Generation Z in China. This
537 study helps researchers to understand how Generation Z's emotions are formed more clearly
538 after considering social servicescapes. This study supports claims about the individualistic,
539 independent, and self-confident traits of this generation in China, echoing previous studies
540 which focused on their offline behaviors (Chow, 2019). There still is a dearth of research about
541 the traits of this generation, and especially, there are mixed research findings about this
542 demographic group depending on the context, social interaction settings, and identity intersect
543 of their online and offline social interactions (Fu, 2018). Thus, future studies are called for to
544 discover how emotions function differently, depending on different solo dining settings (e.g.,
545 different types of restaurants, familiarity with the restaurant, solo dining behaviors) and
546 different personal characteristics (e.g., personality, socioeconomic background) within this
547 same generational group.

548

549 **7. Practical Implications**

550 The findings provide implications for restaurant managers and foodservice providers:
551 they should better cater to the growing solo dining market. In order to maximize the positive
552 emotions of solo diners themselves and their perception of other diners' emotions, foodservice
553 providers could create a friendly solo dining servicescape, such as adjust the table settings with
554 adequate distances between tables. As an example, designing the restaurant atmospherics so

555 that dining tables focus on an open kitchen setting would allow patrons to view the meal
556 production process simultaneously with the consumption process. Providing tables along wall
557 areas would service solo diners and offer them similar opportunities to focus upon open kitchen
558 activity. This strategy would provide aspects of viewing entertainment and some educational
559 benefits for solo diners as they are able to become a part of the viewing process of meal
560 preparation and delivery. This design would allow solo diners to be physically separated from
561 other diner groups, but also be near enough to other groups of which has been reported as
562 desirable to solo diners (Han, 2018). Additionally, in consideration of aesthetics, restaurant
563 designs could incorporate creative counter/bar area seating for better solo dining experiences.

564 Restaurants could strategically balance combinations of groups and solo diners to
565 maximize enjoyment for these different dining groups, thereby creating adequate ambience to
566 minimize NE such as loneliness, isolation, stress, and boredom. In doing so, restaurant
567 employees and their roles would be critical, thus, it is imperative that restaurants provide proper
568 service training to their staff so that they are able to properly seat solo diners in the dining areas
569 most compatible with the characteristics and behaviors of other dining groups. Daily, pre-
570 opening meetings with service providers would serve as an opportunity to prepare staff for
571 chances to address the wishes and needs for different solo dining parties and identify their
572 preferred seating areas. Development of well-designed training manuals for service employees
573 would aid in how to appropriately alter their approach to create a seamless and comfortable
574 interaction with solo diners, which would then assist in providing a more enhanced dining
575 experience.

576 The results also provide implications for managers and foodservice providers: they
577 should accommodate solo dining consumers representing different generations. Foodservice
578 providers are encouraged to focus on creating pleasant solo diner emotions that specifically

579 cater to Generation Z customers. Roetzel (2017) emphasized the importance of lighting for
580 improved employee job commitment and overall job performance. Extending this concept to
581 Generation Z's solo diners may result in similar benefits, leading them to focus on their own
582 meals without being distracted by other diners. Thus, lighting layout and levels of illumination
583 around dining areas could act as an inducement to attract Generation Z customers to those areas.
584 As well, service providers need to consider the overall attractiveness of the dining environment
585 desired by generations representing older solo dining patrons. These individuals may seek
586 restaurants offering a social space for interacting with other solo diners to develop more
587 positive feelings with their solo dining experience. Thus, it is essential restaurants create and
588 offer the most appropriate dining environment by combining various aspects of physical
589 environments (e.g., lighting, music, furniture and layout) with human environmental factors
590 (e.g., well-trained service employees) to meet the needs of different solo dining preferences in
591 consideration of demographic segments such as age.

592

593 **8. Limitations**

594 Accounts of solo dining emotions in this study were collected through a survey where
595 respondents reported their emotions about solo dining retrospectively. The rationale for using
596 a retrospective survey was based on the consideration that approaching solo diners for surveys
597 or conducting an experiment on solo dining emotions might disturb the subjects' real
598 experience. Future research is encouraged to develop other innovative methods, such as
599 observations, experiments, or scenario-based surveys or interviews, to capture vivid solo dining
600 emotions.

601 The survey investigated the participants' overall solo dining experience without
602 considering any temporal differences (i.e., the survey did not consider the time of the day or

603 week of the solo dining experience). Future research is advised to explore the effects of solo
604 dining temporal differences, occasions and recency on solo dining emotions. Likewise, the
605 stages of solo dining were not considered in this study. Future research could investigate the
606 dynamics and changes in emotions throughout the different stages of a solo dining experience,
607 from waiting to be seated, ordering the dish, waiting for the dish to be served, during meals,
608 and after finishing the meal and before checking out.

609 The study was conducted in South China and specifically, in Macao. As prior research
610 has suggested, because of regional differences in the dining culture within China (Cui & Liu,
611 2000), the results should be carefully interpreted before generalized to other regions. Research
612 that compares the results of this study with dining experiences in other regions of China will
613 be fruitful in casting light on the regional differences in solo dining. Last, but not least, the data
614 were collected before the COVID-19 pandemic. As prolonged isolation may have an impact
615 on people's emotional traits, follow-up studies could be conducted during and after the
616 pandemic to test if the emotions associated with solo dining have changed in light of the
617 changes to social servicescapes such as maintaining social distancing in a dining setting in the
618 new normal post-COVID-19.

619

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807 **Table 1.**
808 Survey sample profile

| | <i>N</i> | % |
|--|----------|-------|
| Gender | | |
| Male | 274 | 43.0 |
| Female | 363 | 57.0 |
| Age | | |
| 18-24 | 199 | 31.1 |
| 25-34 | 187 | 29.4 |
| 35-44 | 95 | 14.9 |
| 45-54 | 85 | 13.3 |
| 55-64 | 58 | 9.1 |
| 65 or above | 14 | 2.2 |
| Monthly individual income (in MOP, 1 USD = about 8 MOP) | | |
| <10,000 | 208 | 32.7 |
| 10,000 to 19,999 | 223 | 35.0 |
| 20,000 to 29,999 | 137 | 21.5 |
| 30,000 to 39,999 | 44 | 6.9 |
| 40,000 or above | 19 | 3.0 |
| No answer | 6 | 0.9 |
| Occupation | | |
| Professional | 167 | 26.2 |
| Trade worker or manual labourer | 49 | 7.7 |
| Service worker | 197 | 30.9 |
| Student | 138 | 21.7 |
| Retired | 35 | 5.5 |
| Self-employed | 31 | 4.9 |
| Unemployed | 12 | 1.9 |
| Other | 8 | 1.3 |
| Relationship status | | |
| Single | 250 | 39.2 |
| In a relationship (live together) | 37 | 5.8 |
| In a relationship (live separately) | 117 | 18.4 |
| Married | 213 | 33.4 |
| Divorced | 18 | 2.8 |
| No answer | 2 | 0.3 |
| Living arrangement (multiple answer allowed) | | |
| | <i>n</i> | % |
| With partner | 244 | 38.3 |
| With children | 151 | 23.7 |
| With parents | 289 | 45.4 |
| Alone | 54 | 8.5 |
| Share house with strangers | 4 | 0.6 |
| With friends | 19 | 3.0 |
| Dormitory | 11 | 1.7 |
| Relatives | 10 | 1.6 |
| Education | | |
| Primary school or below | 52 | 8.2 |
| Secondary school | 244 | 38.3 |
| Undergraduate degree | 306 | 48.0 |
| Graduate degree or above | 35 | 5.5 |
| Total | 637 | 100.0 |

809

Table 2.
Validities and reliabilities of measurements

| Construct | Standardized loadings | t-Value | CCR ^a | AVE ^b | Cronbach's alpha |
|---|-----------------------|-----------|------------------|------------------|------------------|
| Solo diner PE | | | 0.851 | 0.535 | 0.839 |
| Liberated | 0.684 | – | | | |
| Relaxed | 0.790 | 17.289*** | | | |
| Enjoying | 0.797 | 17.339*** | | | |
| Confident | 0.695 | 15.301*** | | | |
| Pleased | 0.680 | 15.323*** | | | |
| Solo diner NE | | | 0.862 | 0.612 | 0.854 |
| Isolated | 0.692 | – | | | |
| Stressful | 0.710 | 16.646*** | | | |
| Bored | 0.873 | 19.803*** | | | |
| Being gazed by other diners | 0.839 | 19.220*** | | | |
| PE of others | | | 0.882 | 0.601 | 0.877 |
| Liberated | 0.619 | – | | | |
| Relaxed | 0.814 | 16.461*** | | | |
| Enjoying | 0.864 | 17.112*** | | | |
| Confident | 0.837 | 16.777*** | | | |
| Pleased | 0.717 | 15.117*** | | | |
| NE of others | | | 0.862 | 0.612 | 0.863 |
| Isolated | 0.704 | – | | | |
| Stressful | 0.745 | 17.635*** | | | |
| Bored | 0.864 | 19.971*** | | | |
| Being gazed by other diners | 0.806 | 18.849*** | | | |
| Solo dining experiential outcome | | | 0.813 | 0.592 | 0.798 |
| I am familiar with eating out alone | 0.756 | – | | | |
| I am satisfied with eating out alone | 0.823 | 17.209*** | | | |
| I am willing to eat out alone | 0.726 | 16.410*** | | | |

Notes: ^a CCR: composite construct reliability; AVE: average variance extracted; *** $p < 0.001$; $\chi^2/df = 2.344$, $p < .001$; CFI = 0.939; IFI = 0.927; GFI = 0.913; RMSEA = 0.065

Table 3.
Correlations and discriminant validity

| | Mean | S.D. | 1 | 2 | 3 | 4 | 5 |
|-------------------------------------|-------|-------|--------------------------|--------------|--------------|--------------|--------------|
| 1. Solo diner PE | 5.112 | 2.164 | 0.731^a | | | | |
| 2. Solo diner NE | 3.823 | 2.452 | 0.284 ^b | 0.782 | | | |
| 3. PE of others | 4.725 | 2.259 | 0.721 | 0.394 | 0.775 | | |
| 4. NE of others | 3.992 | 2.472 | 0.298 | 0.759 | 0.429 | 0.782 | |
| 5. Solo dining experiential outcome | 5.903 | 2.225 | 0.388 | -0.105 | 0.273 | -0.027 | 0.769 |

Notes: PE (positive emotion); NE (negative emotion); ^aDiagonal elements (in bold) are the square root of the average variance extracted (AVE); ^bOff-diagonal elements are the correlations among constructs

Table 4.

Polynomial regression analysis results

| Dependent variable: solo dining experiential outcome | | | |
|---|----------------------------------|---|----------------------------------|
| Model 1 (PE) | | Model 2 (NE) | |
| | Unstandardized beta coefficients | | Unstandardized beta coefficients |
| Constant (b ₀) | 0.895*** | Constant (b ₀) | 0.978*** |
| Gender | 0.171 | Gender | 0.159 |
| Frequency of solo dining | 0.373*** | Frequency of solo dining | 0.420*** |
| Solo diner PE (b ₁ X) | 0.348*** | Solo diner NE (b ₁ X) | -0.098* |
| PE of others (b ₂ Y) | 0.004 | NE of others (b ₂ Y) | 0.054 |
| Solo diner PE ² (b ₃ X ²) | 0.013 | Solo diner NE ² (b ₃ X ²) | 0.004 |
| Solo diner PE × PE of others (b ₄ XY) | 0.041 | Solo diner NE × NE of others (b ₄ XY) | 0.039 |
| PE of others ² (b ₅ Y ²) | 0.005 | NE of others ² (b ₅ Y ²) | 0.017 |
| R ² | 0.195*** ^a | R ² | 0.109** |
| Surface tests | | | |
| Along Y = X line | | Along Y = X line | |
| Slope (a ₁ =b ₁ + b ₂) | 0.337 (7.285***) ^a | Slope (a ₁ =b ₁ + b ₂) | -0.048 (-1.352) |
| Curvature (a ₂ =b ₃ + b ₄ + b ₅) | 0.071 (5.142***) | Curvature (a ₂ =b ₃ + b ₄ + b ₅) | 0.059 (4.251**) |
| Along Y = - X line | | Along Y = - X line | |
| Slope (a ₃ =b ₁ - b ₂) | 0.326 (7.034***) | Slope (a ₃ =b ₁ - b ₂) | -0.151(-4.264**) |
| Curvature (a ₄ =b ₃ - b ₄ + b ₅) | -0.036 (-2.599**) | Curvature (a ₄ =b ₃ - b ₄ + b ₅) | -0.068 (-4.896**) |

Notes: PE (positive emotion); NE (negative emotion); ^a number in parentheses are *t*-values; **p* < 0.05, ***p* < 0.01, ****p* < 0.001

Table 5.

Polynomial regression analyses: testing the moderating effects of generations (Generation Z vs. Older generational group)

| Dependent variable: solo dining experiential outcome | | | | | |
|---|----------------------------------|----------|---|----------------------------------|----------|
| Model 1 (PE) | | | Model 2 (NE) | | |
| | Unstandardized beta coefficients | | | Unstandardized beta coefficients | |
| | Step 1 | Step 2 | | Step 1 | Step 2 |
| Constant (b ₀) | 0.895*** | 0.900*** | Constant (b ₀) | 0.978*** | 0.989*** |
| Gender | 0.171 | 0.141 | Gender | 0.159 | 0.148 |
| Frequency of solo dining | 0.373*** | 0.352*** | Frequency of solo dining | 0.420*** | 0.411*** |
| Solo diner PE (b ₁ X) | 0.348*** | 0.241*** | Solo diner NE (b ₁ X) | -0.098* | -0.005 |
| PE of others (b ₂ Y) | 0.004 | 0.085 | NE of others (b ₂ Y) | 0.054 | 0.022 |
| Solo diner PE ² (b ₃ X ²) | 0.013 | 0.014 | Solo diner NE ² (b ₃ X ²) | 0.004 | 0.013 |
| Solo diner PE × PE of others (b ₄ XY) | 0.041 | 0.037 | Solo diner NE × NE of others (b ₄ XY) | 0.039 | 0.045 |
| PE of others ² (b ₅ Y ²) | 0.005 | 0.012 | NE of others ² (b ₅ Y ²) | 0.017 | 0.013 |
| Generation Z ^a (b ₆ W) | | -0.188 | Generation Z (b ₆ W) | | -0.151 |
| Solo diner PE × Generation Z (b ₇ XW) | | 0.362*** | Solo diner NE × Generation Z (b ₇ XW) | | -0.229* |
| PE of others × Generation Z (b ₈ YW) | | -0.277** | NE of others × Generation Z (b ₈ YW) | | 0.065 |
| Solo diner PE × PE of others × Generation Z (b ₉ XYW) | | -0.020 | Solo diner NE × NE of others × Generation Z (b ₉ XYW) | | -0.015 |
| R ² | 0.195 | 0.213 | R ² | 0.110 | 0.125 |
| ΔR ² (ΔF) | 0.017 (3.469**) | | ΔR ² (ΔF) | 0.015 (2.815*) | |
| Surface tests | | | | | |
| Along Y = X line (Generation Z) | | | Along Y = X line (Generation Z) | | |
| Slope (a ₁ =b ₁ + b ₂) | 0.416 (2.257**) ^b | | Slope (a ₁ =b ₁ + b ₂) | -0.155 (-2.187*) | |
| Curvature (a ₂ =b ₃ + b ₄ + b ₅) | 0.046 (1.953*) | | Curvature (a ₂ =b ₃ + b ₄ + b ₅) | 0.067 (2.649**) | |
| Along Y = - X line | | | Along Y = - X line | | |
| Slope (a ₃ =b ₁ - b ₂) | 0.803 (4.355**) | | Slope (a ₃ =b ₁ - b ₂) | -0.352 (-4.964**) | |
| Curvature (a ₄ =b ₃ - b ₄ + b ₅) | 0.019 (0.801) | | Curvature (a ₄ =b ₃ - b ₄ + b ₅) | 0.020 (0.790) | |
| Along Y = X line (Older) | | | Along Y = X line (Older) | | |
| Slope (a ₁ =b ₁ + b ₂) | 0.326 (6.769***) | | Slope (a ₁ =b ₁ + b ₂) | 0.018 (0.400) | |
| Curvature (a ₂ =b ₃ + b ₄ + b ₅) | 0.063 (3.818**) | | Curvature (a ₂ =b ₃ + b ₄ + b ₅) | 0.069 (4.097**) | |
| Along Y = - X line | | | Along Y = - X line | | |
| Slope (a ₃ =b ₁ - b ₂) | 0.155 (3.213**) | | Slope (a ₃ =b ₁ - b ₂) | -0.033 (-0.739) | |
| Curvature (a ₄ =b ₃ - b ₄ + b ₅) | -0.015 (-0.931) | | Curvature (a ₄ =b ₃ - b ₄ + b ₅) | -0.042 (-2.484**) | |

Notes: PE (positive emotion); NE (negative emotion); ΔR² indicates an increase in variance explained by adding the set of non-linear terms (X², XY and Y²) above the linear terms (X and Y); ^aolder generational group was used as the reference group; ^b number in parentheses are *t*-values; **p* < 0.05, ***p* < 0.01, ****p* < 0.001

Figure 1.

Emotional congruence between solo diners and other diners

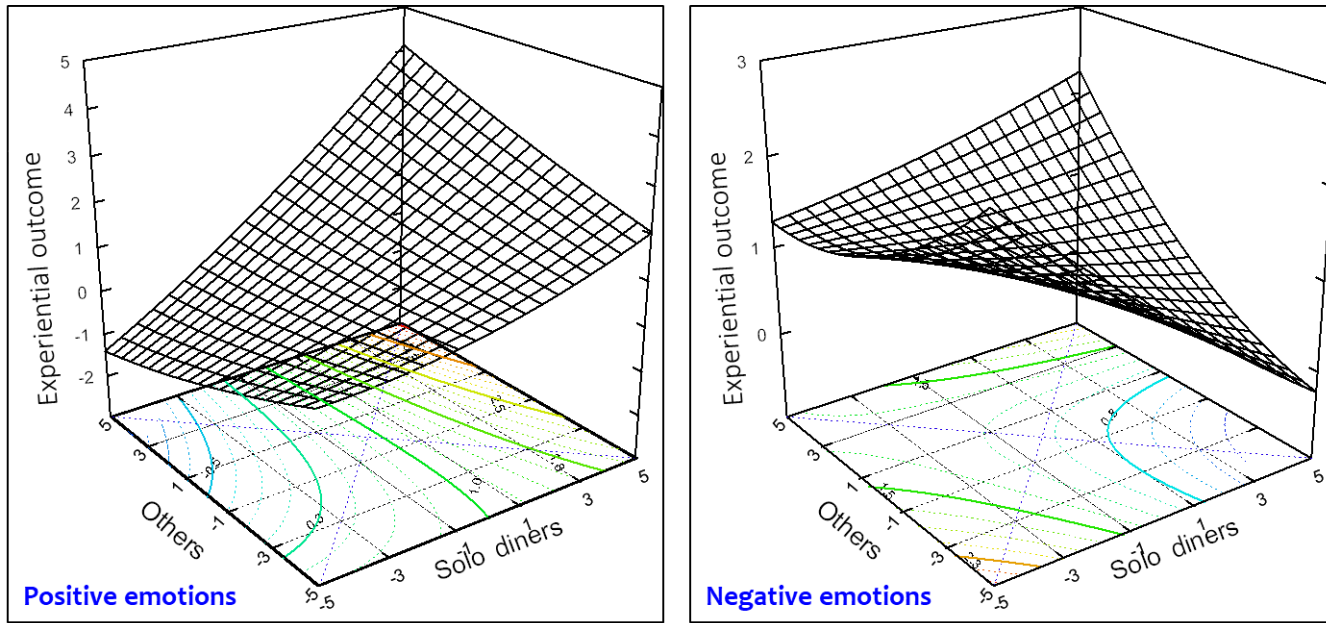


Figure 2.

Emotional congruence between solo diners and other diners: Generation Z vs. older generational group

