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Research Note: Is urban nature necessary for well-being? For whom?

A necessary condition analysis

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Conflicts of interest

Florence Allard-Poesi declared to have no financial or non-financial conflict of interests in the research.

Justine Massu declared to have no financial or non-financial conflict of interests in the research.

Ethics approval

The vice-president of the university (UPEC), dedicated to research, attests that the research respects the highest standards of ethics and scientific integrity and that no ethical authorization is required under the university's regulations for it to be published.

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1 **Research Note: Is urban nature necessary for well-being? For whom?**

2 **A necessary condition analysis**

3 **Abstract**

4 This research investigates whether nature located near urban residences is necessary for—and
5 not only associated with—the well-being of urban populations, especially those experiencing
6 high financial strain. A questionnaire measuring well-being and the perceived presence of
7 different types of nature was administered to a sample of 2,500 French urban residents.
8 Psychometric tests then necessary condition analyses (Dul, 2016) were conducted. The results
9 show that: (1) nature is necessary for people living with high financial strain to reach high levels
10 of well-being, but this is not the case for people experiencing low or no financial strain; (2)
11 different types of nature (i.e., undomesticated, proximity, and domesticated nature) are
12 necessary for urban residents with high financial strain. This suggests that the different types
13 of nature play different, non-substitutable roles in urban dwellers' well-being and health. These
14 results extend prior research on the equigenic potential of urban nature.

15 Key words: financial strain, WHOQOL-26, well-being, urban nature, necessity, NCA

16 17 1. Introduction

18 Using necessary condition analysis (NCA; Dul, 2016; see also Karwowski et al., 2016, and
19 Luther et al., 2017, for examples of research in psychology and medicine using NCA), this short
20 communication is aimed at answering two questions: *Is the presence of nature necessary for*
21 *urban residents to attain high levels of well-being? Is this necessary for all residents, regardless*
22 *of financial strain?* Adopting a comprehensive view of well-being, this research follows the

23 World Health Organization (WHO, 1998) definition and considers well-being as including
24 people's perceptions of their psychological and physical health, their immediate environment,
25 and the resources (in terms of energy, information, and transport in particular) they have
26 available to conduct their lives. Well-being is defined as:

27 an individual's perception of their position in life in the context of the culture and value
28 systems in which they live and in relation to their goals, expectations, standards, and
29 concerns. It is a broad-ranging concept affected in a complex way by the person's
30 physical health, psychological state, personal beliefs, social relationships, and their
31 relationship to salient features of their environment. (The WHOQOL Group, 1998)

32 Past research (see Rigolon et al., 2021, for a review) suggests that urban nature, in particular
33 green spaces, have the potential to be equigenic (that is, they can, under specific conditions,
34 reduce socioeconomic health and quality of life inequalities). For instance, Olsen et al. (2019b)
35 showed that a more even distribution of land cover in European cities was associated with lower
36 levels of socioeconomic disparities in quality of life. Mitchell et al. (2015) demonstrated that
37 access to green spaces was associated with narrower gaps in perceived quality of life between
38 people under the least and the most financial strain. This moderating effect of the presence of
39 nature near urban residences also holds for physical and mental health. Mitchell and Popham
40 (2008) found that all-cause mortality and mortality from circulatory diseases were significantly
41 lower in the deprived but greenest areas than in less-green ones. Pope et al. (2015) showed how
42 access to and the quality of green space in deprived areas in the United Kingdom were
43 associated with lower psychological distress.

44 People with higher financial strain—with no car and reduced access to hobbies or holidays in
45 other places—are more dependent on their residences' proximate environment, which therefore
46 has a stronger impact on their physical health and well-being than it does for people under less

47 financial strain. This means that the mitigative, restorative, and capacity-building or
48 instauration effects of urban nature near residences on mental and physical health (see
49 Markevych et al., 2017) can be expected to be higher for urban residents with high financial
50 strain than for other urban residents.

51 Theoretically, given that this dependence of people with higher financial strain on their
52 proximate environment, one may hypothesize that the presence of nature near their residence is
53 not only associated with, but necessary for, a high level of well-being. Furthering association
54 hypotheses between nature and well-being, the necessity hypothesis means that urban residents
55 with high financial strain will not reach a high level of well-being if nature near their residence
56 is absent or reduced.

57 Recent research has underlined that urban residents perceive different types of nature depending
58 on its biodiversity and the vegetation's complexity and height (see Southan et al., 2017; 2018;
59 Fisher et al., 2021; Meyer-Grandbastien et al., 2020), and that wilder, undomesticated spaces
60 are not only preferred by urban residents but also associated with higher psychological and
61 physical restorative benefits than more managed or domesticated spaces. Wilder green spaces
62 are also supposed to mitigate urban nuisances, such as noise, pollution, and urban violence, and
63 their negative effects on the psychological, physical, and environment dimensions of well-
64 being. Finally, these spaces are opportunities to practice physical activities, thus they generate
65 instauration effects that are associated with better physical and psychological well-being. Given
66 these prior results and theoretical arguments, it is hypothesized that:

67 H1a. Undomesticated nature is necessary for urban residents with high financial strain to reach
68 high levels of well-being.

69 H1b. Undomesticated nature is not necessary for urban residents with high financial strain to
70 reach high levels of well-being.

71 It does not follow that more domesticated urban spaces such as city gardens, parks, or pockets
72 of greenery, including roof gardens and flowers on balconies, are not associated with physical
73 or psychological well-being. City gardens or parks, hereafter called domesticated nature, allow
74 urban residents to connect with nature and meet other people, thereby conveying cognitive and
75 emotional restorative benefits (Kondo et al., 2018). If large enough, these spaces may be unique
76 opportunities to practice soft or more intense physical activities for people with high financial
77 strain. This leads to the following hypotheses:

78 H2a. Domesticated nature is necessary for urban residents with high financial strain to reach
79 high levels of well-being.

80 H2b. Domesticated nature is not necessary for urban residents with low financial strain to reach
81 high levels of well-being.

82 Finally, small spots of greenery such as plants on a balcony or a patio are small nature spaces
83 that may favor contemplative activities or soft physical activities such as gardening, which has
84 been shown to be related to better psychological health (White et al., 2019). Usually highly
85 valued by urban residents, these small spaces may be associated with a higher perceived quality
86 of one's residence and a healthier environment (The authors, 2022).

87 H3a. Proximity nature is necessary for urban residents with high financial strain to reach high
88 levels of well-being.

89 H3a. Proximity nature is not necessary for urban residents with low financial strain to reach
90 high levels of well-being.

91 Investigating these hypotheses will provide a test of the hypothesized higher dependence of low
92 socioeconomic status groups on their immediate environment and of the necessary presence of
93 different types of nature in their immediate environment for their well-being. This is crucial if
94 investments in urban green spaces and nature are to be allocated appropriately.

95 Studies based on split-sample analysis (e.g., comparing the association between green space
96 and health for low vs. high socioeconomic groups) and interaction analysis (e.g., measuring
97 interactions between green space and socioeconomic measures) have shown that urban nature
98 and green spaces have more protective effects for residents with high financial strain than for
99 those experiencing low financial strain (see Rigolon et al., 2021, for a review). While these
100 results are important, it cannot be concluded that the presence of green spaces or nature near
101 one's residence is necessary for reaching a high level of health or well-being (above the average
102 for the urban population under study, for instance). To test our hypotheses, we use NCA (Dul,
103 2016; 2021).

104

105 2. Methods

106 2.1 Data collection and sampling

107 A questionnaire was designed to assess urban residents' well-being using the WHOQOL-26,
108 the perception of urban nature near residences, and other variables. MIS Group, a member of
109 ESOMAR, made the questionnaire available online to 72,000 residents of French cities with
110 high and intermediate density. More than 3,200 people completed the questionnaire, from
111 which a final sample of 2,500 urban respondents of at least 15 years old was extracted. This
112 provided a sample with a collective profile similar to that of the total French urban population
113 in terms of age, sex, regional location, and occupation. Respondents were asked to consider the

114 previous week when answering the questionnaire. They were advised that there were no good
115 or bad answers and that they should report on their personal experience and feelings (see the
116 authors, 2022, for more details on the protocol). The research design received ethical approval
117 from the research vice-rector of the authors' university. We removed 158 potential outliers
118 using the Mahalanobis distance criterion, based on responses for all items except
119 sociodemographic variables, resulting in a sample of 2,342 participants. The sociodemographic
120 characteristics of the final sample are included in Table 1.

121

122 2.2 Variables

123 Outcome variable: Well-being

124 We used the French version of the WHOQOL-26, partially validated by Baumann et al. (2010),
125 to measure well-being. We added two items from the WHOQOL-100 to assess how healthy
126 respondents perceived the environment near their residences: "How satisfied are you with your
127 physical environment (e.g., pollution, climate, noise, and attractiveness)?" and "How concerned
128 are you with the noise in the area you live in?" Responses were given on 5-point scales, with
129 higher scores reflecting greater satisfaction or greater concern (1 = very dissatisfied to 5 = very
130 satisfied; 1 = not at all to 5 = completely).

131 Independent variable: Nature near residence

132 A second scale was used to evaluate respondents' perceptions of the presence of different types
133 of nature near their residences, defined as nature that they could see from home or access on
134 foot in under 15 minutes. The scale covered 19 types of nature, from large green and blue spaces
135 (e.g., forests, pastures, rivers, coasts, and parks) through intermediate areas (e.g., individual,

136 roof, and public gardens) to small areas of greenery (e.g., isolated trees in the street, flower
137 beds, and plants on a patio or balcony). Respondents answered on a 5-point scale, with higher
138 scores reflecting higher presence of nature, as perceived by the respondent (1 = not at all present
139 to 5 = extremely present).

140 Socioeconomic status

141 Following Mitchell et al. (2015), socioeconomic status was measured using perceived financial
142 strain. Participants were asked whether they had enough money to meet their needs. The
143 answers were given on a 5-point scale, with higher scores reflecting lower financial strain
144 (1 = not at all to 5 = an extreme amount).

145 Other variables

146 Other variables reported are sex, age, annual household income (\leq €10,999, €11,000–25,999,
147 €26,000–40,999, €41,000–55,999, or \geq €56,000), and health status. Respondents were asked
148 whether they had any of the 14 health problems listed in the WHOQOL-100 or any other health
149 problems. Answers were coded as “Yes” if at least one problem was mentioned and “No” if
150 none were indicated. Table 1 presents the descriptive analyses conducted on these variables and
151 the well-being average according to main demographic criteria. Men and people aged 15–25
152 and 46–65 years old report higher levels of well-being, while low-income populations with high
153 financial strain and people living with health problems report lower levels of well-being. The
154 questionnaire also included variables not reported here: frequency of exposure to nature,
155 frequency and types of activity completed in nature, and the characteristics (i.e., perceived
156 quality) of nature near their residence.

157 2.3 Data analysis

158 We conducted a two-step procedure to analyze the data. This was for two reasons. First, because
159 the factorial structure of the French version of the WHOQOL-26 has not been established and
160 psychometrically validated. Second, because we created or adapted the other measures in the
161 questionnaire for this research. We conducted psychometric tests on every variable to identify
162 latent variables then defined the set of items by best fit. We then used NCA (Dul, 2016) to see
163 whether nature near urban residences was necessary for the well-being of subgroups with
164 different levels of financial strain. An approximate permutation test with 10,000 permutations
165 was conducted to test the significance of effect sizes (Dul, van der Laan, & Kuik, 2018).

166 2.3.1 Psychometric tests

167 Psychometric analyses on items assessing well-being resulted in a bifactorial model (Holzinger
168 and Swineford, 1937) with 20 items grouped in four factors and a general factor ($\chi^2 = 10,44.36$,
169 $df = 146$, $p < .001$, CFI = .94; NNFI = .92; RMSEA = .05; SRMR = .04). Only the general
170 factor was used in this study ($\alpha = .87$). The items describing the types of nature near urban
171 citizens' residences gave three dimensions ($\chi^2 = 633$, $df = 45$, $p < .001$, CFI = .95; NNFI = .93;
172 RMSEA = .08; SRMR = .05). The first dimension (undomesticated) comprised four items:
173 forests, roadsides, scrubland, and fields ($\alpha = .81$). The second dimension (proximity) comprised
174 five items: balconies with flowers or vegetables, patios with flowers or vegetables, flower beds,
175 roof gardens, and hanging baskets ($\alpha = .81$). The third dimension (domesticated) comprised
176 three items: parks, city gardens, and playgrounds ($\alpha = .82$). Means, standard deviations, and
177 correlations are presented in Table 2.

178 2.3.2 Necessary condition analysis

179 To test the extent to which nature near residences was necessary for residents' well-being, we
180 relied on NCA, as developed by Dul (2016, 2021). Stepping away from regression-based

181 methods, NCA allows for testing of the necessity assumption (“there is no Y without X”; “if
182 there is no X, there is no Y”). It identifies single factors that are necessary but not sufficient for
183 an outcome. The process is as follows: If X is a necessary condition for Y, in the scatterplot of
184 their relationship, the upper-left corner will be empty, meaning that there are no individuals (or
185 at least there should be very few) with low X and high Y. NCA draws and calculates the
186 parameters of a ceiling line on top of the XY scatterplot. The ceiling envelopment with free
187 disposal hull (CE-FDH) was chosen to draw the line that distinguishes between empty and
188 non-empty spaces. This coefficient estimates with 100% accuracy the necessity effect size from
189 the proportion of empty space size in the upper-left corner relative to the total space that can
190 have data.

191

192 Following prior research and our hypotheses, we expect high presence of nature near urban
193 residences to be necessary for high levels of well-being for residents with high financial strain,
194 unlike the low financial-strain residents, who can report high levels of well-being without high
195 presence of nature near their residence. This implies that in a scatterplot of nature vs. well-being
196 for people with high financial strain, there will be empty space in the upper-left corner. This
197 will not be observed for urban residents with low financial strain.

198 As the presence of nature and well-being are conceived and assessed through continuous
199 variables, the definition of high levels cannot be set objectively and needs to be deduced from
200 the population distribution on these variables. In this research, we followed the criteria applied
201 by Van der Valk, Sumo, Dul, & Schroeder (2016) to consider high levels of well-being to be
202 those in the 90th percentile, which is quite demanding, i.e., 10% of the respondents were able to
203 reach the so-called high levels of well-being ranging from 4.2 to 5 (the observed maximum).

204 After running an analysis on the overall sample, we split our data set into five subgroups based
205 on participants' responses (on a 5-point scale) to the questionnaire item on perceived financial
206 strain. This allowed us to test whether and how the necessity effects varied according to urban
207 residents' financial strain.

208 3. Results

209 NCA was conducted on the overall sample first, then on the five "financial strain" subgroups.
210 Ceiling lines were drawn in the scatterplots, and the necessity effect sizes were calculated. Table
211 3 shows the necessity effect sizes for the three types of nature (domesticated, undomesticated,
212 and proximity) on well-being, calculated using CE-FDH ceiling lines (Dul, 2021), and the
213 results of significance tests. The results show that the necessity effect sizes of nature for well-
214 being vary according to urban residents' financial strain and the type of nature near their
215 residence.

216 When considering the overall population of respondents, the presence of undomesticated,
217 proximity, or domesticated nature did not appear necessary for urban residents' well-being. No
218 single type of nature showed a significant necessary effect on well-being. For instance, Figure
219 1 shows a high level of well-being with a low level of domesticated nature in the vicinity of
220 residences.

221 The results for the financial strain subgroups showed clear differences between low and high
222 financial strain. The necessity effects of the three types of nature for well-being were significant
223 for urban residents with the most financial strain (subgroup 1 for the three types of nature—see
224 Figures 2a, 2b, and 2c—and subgroup 2 for proximity and undomesticated nature), thereby
225 confirming hypotheses H1a, H2a, and H3a. However, the effect sizes decreased as financial
226 strain decreased (see subgroup 3 in Figure 3), and none of the effect sizes were significant for

227 the two lowest levels of financial strain (subgroups 4 and 5), thereby confirming hypotheses
228 H1b, H2b, and H3b. For instance, to reach a level of 4 for well-being, urban residents with the
229 highest financial strain need a perceived presence of domesticated nature of around level 3.5
230 (i.e., between moderately and very present). To reach a level of 4.3 for well-being, they need a
231 perceived presence of undomesticated nature of level 4.3 (i.e., very present).

232 Supplemental Table 2 includes NCA bottleneck tables showing which percentile of perceived
233 types of nature is a bottleneck for a given desired level of well-being (Dul, 2016).

234 4. Discussion

235 This study shows that for urban dwellers experiencing high financial strain, the presence of
236 nature near urban residences is necessary for high levels of well-being. Theoretically, these
237 results contribute to specifying the relationship between urban nature and urban residents' well-
238 being. More precisely, they demonstrate that while undomesticated, proximity, and
239 domesticated nature are not necessary for urban residents, when considered as a whole, to reach
240 high levels of well-being, these three types of nature are all necessary for the subgroup of
241 residents with the highest financial strain. These results contribute to the current literature in
242 two ways.

243 First, they further the findings of previous research that observed a stronger association between
244 green spaces and quality of life (Olsen, Nicholls, and Mitchell, 2019) or mental (Mitchell et al.,
245 2015; Pope et al., 2015) and physical health (Mitchell and Popham, 2008; Rigolon et al., 2021)
246 in deprived areas than in less deprived areas. Theoretically, for urban residents with high
247 financial strain, it is not just that the presence of nature near their residences is more strongly
248 associated with better perceived quality of life, better mental health or lower distress, and lower
249 risks of cardiovascular diseases; its presence is necessary for them to report high levels of well-

250 being and perceived mental and physical health, as measured by the WHOQOL. Following
251 Rigolon et al. (2021), this necessity relationship may be interpreted as resulting from higher
252 dependence on the immediate environment among people with high financial strain.

253 Second, the results show that all types of nature investigated in this study (undomesticated,
254 proximity, and domesticated) are necessary for higher levels of well-being in high financial-
255 strain subgroups. This suggests that the different types of nature have specific, non-substitutable
256 effects on people's well-being. Though further theoretical and empirical investigation is
257 needed, it may be hypothesized that undomesticated nature (e.g., woodlands, forests, and
258 scrubland) is a more efficient buffer against urban nuisances (such as air pollution and noise)—
259 which are also known to be higher in deprived areas—than isolated areas of greenery or small
260 city parks (see Kondo et al., 2018; Wu et al., 2020). These wilder spaces, and their biodiversity,
261 favor contemplative activities that convey restorative psychological benefits (Fisher et al.,
262 2021; Meyer-Grandbastien et al., 2020; Southon et al., 2018) that may not be provided by other
263 activities, given people's lack of financial resources. For its part, proximity nature (such as
264 plants on a balcony or a patio) offers opportunities for frequent contact with nature and light
265 activities that may bring complementary physical and cognitive or emotional restorative effects,
266 or a more favorable appreciation of one's environment. Finally, domesticated nature (such as
267 city gardens and parks, which are rather small and overused in French urban areas) provides
268 opportunities to create and maintain social relationships, which may be crucial for
269 psychological well-being, especially for people who are retired, unemployed, or working
270 irregular late or early hours. While these physical, cognitive, and emotional benefits can be
271 obtained from other activities, such as leaving the city for the countryside or seaside for the
272 weekend, or going to the gym, they may not be affordable or accessible for people with high
273 financial strain. In turn, people with low financial strain are likely to take advantage of other
274 opportunities for social encounters, such as during their leisure time or professional activities.

275 Although further theoretical and empirical investigations are needed to deepen our
276 understanding of the non-substitutability observed between the different types of nature, our
277 results indicate that, as financial strain increases, the presence of different types of nature near
278 urban residences becomes more crucial for reaching high levels of well-being and health.
279 Following Triguero-Mas et al. (2021), this should not lead us to neglect the disruptive impact
280 of greening initiatives and their associated risks of gentrification, such as economic insecurity,
281 displacement of family or friends from a neighborhood, and loss of community feelings. That
282 nature is *necessary* for the well-being and health of people under high financial strain does not
283 mean that it is *sufficient* for well-being and health. Greening initiatives need accompanying
284 measures—for instance, community-based interventions, promotion of the use of green spaces,
285 or anti-gentrification schemes (Triguero-Mas et al., 2021)—so that the potential benefits for
286 targeted urban residents are realized (see also Badland and Pearce, 2019). Nevertheless, our
287 study invites urban planners and policymakers to direct greening initiatives toward urban
288 neighborhoods with high financial strain.

289

290 5. Limitations and further research

291 Several limitations of this study need to be addressed in further research. First, NCA does not
292 demonstrate causality, as it does not account for the passing of time between the presumed
293 cause and the effect. While the research draws on Markevych et al.'s (2017) theoretical model,
294 which supposes causality between the presence of nature and health benefits, as this study used
295 cross-sectional data, we cannot contend to have demonstrated causality. To this end, future
296 research should use time series data sets.

297 Second, following Mitchell et al. (2015), and consistent with the WHOQOL questionnaire's
298 ratings of people's well-being, we chose to measure financial strain using respondents'
299 subjective perceptions. Further research could use more objective measures (or combinations
300 of measures) of financial strain—for example, household income and education (Rigolon et al.,
301 2021)—even if those do not exactly assess financial strain as experienced by urban residents.

302 Third, data were collected during the pandemic, and we cannot be sure that the circumstances
303 did not increase urban residents' awareness of the well-being benefits of nature in their
304 immediate surroundings. However, the fact that our results are consistent with those of studies
305 conducted before the COVID-19 crisis suggests that any increased awareness did not affect the
306 study.

307 Finally, as the study used an online questionnaire, the results are not generalizable to people
308 with low French or digital literacy. Further research could use face-to-face interviews so that
309 people with low literacy can be included.

310

311 6. Conclusion

312 While replication studies are needed, particularly in other countries, this research advances prior
313 research by showing: first, that urban nature not only reduces health inequities but is also
314 necessary for people living with high financial strain to reach high levels of well-being (which
315 is not the case for people experiencing low or no financial strain); second, that different types
316 of nature (i.e., undomesticated, proximity, and domesticated nature) are necessary for, and have
317 different, non-substitutable roles in, urban dwellers' well-being and health. Further theoretical
318 and empirical research is needed to better understand these findings.

319

320

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408

409 Table 1. Sample characteristics and mean level of well-being.

Variable	N	%	Mean level of well-being	Standard deviation
Sex				
Male	1,092	47.0	3.64	.53
Female	1,250	53.0	3.55	.52
Age				
15–25	346	14.8	3.63	.44
26–35	382	16.3	3.59	.55
36–45	373	15.9	3.55	.56
46–55	370	15.8	3.52	.57
56–65	341	14.6	3.65	.53
66–75	490	20.9	3.61	.49
≥ 76	40	1.7	3.48	.44
Annual household income (€)				
≤ 10,999	279	11.9	3.35	.56
11,000–25,999	676	28.9	3.52	.51
26,000–40,999	787	33.6	3.64	.51
41,000–55,999	409	17.5	3.68	.50
≥ 56,000	191	8.2	3.81	.47
Health problems				
No	1,321	56.0	3.75	.47
Yes	1,021	44.0	3.42	.53
Financial strain: “Do you have enough money to meet your needs?”				
1. Not at all	274	11.7	3.05	.56
2. A little	403	17.2	3.39	.49
3. Moderately	1,125	48	3.64	.44
4. A lot	468	20.0	3.87	.38
5. An extreme amount	72	03.1	4.20	.50

411 Table 2. Mean, standard deviation, and correlations for well-being, types of nature, and
 412 financial strain.

Variable	M	SD	1	2	3	4
1. Well-being	3.59	0.52				
2. Undomesticated nature	2.72	1.05	.27**			
3. Proximity nature	2.25	0.85	.27**	.54**		
4. Domesticated nature	3.02	0.95	.32**	.38**	.50**	
5. Financial strain	2.86	0.97	.50**	.12**	.19**	.19**

413 *Notes.* *M* and *SD* are used to represent mean and standard deviation, respectively. * indicates *p*
 414 < .05; ** indicates *p* < .01; *** indicates *p* < .001.

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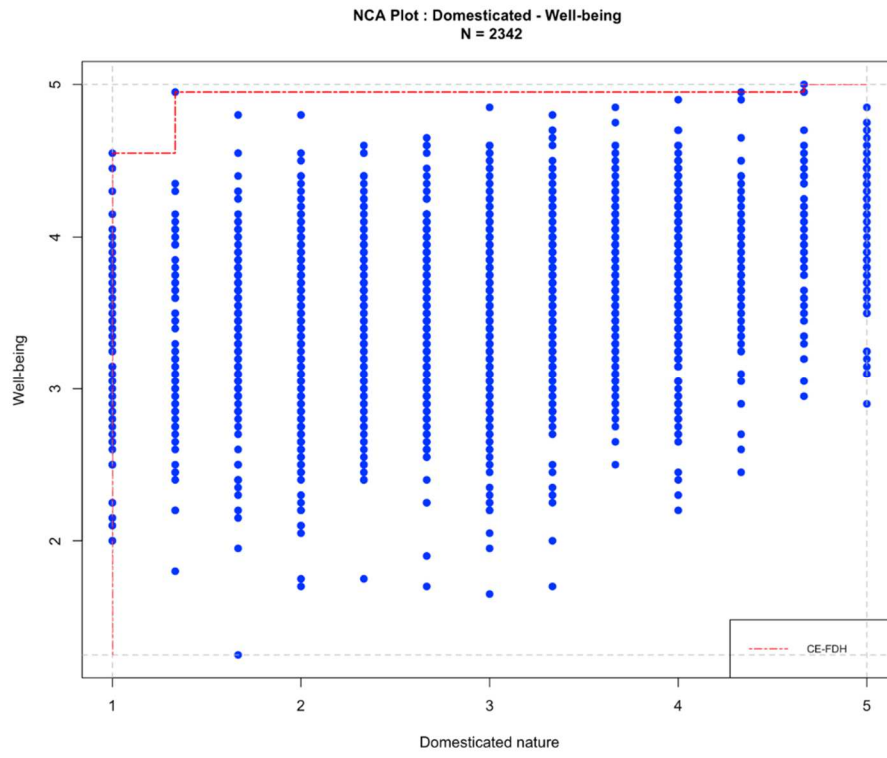
417 Table 3. Necessity effects of nature on well-being of residents with different levels of financial
 418 strain, and results of significance tests.

	N	Necessity effects of types of nature					
		Domesticated		Proximity		Undomesticated	
		ES	<i>p</i>	ES	<i>p</i>	ES	<i>p</i>
Total	2,342	0.2		0.1		0.2	
Financial strain: “Do you have enough money to meet your needs?”							
1. Not at all	274	.16	.001	.08	.002	.11	.010
2. A little	403	.12		.10	.019	.14	.010
3. Moderately	1,125	.06	.001	.02	.014	.03	.023
4. A lot	468	.08		.04		.05	
5. An extreme amount	72	.03		.02		.04	

Notes: The abbreviation ES stands for effect sizes. Necessity effect sizes are based on the CE-FDH ceiling line; Only *p* values with a value inferior to .05 were reported in the table.

419

420 Figure 1. All respondents: NCA scatterplot for domesticated nature and well-being.

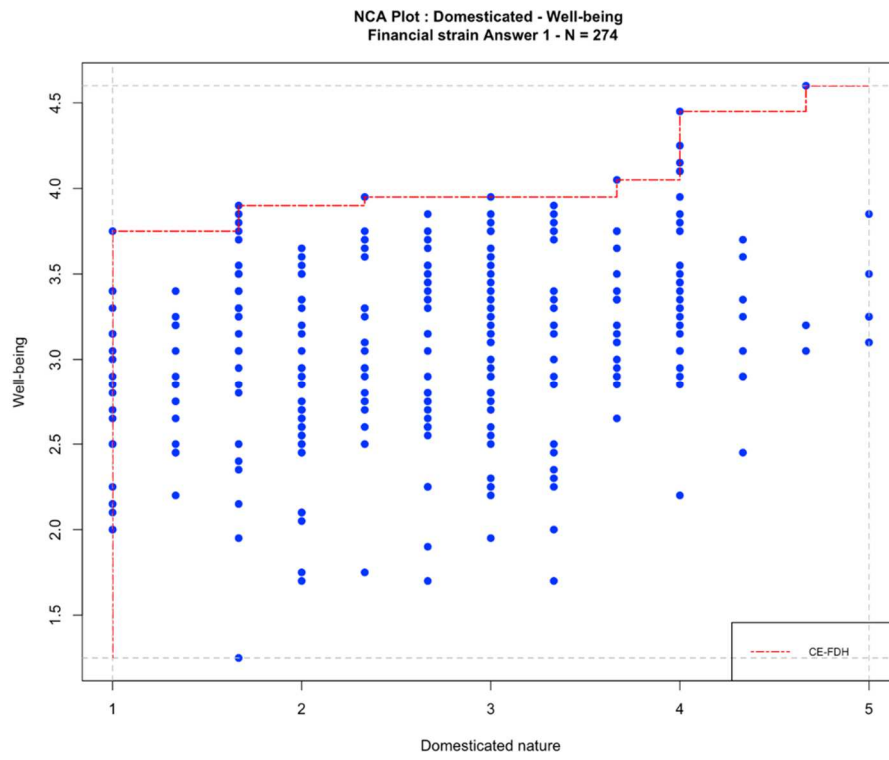


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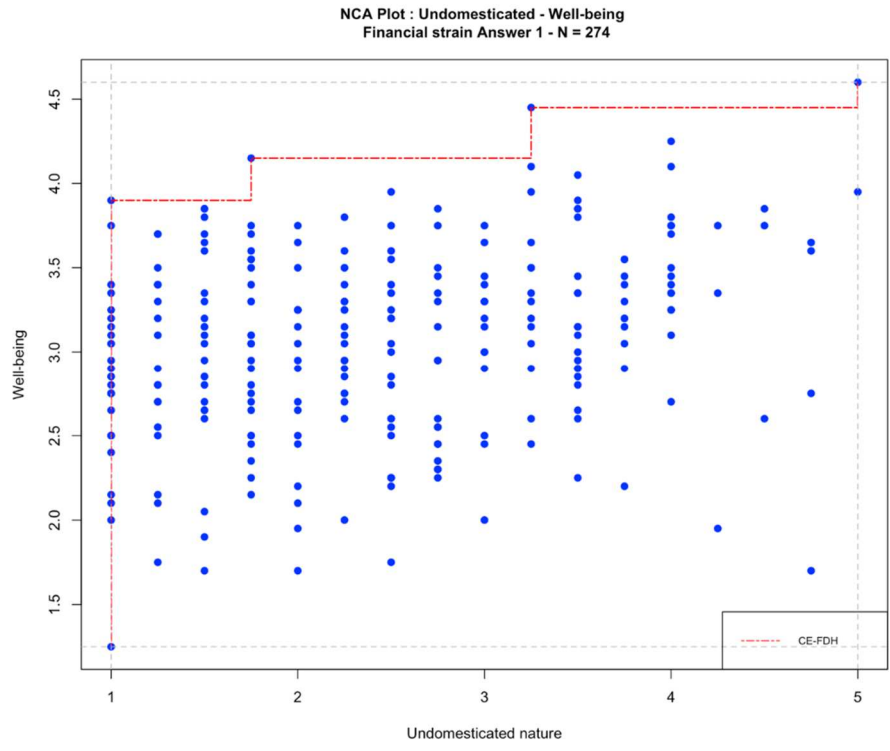
424 Figure 2a. Subgroup 1 (highest financial strain): NCA scatterplot for domesticated nature and
425 well-being.



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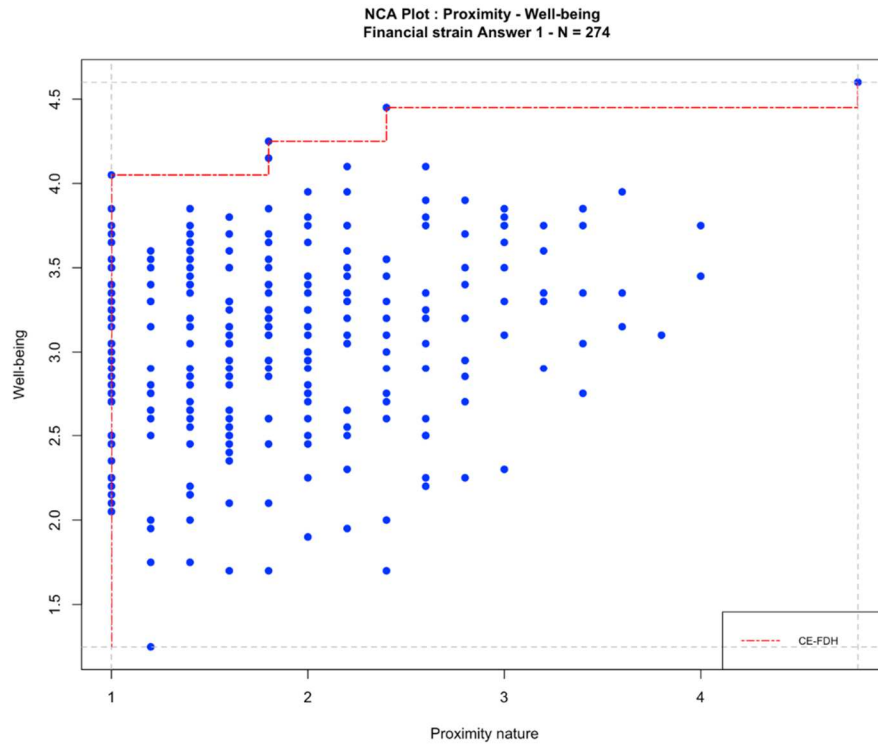
428 Figure 2b. Subgroup 1 (highest financial strain): NCA scatterplot for undomesticated nature
429 and well-being.



430

431

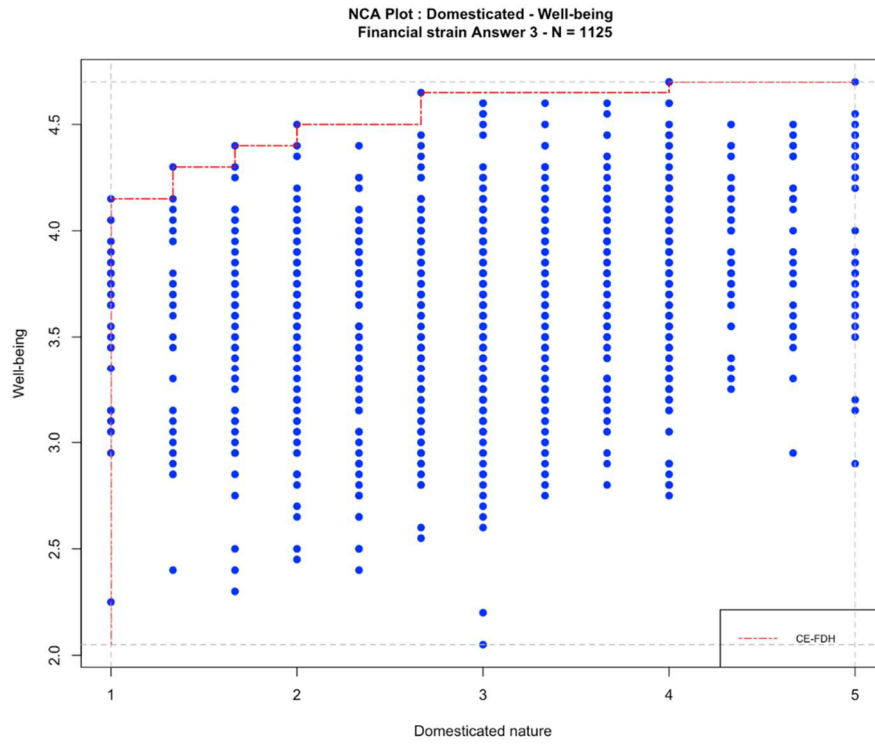
432 Figure 2c. Subgroup 1 (highest financial strain): NCA scatterplot for proximity nature and well-
433 being.



434

435

436 Figure 3. Subgroup 3 (middle financial strain): NCA scatterplot for domesticated nature and
437 well-being.



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