



Attitudes toward forest diversity and forest ecosystem services—a cross-cultural comparison between China and Switzerland

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Abstract: Aims: Despite the current interest in services provided by ecosystems and the role of biodiversity, the relationship among human attitudes, biodiversity and ecosystem services has hardly been investigated. Moreover, few studies have examined attitudes toward nature in cross-cultural comparisons. This study investigates the attitudes of Chinese and Swiss people, both environmental experts and laypersons, toward forest biodiversity and ecosystem services. Methods: Overall, 640 people in China and Switzerland were interviewed with the help of a standardized questionnaire. In each country, the study population was equally divided into an urban (80 city dwellers and 80 environmental science students) and a rural (80 forest visitors and 80 farmers) study group. The 15-minute interviews took place in the cities of Beijing and Zurich and in the rural forested areas of Dujiangyan, Sichuan Province and Lake Sempach, canton Lucerne. Attitudes toward forest biodiversity were investigated with the help of color photographs that depicted both monocultures and species-rich forests typical for China and Switzerland. Attitudes toward ecosystem services were investigated with the help of 13 statements on provisioning, regulating, cultural and supporting services of forests. Important Findings: On average, Chinese participants showed no strong preferences for biodiversity, whereas the Swiss clearly preferred species-rich forests over monocultures. However, Chinese environmental science students did prefer species-rich forests and attributed to them a higher conservation value because of their higher biodiversity. Although there were no strong preferences for Chinese versus Swiss forests, all participants correctly answered that Chinese forests are more species rich in terms of plants and animals and thus found them less boring and more interesting, but also less managed, than Swiss forests. All participants highly valued the ecosystem services provided by forests; especially the regulating and supporting ones. Environmental science students and farmers placed more importance on the provisioning services, whereas city dwellers and forest visitors emphasized more on the regulating services. The disjuncture between the high ecological quality of species-rich forests and their low attractiveness to Chinese study participants points to a potential conflict between conservation policies and the public's preferences. A better communication of ecosystem services provided by forest biodiversity to the public might change these preferences in favor of ecological quality, as already observed among Chinese environmental science students.

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Attitudes towards forest diversity and forest ecosystem services—a cross-cultural comparison between China and Switzerland

Running title: Attitudes towards forest diversity

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1 **Abstract**

2 **Aims** Despite the current interest in services provided by ecosystems and the role of
3 biodiversity, the relationship between human attitudes, biodiversity and ecosystem
4 services has hardly been investigated. Moreover, few studies have examined attitudes
5 towards nature in cross-cultural comparisons. This study investigates the attitudes of
6 Chinese and Swiss people, both environmental experts and laypersons, towards forest
7 biodiversity and ecosystem services.

8 **Methods** Overall 640 people in China and Switzerland were interviewed with the help
9 of a standardized questionnaire. In each country, the study population was equally
10 divided into an urban (80 city-dwellers and 80 environmental science students) and a
11 rural study group (80 forest visitors and 80 farmers). The 15-minute interviews took
12 place in the cities of Beijing and Zurich, and in the rural forested areas of Dujiangyan,
13 Sichuan Province, and Lake Sempach, canton Lucerne. Attitudes towards forest
14 biodiversity were investigated with the help of color photographs that depicted both
15 monocultures and species-rich forests typical for China and Switzerland. Attitudes
16 towards ecosystem services were investigated with the help of 13 statements on
17 provisioning, regulating, cultural and supporting services of forests.

18 **Important Findings** On average, Chinese participants showed no strong preferences
19 for biodiversity, whereas the Swiss clearly preferred species-rich forests over
20 monocultures. However, Chinese environmental science students did prefer species-rich
21 forests and attributed to them a higher conservation value because of their higher
22 biodiversity. Although there were no strong preferences for Chinese vs. Swiss forests,
23 all participants correctly answered that Chinese forests are more species-rich in plants
24 and animals and thus found them less boring and more interesting, but also less

25 managed than Swiss forests. All participants highly valued the ecosystem services
26 provided by forests; especially the regulating and supporting ones. Environmental
27 science students and farmers placed more importance on the provisioning services,
28 whereas city-dwellers and forest visitors emphasized more the regulating services.

29 The disjuncture between the high ecological quality of species-rich forests and their low
30 attractiveness to Chinese study participants points to a potential conflict between
31 conservation policies and the public's preferences. A better communication of
32 ecosystem services provided by forest biodiversity to the public might change these
33 preferences in favor of ecological quality as already observed among Chinese
34 environmental science students.

35

36 Keywords: Biodiversity preferences, cross-cultural comparison, forests, valuation of
37 ecosystem services

38

39 **Introduction**

40 Human alterations of the environment have resulted in a global loss of forest
41 biodiversity (Sala *et al.* 2000). This loss may negatively affect ecosystem functioning
42 and diminish the capacity of forest ecosystems to provide society with a stable and
43 sustainable supply of essential goods and services (Hu *et al.* 2008; Quijas *et al.* 2010).
44 The protection and conservation of primary forests, the restoration of forests in ways to
45 enhance biodiversity and improve ecosystem services, and a sustainable forest
46 management have thus become priority conservation goals around the world (Chazdon
47 2008; Schmitt *et al.* 2009). However, members of different cultures or cultural groups
48 may value forest biodiversity and ecosystem services differently and, in consequence,
49 may or may not support conservation goals set for example by governments (Deng *et al.*
50 2006). Although it becomes increasingly evident that decision-making strategies are
51 needed that better align ecological goals and human values (Saunders *et al.* 2006;
52 Gobster *et al.* 2007), the relationship between forest diversity, ecosystem services and
53 human attitudes has hardly been investigated. Moreover, few studies have examined
54 attitudes towards nature in cross-cultural comparisons (Eisler *et al.* 2003; Buijs *et al.*
55 2009).

56 It has been pointed out that environmental problems are largely ingrained into
57 traditional values, attitudes and beliefs of a given society (Xu *et al.* 2005; Deng *et al.*
58 2006). The influence of culture on people's perception of landscapes and their attitudes
59 towards nature has been extensively studied. Some studies found that culture can have
60 strong effects on landscape preferences (e.g. Zube & Pitt 1981; Eisler *et al.* 2003; Buijs
61 *et al.* 2009). Other studies, however, stressed that cultural similarities regarding such
62 preferences are much larger than cultural differences (e.g. Yang & Brown 1992; Herzog

63 *et al.* 2000). Only few studies have compared the attitudes towards nature of people
64 living in Western and Asian countries (Yang & Kaplan 1989; Yang & Brown 1992).
65 Moreover, only limited cross-cultural research has been carried out comparing people's
66 attitudes towards forests (Kaplan & Herbert 1986).

67 Natural systems cannot be understood, conserved and managed properly without
68 recognizing people's environmental perceptions and attitudes (Lee & Zhang 2008).
69 Knowing these perceptions and attitudes can make it easier to develop effective
70 conservation and management strategies, which are both sustainable in the long term
71 and sensitive to the needs of local people (Zube & Pitt 1981; Eisler *et al.* 2003; Castillo
72 *et al.* 2005; Xu *et al.* 2006; Dolisca *et al.* 2007). For example, knowing how landscape
73 perception differs among various groups such as farmers or outdoor recreationists can
74 help crafting and implementing effective conservation measures (Van de Berg *et al.*
75 1998; Natori & Chenoweth 2008; Junge *et al.* 2011). Moreover, education plays a key
76 role in increasing people's environmental knowledge (Lee & Zhang 2008) and
77 preferences regarding natural landscapes and their conservation (Xu *et al.* 2006; Chen *et*
78 *al.* 2011). Therefore, the environmental education and expertise of people should be
79 taken into account when investigating attitudes towards natural landscapes.

80 In the present study, we compared the attitudes of two cultural groups (Chinese and
81 Swiss people) and two sub-groups (environmental experts and laypersons) towards
82 forests biodiversity and ecosystem services. China was chosen as a case study for a
83 large Eastern country with a rapidly developing economy, in which human behavior
84 especially over the last 60 years has caused large environmental changes, including
85 large-scale deforestation, high biodiversity loss, high levels of soil erosion and
86 catastrophic flooding (Zhang *et al.* 2000). In the wake of the 1998 floods in the Yangtze

87 River basin, the Chinese government initiated a 13-year forest conservation program to
88 conserve natural forests and restore forest biodiversity and sustainability (Xu *et al.*
89 2006). Switzerland was chosen as a case study for a highly developed Western country
90 that has experienced extreme deforestation until the mid-19th century, but since then
91 has put great efforts in increasing its forested area and into forest sustainability. Today,
92 all forest clearings in Switzerland have to be counterbalanced by reforestations (Neet &
93 Bolliger 2004). As in other European countries, forests in Switzerland are popular
94 settings for outdoor recreation, and a shift to more nature-based management practices
95 aims to increase their recreational values, which are highly dependent on visual
96 appearance (Nielsen *et al.* 2007).

97

98 **Methods**

99 In 2008, overall 640 study participants in China and Switzerland were interviewed with
100 the help of a standardized questionnaire. In each country, the study population was
101 equally divided into an urban (80 city-dwellers, 80 environmental science students) and
102 a rural study group (80 forest visitors, 80 farmers). The city-dwellers and forest visitors
103 were chosen as representatives of the general public, i.e. people with a layperson's view
104 on forest diversity and forest functions, whereas the environmental science students and
105 farmers were chosen as representatives of people with an expert view. This design
106 allowed us to test for the influence of environmental expertise on attitudes towards
107 forest biodiversity and ecosystem services by comparing city-dwellers (laypersons) with
108 environmental science students (experts) in the urban sub-population and forest visitors
109 (laypersons) with farmers (experts) in the rural sub-population.

110 The 15-minute interviews (conducted by the second and third author as native speakers
111 of Swiss German and Chinese, respectively) took place in the cities of Beijing and
112 Zurich, as they harbor universities where environmental sciences can be studied, and in
113 the rural forested areas of Dujiangyan, Sichuan Province, and Lake Sempach, canton
114 Lucerne. In Beijing and Zurich, city-dwellers were addressed in well-visited areas such
115 as parks where they were likely to spend their leisure time, while environmental science
116 students were addressed mainly during or after lectures. In the rural areas, farmers were
117 either interviewed on their farmland or at home, while forest visitors were addressed
118 when walking through a forest.

119 The Chinese study participants were 14–76 years old (mean age 33.5 years). The Swiss
120 study participants were 14–82 years old (mean age 38.7 years). In both countries, 50%
121 of the participants were women and 50% were men. At all data collection steps full
122 anonymity was guaranteed to the participants. They were given a little present after
123 completing the questionnaire (Swiss chocolate for Chinese and Chinese rice cracker for
124 Swiss participants).

125 Attitudes towards forest biodiversity were investigated with the help of color
126 photographs. Color photographs have been found to represent landscapes and landscape
127 elements such as forests in a good way to elicit attitudes of test persons towards the real
128 objects (e.g. Trent *et al.* 1987; Daniel 2001). The letter-sized photographs showed
129 monoculture or species-rich forests typical for China and Switzerland. They had been
130 selected from a pool of pictures provided by Chinese and Swiss forest ecologists who
131 considered them typical. All photographs had been taken from close-up and under
132 similar light conditions; none of them showed elements other than forest vegetation.
133 Each of the four forest types combinations 1) monoculture typical for China, 2)

134 monoculture typical for Switzerland, 3) species-rich forest typical for China and 4)
135 species-rich forest typical for Switzerland was replicated ten times, resulting in overall
136 40 pictures. This allowed us to test differences between forest types against variation
137 within forest types between particular forests such as particular species within
138 monocultures and particular species compositions within mixtures. Ten different sets of
139 four photographs representing each forest type combination once were drawn at
140 random; and each set was assigned to a separate subgroup of 64 participants
141 representing in equal proportions the different study groups.

142 While looking at the pictures, participants were asked step-by-step which forest they
143 liked most, disliked most, considered as most species-rich, most familiar, most
144 comforting, most interesting, most boring, most managed (i.e. managed) and most
145 worth conserving. These adjectives have previously been found to reflect well the
146 perception of scenic beauty of landscapes by test persons (e.g. Kaplan & Kaplan 1989),
147 and have been used in other studies (e.g. Junge *et al.* 2011). They refer to physical
148 characteristics of a landscape (plant species-rich, animal species-rich) and its
149 conservation potential (worth conserving), but also to other associated thoughts and
150 feelings (familiar, comforting, managed, boring, interesting).

151 Attitudes towards ecosystem services provided by forests were investigated with the
152 help of 13 statements about provisioning, regulating, cultural and supporting services as
153 defined by the Millennium Ecosystem Assessment (2005). Study participants were
154 asked to indicate their personal valuation of each service on five-step Likert-scales (1:
155 unimportant, 2: slightly unimportant, 3: neither unimportant nor important, 4: slightly
156 important, 5: important).

157 Data analysis included the following fixed explanatory variables and their interactions:
158 culture (China, Switzerland), study area (urban, rural) and environmental expertise
159 (urban study area: city-dwellers vs. environmental science students; rural study area:
160 forest visitors vs. farmers). Differences in the participants' choices of forest types were
161 analyzed by generalized linear mixed models (multiple logistic regressions). To avoid
162 effects of variability among the pictures within monocultures or species-rich forests and
163 within Chinese and Swiss forests, pictures (n = 40) were used as random-effects
164 explanatory variable. In one analysis, the responses were classified according to
165 preference for species-rich forests vs. monocultures (Table 1 top half and Fig. 1a) and in
166 a second analysis they were classified according to preference for Chinese vs. Swiss
167 forests (Table 1 bottom half and Fig. 1b). The overall preference ("Mean" in Table 1)
168 for species-rich forests or for Chinese forests, respectively, was tested against the mean
169 deviance of the random-effects variable and the mean deviance changes due to entering
170 the fixed-effects variables into the model were tested against mean deviances of their
171 corresponding interactions with the random-effects variable. Here, "tested against"
172 refers to using ratios of mean deviances as approximate F-test statistics. Compared with
173 the use of the deviance as an approximate Chi-square test statistic the use of ratios of
174 mean deviances has the advantage that it allows a simple incorporation of random-
175 effects terms into the generalized linear mixed-model analysis (McCullagh & Nelder
176 1989). The analyses were carried out with GenStat (12th edition; VSN International
177 Ltd.).

178 To test for influences on the importance placed on forest ecosystem services (measured
179 on 5-step rating scales), the data were analyzed by general linear mixed models

180 (multiple linear regression). These analyses were carried out with SPSS for Windows
181 16.0.1.

182

183 **Results**

184 Overall, participants had different preferences for species-rich forests vs. monocultures
185 and for Chinese vs. Swiss forests (“Mean” in Table 1). Monocultures were more
186 disliked and considered more boring and thus less interesting but were also considered
187 more strongly managed than species-rich forests (Fig. 1a). Species-rich forests were
188 considered more species-rich in plants and animals and more worth conserving than
189 monocultures (see Fig. 1a). Although there were no strong preferences for Chinese vs.
190 Swiss forests (Fig. 1b), all participants (correctly) answered that Chinese forests are
191 more species-rich in plants and animals and thus they found them less boring and more
192 interesting, but also less managed than Swiss forests (see Fig. 1b).

193 In addition to these common preferences, there were clear differences in preferences
194 among the different groups of participants, especially between Chinese vs. Swiss
195 participants, environmental science students vs. city-dwellers and forest visitors vs.
196 farmers, but not so much between urban and rural participants (Table 1). For example,
197 Swiss participants liked species-rich forests more than monocultures and found them
198 more familiar and comforting, whereas Chinese participants did not show these
199 preferences (Fig. 1a; line “Culture” in top half of Table 1). Urban participants had a
200 stronger tendency than rural ones to consider species-rich forests as richer in animal
201 species than monoculture forests. Moreover, environmental science students and forest
202 visitors disliked monocultures more than did city dwellers and farmers, respectively,

203 and environmental science students found species-rich forests compared to
204 monocultures more worth-conserving than did city-dwellers. Farmers had a stronger
205 tendency than forest visitors to consider species-rich forests as boring (see top half of
206 Table 1).

207 Not surprisingly, Chinese participants found Chinese forests more familiar than Swiss
208 forests and Swiss participants found Swiss forest more familiar than Chinese forests
209 (Fig. 1b; line “Culture” in bottom half of Table 1). The Swiss participants regarded
210 Swiss forests as more comforting but less worth conserving than Chinese forests,
211 whereas the Chinese participants had no such preferences (see Fig. 1b). Environmental
212 science students found Chinese forests more interesting than Swiss forests, whereas
213 city-dwellers liked Swiss forests more than Chinese forests (see bottom half of Table 1).

214 All participants highly valued the goods and services provided by forest ecosystems
215 (overall mean score of 4.2 on the 5-step scale) and did not differ in the importance
216 placed on regulating services (Table 2). However, among the provisioning services,
217 food production was more important to the Chinese and timber and fuel production
218 more important to the Swiss participants; moreover, recreation was clearly more
219 important to the Swiss. Differences between and within the urban and rural sub-
220 populations were much less pronounced (see Table 2). However, for rural study
221 participants food production was more important to the Chinese than the Swiss
222 participants (mean scores of 3.7 ± 0.11 and 2.9 ± 0.12 , respectively; $F = 7.94$, $P = 0.005$),
223 and for urban participants clean air production (4.9 ± 0.02 vs. 4.8 ± 0.03 , $F = 10.82$, $P =$
224 0.001) and climate regulation were also more important to the Chinese than the Swiss
225 participants (4.9 ± 0.02 vs. 4.7 ± 0.04 , $F = 6.81$, $P = 0.009$).

226 Environmental science students and farmers placed more importance on provisioning
227 services, whereas city-dwellers and forest visitors were more interested in regulating
228 services of the forests. Not surprisingly, forest visitors especially recognized the value
229 of forests as a place to be physically active, and as a habitat for plants and animals (see
230 Table 2).

231

232 **Discussion**

233 Swiss and Chinese participants differed in their preferences for forest biodiversity and
234 their valuation of ecosystem services provided by forests. While the average Chinese
235 participant showed no biodiversity preferences, the average Swiss participant clearly
236 preferred species-rich forests over monocultures (approx. 72% of choices). Recent
237 experimental and large-scale field studies also demonstrated strong preferences of the
238 Swiss public for species richness in grassland ecosystems (Lindemann-Matthies *et al.*
239 2010). This preference was mainly due to diversity itself and not so much to the
240 presence of particular species. The same observation was made in the present study, i.e.
241 preferences for species-rich forests vs. monocultures stood out against the much smaller
242 variation within these two categories between different species compositions and
243 identities shown in the picture sets.

244 Interestingly, Swiss and Chinese participants differed much less in their statements
245 about Chinese vs. Swiss forests, indicating that they were quite “objective” in their
246 judgment, for example that Chinese forests harbor more species of plants and animals
247 than do Swiss forests. This suggests that the observed differences in biodiversity
248 preferences are not due to misconceptions of species richness. Other studies have also

249 shown that humans can, at least roughly, discriminate between different levels of
250 species richness (even if they do not know the species themselves; Lindemann-Matthies
251 *et al.* 2010).

252 There are several, not mutually exclusive, explanations for the lack of a preference for
253 species-rich forests among the Chinese participants. One explanation could be that
254 Chinese participants have a more instrumental view of the natural world (Lee & Zang
255 2008) than Swiss participants. In Chinese-language surveys, nature is commonly
256 viewed as being alien and worthy of improvement by human manipulation (Harris
257 2006). According to Harris (2006) this mirrors traditional Chinese thought, notably
258 Confucianism, which, despite sometimes being invoked as a model for
259 environmentalism, is an anthropocentric paradigm (but see Deng *et al.* 2006). In
260 contrast, the Western traditional world view of mastery over nature is shifting towards a
261 more inclusive anthropocentric or even bio- and eco-centric view (Deng *et al.* 2006).
262 Our findings corroborate these notions and are in line with recent studies that show a
263 growing nature-friendliness in Western cultures with strong preference for variation,
264 naturalness and species richness in forests and other ecosystems (van den Born *et al.*
265 2001; Nielsen *et al.* 2007; Lindemann-Matthies *et al.* 2010). It would be interesting to
266 repeat our study in some years to see if preference trends will also shift in this direction
267 among the Chinese or if the current preference for species-rich forests in Switzerland
268 reflects a temporary phenomenon.

269 A second explanation why the Chinese participants show low preferences for forest
270 biodiversity could be that environmental education until recently used to have a low
271 priority in teaching (Lee & Zhang 2008). In 2003, the Chinese Ministry of Education
272 mandated the inclusion of environmental education in all elementary and secondary

273 school curricula, but this mandate is not yet put into broad action (Efird 2012). Many
274 secondary school teachers are reluctant to teach environmental issues as they are
275 rewarded primarily for their students' achievement on high stakes examinations whose
276 contents do not include substantial environmental education knowledge (Lin & Ross
277 2004; Lee & Zhang 2008). However, environmental education has a strong potential to
278 raise environmental awareness in China (Lee & Zhang 2008; Chen *et al.* 2011; Xiao *et*
279 *al.* 2012). This could be seen in the fact that among the Chinese participants the group
280 of environmental science students, in contrast to the other groups, did have a preference
281 for species-rich forests and attributed to them a higher conservation value due to higher
282 biodiversity.

283 A third explanation for the low biodiversity preference of Chinese participants could be
284 related to the following arguments. A part of our visual aesthetic preferences may be
285 due to a cognitive understanding of ecological sustainability (Kaplan & Kaplan 1989;
286 Gobster *et al.* 2007). This could explain the increased biodiversity preference among
287 environmental science students in China with the corresponding ecological knowledge
288 which the other Chinese participants do not have. For these other Chinese participants,
289 monocultures may be what they know and are familiar with, as they are still the most
290 common forest type in China (Zhang *et al.* 2000), whereas forests in Switzerland are
291 mostly managed as mixed stands. Familiarity and peacefulness, which includes a feeling
292 of comfort and harmony, are two highly influential variables in landscape perception
293 studies (e.g. Kaplan & Kaplan 1989). When looking *at* a scene, people imagine
294 themselves at the same time *in* the scene, resulting in a strong need for security and
295 wellbeing.

296 Both Chinese and Swiss participants acknowledged the benefits of ecosystem services
297 provided by forests. The different valuation of provisioning services can be explained
298 by the stronger reliance of rural people in China on forest resources and the growing
299 perception of forests as a renewable energy source, but especially as places for
300 recreation, in Switzerland. The latter may be an important explanatory component for
301 the strong preference for species-rich forests among the Swiss participants, because
302 recreational values in many Western countries are currently linked to naturalness and
303 diversity (Nielsen *et al.* 2007).

304 Caution should be exercised in generalizing the results of this study. We considered
305 only two regions each within two countries of very different size, and differences found
306 can thus not be interpreted as general differences between countries. In China, regional
307 influences may be strong as it is a culturally, socially and economically highly diverse
308 country (Xu *et al.* 2006). In Switzerland, differences may also occur between the three
309 different language regions (German, French, Italian; Junge *et al.* 2011). Moreover, due
310 to the restricted sampling, our study participants might also not be representative of
311 laypersons and environmental experts in general in the two countries. However, as
312 almost all people addressed were willing to participate in the interviews, they can at
313 least be considered representative in socio-demographic variables such as age, sex and
314 education in the two regions chosen.

315 Species-rich forests like the ones studied are an important focus of conservation efforts
316 worldwide, and it was a pleasing result that both Chinese and Swiss study participants
317 regarded them as worth conserving. However, the disjuncture between the high
318 ecological quality of species-rich forests and their low attractiveness to Chinese study
319 participants points to a potential conflict between recent conservation policies and the

320 references of the public. Furthermore, there is still little evidence that species richness
321 has similarly beneficial effects on ecosystem services in forests as it has in grasslands
322 (Balvanera *et al.* 2006). More ecological knowledge and a better communication of it to
323 the public at large might change preferences in favor of ecological quality, already seen
324 among the Chinese environmental science students. We especially recommend
325 communicating the possible link between biodiversity and the supporting services of
326 forests, which were regarded as highly beneficial in both cultures. This should help
327 people to realize that human wellbeing, wealth and environmental quality may be more
328 closely linked than previously assumed.

329

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433

434 **Figure legend**

435

436 Fig. 1: Attitudes towards (a) forest diversity and (b) forest origin. In choice tasks, 320
437 Chinese and 320 Swiss people pointed out the one forest they liked most, disliked most,
438 and thought to be most plant species-rich, animal species-rich, familiar, comforting,
439 interesting, boring, managed and worth conserving. Each person judged one set of four
440 pictures (one monoculture from China and one from Switzerland and one species-rich
441 forest from China and one from Switzerland); altogether there were ten replicate picture
442 sets each distributed to 32 Chinese and 32 Swiss participants.

1 Table 1: Influence of design variables on the study participants' (n=640) choice of one forest type out of four which they considered as most representative for
2 characteristics (a)–(j). The forests varied in species richness (species-rich forest, monoculture) and origin (China, Switzerland). Data were analyzed by logistic
3 regression using generalized mixed models. Table entries are approximate F-ratios (see Methods) and significance levels (*** $P < .001$; ** $P < .01$; * $P < .05$). Arrows denote
4 for species richness: ↑ more and ↓ less likely to select a species-rich forest, and for origin: ↑ more and ↓ less likely to select a Chinese forest.

5

Design variables	<i>F</i> -statistics of differences in choice due to certain forest characteristics									
	(a) liked	(b) disliked	(c) plant species-rich	(d) animal species-rich	(e) familiar	(f) comforting	(g) cultivated	(h) boring	(i) interesting	(j) worth conserving
<i>Species richness of the forest</i>										
Mean	9.32**	16.05***	28.27***	27.96***	5.29*	1.86	12.73***	32.98***	16.04***	12.37**
Culture: China vs. Switzerland	29.38***↓	11.34**↑	4.40	3.63	8.80**↓	6.58*↓	0.70	20.23***↑	8.22**↓	7.96**↓
Study area: Urban vs. Rural	0.99	1.59	0.02	18.10***↓	2.60	0.56	1.74	1.37	2.14	3.37
City dwellers vs. Students (within group Urban)	1.08	6.35*↑	0.00	0.51	0.26	0.19	0.96	2.28	0.09	5.06*↓
Forest visitors vs. Farmers (within group Rural)	0.98	6.11*↓	3.01	0.02	0.21	0.34	0.88	6.08*↓	0.17	1.02
<i>Origin of the forest</i>										
Mean	1.34	0.39	5.61*	5.34*	7.29**	2.96	13.38***	4.89*	6.60*	2.49
Culture: China vs. Switzerland	0.00	0.70	7.03*↓	4.28*↓	27.76***↑	6.30*↑	8.97**↑	1.33	1.06	9.83**↓
Study area: Urban vs. Rural	3.68	5.58*↓	2.24	0.31	10.82**↑	1.79	0.21	5.02*	6.37*↑	2.21
City dwellers vs. Students (within group Urban)	6.97*↓	8.39**↑	5.25*↓	7.93**↓	2.80	0.65	0.24	2.65	7.03**↓	3.77
Forest visitors vs. Farmers (within group Rural)	0.95	20.75***↓	7.96**↑	1.95	2.66	1.72	0.04	5.38*↓	6.53*↑	0.91

