

PERCEPTION OF CONTEMPORARY RURAL LANDSCAPE BY ITS FUTURE MANAGERS: CZECH AND JAPANESE STUDENTS OF LANDSCAPE PLANNING

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Abstract

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The problem of rural areas anywhere in the world is their changing identity due to the recent changes in land use and in agricultural practices and due to their growing industrialization. As the experience of landscape beauty is an important part of human flourishing, it should have a prominent place in landscape planning, but we know next to nothing about how it is influenced by the contemporary changes. Here we show how six different rural landscape situations in regions experiencing the changing identity are perceived by university students of landscape planning and landscape architecture. We have compared responses of Czech and Japanese students, in order to compare respondents with different cultural backgrounds. We found a relatively homogenous and cultural-independent pattern of rural landscape evaluations based on aesthetical and ecological values more than on agricultural production. The best-valued landscape represents a combination of aesthetical attractiveness and possibility of recreation activities and consists of a mixture and relatively balance of man-made and natural patches. Our study enables a prognosis of the future development of rural areas, as our respondents will become experts in landscape architecture and planning, and therefore their preferences today could become a reality tomorrow.

Key words: landscape perception, aesthetical value, landscape changes, contingent valuation method (CVM), willingness to pay (WTP)

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Introduction

Landscapes are not only parts of Earth's surface consisting of land and vegetation, but also a mosaic of roads, buildings, cultural heritage monuments, patches of agricultural land and of protected areas with contrasting social, cultural and aesthetical values (Forman, 1997). All these elements contribute to landscape quality, which has become a key concept in relation to nature policy and landscape planning (Arler, 2000). Human perception of landscape quality expressed as its beauty is an important part of human flourishing, and should therefore have a prominent place in landscape planning (Arler, 2000). Landscape perception and its aesthetic value for humans have therefore been intensively studied for over 25 years (Zube, Pitt, 1981; Ribe, 1982; Zube et al., 1982; Kaplan, Kaplan, 1989; Bourassa, 1990; Appleton, 1996; Aoki, 1999). There is an assumption that landscapes have an intrinsic or objective beauty (Shuttleworth, 1980a), which – although being a subjective response of the observer (Polakowski, 1974) – can be quantified via the presence of certain dimensions (Buhyoff, Riesenmann, 1979; Dearden, 1980).

The problem of rural areas anywhere in the world, particularly in world labelled as “developed” is their changing identity due to the recent changes in land use and in agricultural practices and due to growing industrialization of rural landscape. It is clear visible in countries that are in a transition period from the traditional to contemporary intensive farming (e.g., countries in Central and Eastern Europe). Rural sociologists then speak about post-traditional rurality (Bruckmeier, Kopytina, 2001). We know relatively a lot about how the landscape structures are changing, but much less about human visual perception of these changing landscape.

In fact we are facing in the Czech Republic and Slovak Republic great changes in landscape patterns as well as changes in their esthetical and economical perception and evaluation and many authors are mentioned this problem. Journal *Ekológia* is open to this focus traditionally: aesthetic qualities on the case study of the flood-plain of Morava river in study of Ofahef (1999), specific aesthetical feelings using set of photographs of Pietrzak (1999), abandoning agricultural lands of Lipský et al. (1999), changes in agricultural patterns in Bohemian landscape of Sklenička (2002), changing landscape scenery of Lapka, Cudlínová (2003), as well as more on biological aspects oriented studies Boucníková, Kučera (2006) and Cudlín et al. (2006), etc. This is a long-term topic of our interest, too. We provided experimental pilot study in Novohradské Mts on the changing perception of landscape values in 2004. First results were published in *Ekológia*, too (Lapka, Cudlínová, 2004). Now we have occasion to continue with more developed methodology and testing the problem of the landscape perception on more representative as well as international sample of Czech and Japanese students ($n = 79$ and $n = 86$ respondents).

We try to make an attempt toward more international and if possible more general focus on landscape perception of changing rural landscape, because all mentioned studies above are working with the Czech or Slovak samples of landscape structure and with Czech or Slovak respondents, experts etc. The rather philosophical than methodological question is if the results show changing landscape in terms of real geo-ecosystem or changing values

in terms of intrinsic social and cultural values. For this reason we consider international comparison very useful to avoid subjective based cultural interpretation.

In this paper, we therefore tested, how different landscape types are perceived by Czech and Japanese university students of landscape planning and landscape architecture or some other environmental studies related to landscape. This was because we assumed that these students could be seen as future experts, who will make decisions about the future development of rural landscape. We used two methods: ranking of landscapes by aesthetical value and willingness to pay for preserving of a particular type of landscape. We hope that our results may offer some predictions, how future rural landscapes may look like, as this is mainly determined by the people, who will plan these landscapes in the future – and our respondents may become ones.

Methods

Experimental areas

We used two areas as examples of rural landscapes: Novohradské Mts (South Bohemia, Czech Republic) and Tsukuba area (Ibaraki prefecture, Japan). Both areas have in common that they are experiencing changes from the traditional to intensive farming (Klijn, Vos, 2000) and leaving of the only agricultural production nowadays. Both areas are agricultural landscapes; their average altitude is about 1000 m, size about 20x20 km. They both include a great diversity of ecosystems represented by fine landscape mosaics, including mountain areas. The Novohradské Mts is a valuable area with a concentration of natural and cultural points of interest, while the Tsukuba area represents a fertile plain, with surviving satoyama (Takeuchi et al., 2003) – traditional rural landscape of Japan – and many historical and cultural places tied to the Kanto culture. The proportions of agricultural land, forest and urban areas are 29.6%, 46.1% and 2.4% respectively in the Novohradské Mts and 33%, 35% and 11.2% respectively in the Tsukuba area. For area selection, we used actual land-use/land-cover GIS analysis, remote sensing data from Landsat 7 – ETM+ 2002, aerial photographs by Jiří Žaloudík, Institute of Systems Biology and Ecology v.v.i. ASCR and data from the Ibaraki prefecture official information materials. We were strictly focused on the six defined situations in rural landscapes, i.e. the sightseeing sceneries were not the aim of this study, despite of their attractiveness. The reason of selection of these areas was also the obtained data from pilot study as it is mentioned above (Lapka, Cudlínová, 2004) as well as that these areas are representing more general sample of rural areas in transition. Despite of this fact we try to find six situations as much general as possible in every rural landscape. The other fact supporting the chose of these areas is that about 50% of all Czech students have some experience with Novohradské Mts as well as 50% of Japanese students have some experience with Tsukuba area.

Respondents

Our sample consisted of Czech and Japanese university students of landscape planning, landscape architecture or some other environmental studies related to landscape. The Czech group consisted of 79 respondents (41 males and 38 females, average age 21.0 years). None of them work professionally in the Novohradské Mts, but most of them are involved in environmental protection or similar activities. The Japanese group consisted of 86 respondents (54 males and 34 females, average age 19.4 years) and also none of them work professionally on the protection or management of Tsukuba area.

The respondents were students of University of Tsukuba, University of Chiba and University of Ibaraki in Japan and students of Charles University, Prague, University of South Bohemia České Budějovice and Masaryk University Brno in Czech. The number of students of one university made approximately one third of national sample. About one third of each aggregate was also graduate students, the rest was undergraduate.

Tests used

Our first approach was based on the direct method of landscape evaluation (Arthur et al., 1977; Briggs, France, 1980; Pérez, 2002; Arriaza et al., 2004), which compares the scenic preferences of members of the public for landscapes. As in several earlier works that have attempted to assess the scenic preferences of observers (Dunn, 1976; Zube et al., 1982; Law, Zube, 1983; Shafer, Brush, 1977; Shuttleworth, 1980b; Hunziker, Kienast, 1999; Wherrett, 2000; Pérez, 2002; Arriaza et al., 2004), we used photographs of the rural landscapes. Our approach was derived from the Zonneveld's (1995) idea concerning landscape as a combination/interaction of nature and culture. Instead of his scheme, however, we used the proportion of anthropogenic and natural patches in only one landscape type – the rural landscape – where the amount of anthropogenic, semi/natural and natural elements is clearly visible.

Our second approach used the contingent valuation method (CVM, Willis, 1994), which is the generic name given to a broad class of methods in which respondents, confronted with choice problems defined by the researcher, reveal their willingness to pay (WTP) either directly or implicitly via decisions whether or not to buy a hypothetical proposition at a given price (contingent purchase decision; Randall, 1987). The most common form of application of the CVM is the survey method. This method of revealing social preferences is deeply rooted in psychology and sociology. The CVM is most frequently used in the case of landscape amenity evaluation or changing the landscape scenery. This was the main reason why we applied it in our case.

At the beginning of the test, each recipient received six sets of high quality color photographs, taken under similar weather conditions (sunny weather, vegetation season), representing different types of rural areas in each country. Each set was represented by two pairs of photographs, two for Czech and two for Japanese landscape: one picture was showing the whole view of certain scenery; the second one was showing a detail of the same scenery. The types of rural areas represented by individual sets were:

- (A) industrial and shopping area located in a rural landscape,
- (B) renewal of traditional landscape, which respects the original patch size, but uses modern agricultural and landscape elements – greenhouses, new roads, new alleys etc.,
- (C) fallow rural landscape in an early stage of vegetation succession,
- (D) traditional rural landscape,
- (E) park landscape built within a rural area,
- (F) sub-urban landscape surrounding a village or a small town.

See Fig. 1 for the original photographs ranked from most “urban-like” to most “wilderness-like” ones.

Each photograph was projected by PowerPoint at least three times separately for one minute and then the whole series was projected once more three times. The students also had a black and white version available, printed on the test sheet, where they wrote their evaluation.

The students were then asked to perform the following tasks:

- 1) sort the landscape types from the most to the least beautiful one according to their personal feeling. The students were not allowed to evaluate two landscapes equally,
- 2) the students were asked to imagine, how they would partition their hypothetical net annual salary to all things necessary for their life (accommodation, food, recreation etc.). After this, they were asked to decide which amount of money from the remainder of this salary they would be willing to pay for preserving the specific type of landscape in case its future existence were threatened by a change in management. The payment would only be made once a year to a special governmental fund devoted exclusively to landscape preservation. Respondents were allowed to decide in two independent steps, which amount of money they were willing to pay in the case of:
 - a) free access to the landscape scenery,
 - b) closed public access to the landscape scenery.

The alternative with the close public access was used to get an estimate of the intrinsic value of the landscape.

The respondents were then asked to determine, whether the motivation of their payment was aesthetic, ecological, economical (possible profitable use of the area in now or later for agricultural production or build-up area) or other. They were allowed to check one or more possibilities.

Our respondents were told that their hypothetical annual net salary was 100 000 crowns (Czech students) or net salary 3 000 000 Yen (Japanese respondents). These amounts were chosen as examples of the average net salaries

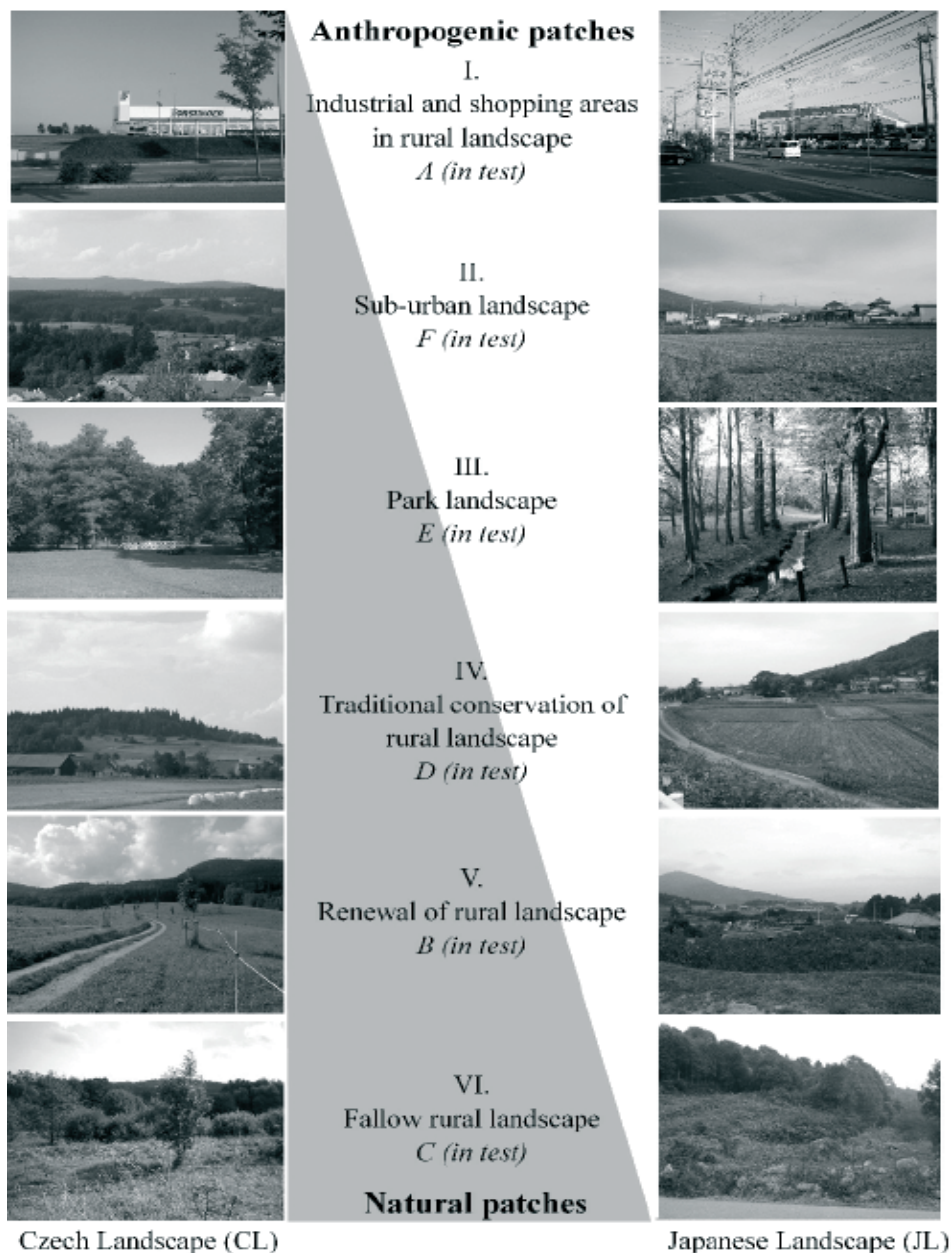


Fig. 1. Photographs of Czech and Japanese landscapes used in the tests.

in the Czech Republic and Japan, first job just after finishing studies, average of year 2004 according EU survey. In order to make the values comparable, however, only Czech crowns were used for the analyses and values in Yen were divided by 30, which then gives comparable numerical values (3 000 000 : 30 = 100 000), even if this does not correspond to the official exchange rate. This way, we were comparing percentage of salary between Japan and the Czech Republic, with 100 000 (or 3 000 000 Yen divided by 30) being 100%, rather than absolute values.

Statistical analyses

We used the statistical package STATISTICA for all the analyses, which consisted of calculation of the correlation matrix and of several classical tests, like MANOVA, Tukey multiple comparison tests, nonparametric t-tests and G-tests (Zar, 1984). The data were log-transformed prior to the analyses in order to improve their normality. If this was not sufficient, then nonparametric tests were used. In case of multiple tests, Bonferroni correction was applied.

Results

The evaluation of Czech (CL) and Japanese (JL) landscapes A–F according to their subjective aesthetical value (from 1 – least beautiful to 6 – most beautiful) by students from the Czech Republic (CS) and from Japan (JS) is shown in Fig. 2. There were significant differences in evaluation between Czech and Japanese students (MANOVA with log transformation, Table

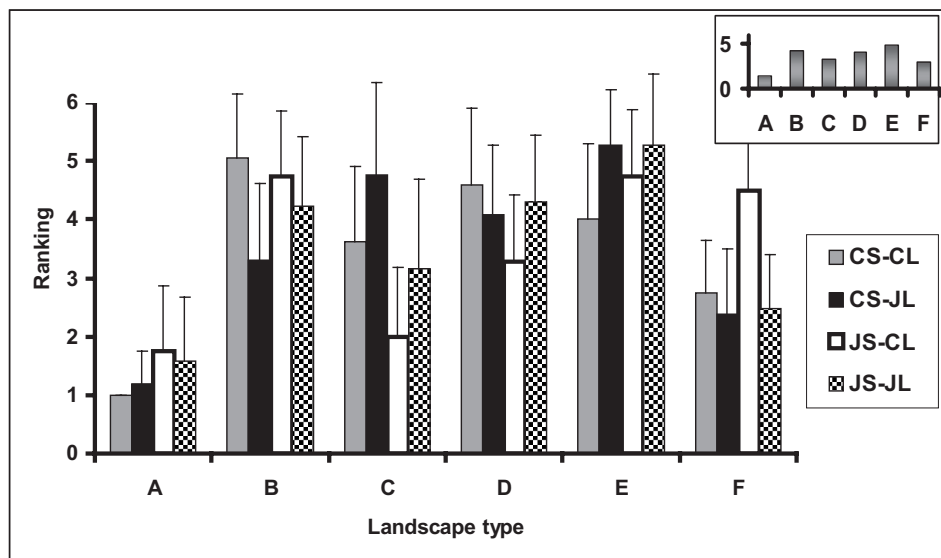


Fig. 2. Evaluation scores of Czech (CL) and Japanese (JL) landscapes A–F according to their subjective aesthetical value (from 1 – least beautiful to 6 – most beautiful) by students from the Czech Republic (CS) and from Japan (JS). Error bars indicate standard deviations. Average scores across all students and both CL and JL are in inset.

Table 1. Results of MANOVA on aesthetical value, WTP in case of open access, and WTP in case of closed access with factors STUDENT (Czech vs. Japanese) and LANDSCAPE (Czech vs. Japanese).

	Test	Value	F	Effect df	Error df	P
Aesthetical value						
intercept	Wilks	0.00	142039.47	6	247	0.000
student	Wilks	0.72	15.66	6	247	0.000
landscape	Wilks	0.64	23.10	6	247	0.000
student*landscape	Wilks	0.79	10.74	6	247	0.000
WTP – open access						
intercept	Wilks	0.12	294.63	6	249	0.000
student	Wilks	0.83	8.56	6	249	0.000
landscape	Wilks	0.62	25.55	6	249	0.000
student*landscape	Wilks	0.77	12.61	6	249	0.000
WTP – closed access						
intercept	Wilks	0.45	50.41	6	249	0.000
student	Wilks	0.76	12.81	6	249	0.000
landscape	Wilks	0.92	3.72	6	249	0.001
student*landscape	Wilks	0.99	0.50	6	249	0.807

Table 2. Results of multivariate tests performed on landscapes A–F (each accompanied by Bonferroni correction). Tukey test was used for comparison of evaluations of aesthetical value, and a series of nonparametric t-tests with subsequent Bonferroni correction for the WTP values. Different letters in the rows mean significant difference at $p < 0.05$ after Bonferroni correction.

	A	B	C	D	E	F
Aesthetical value	1.45 a	4.40 c	3.17 b	4.08 c	4.88 d	3.02 b
WTP – open access	184 a	1458 d	899 bc	1317 cd	1456 d	504 b
WTP – closed access	49 a	576 c	900 c	393 bc	575 c	177 b

Notes: A – industrial area, B – renewal landscape, C – fallow, D – traditional rural landscape, E – park, F – suburban landscape

1). The students also evaluated Czech and Japanese landscapes differentially (MANOVA with log transformation, Table 1), which was significant for landscapes B, D and F (subsequent univariate test with log transformation and Bonferroni correction). The Tukey test with subsequent Bonferroni correction (Table 2) revealed that landscape E was considered to be significantly the most beautiful, followed by landscapes B and D. Landscape A was seen as significantly the most ugly one.

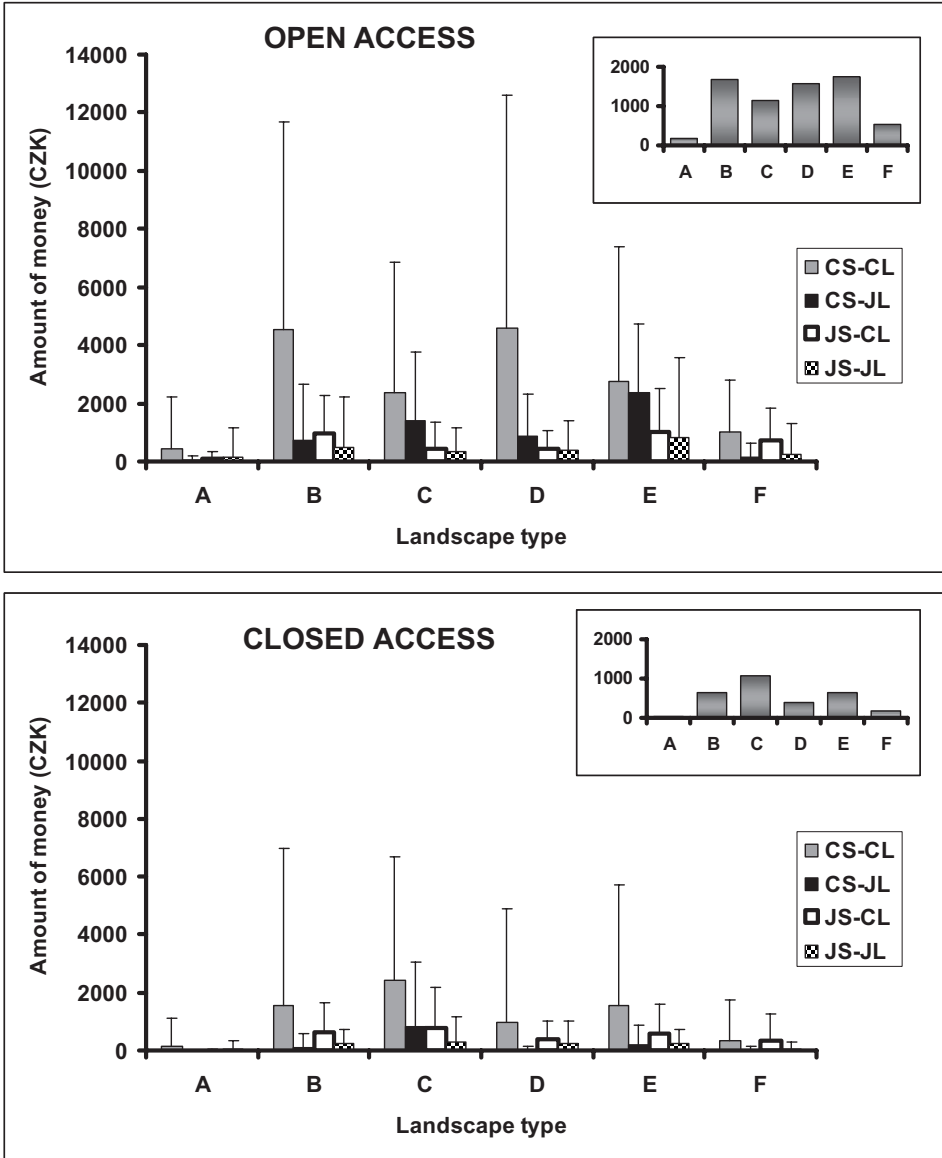


Fig. 3. WTP of students from the Czech Republic (CS) and from Japan (JS) for Czech (CL) and Japanese (JL) landscapes in cases of free or closed public access. Error bars indicate standard deviations. Average scores across all students and both CL and JL are in inset.

There were large inter-individual differences in the willingness to pay, demonstrated by the large standard deviations (Fig. 3). Czech students were willing to pay significantly more

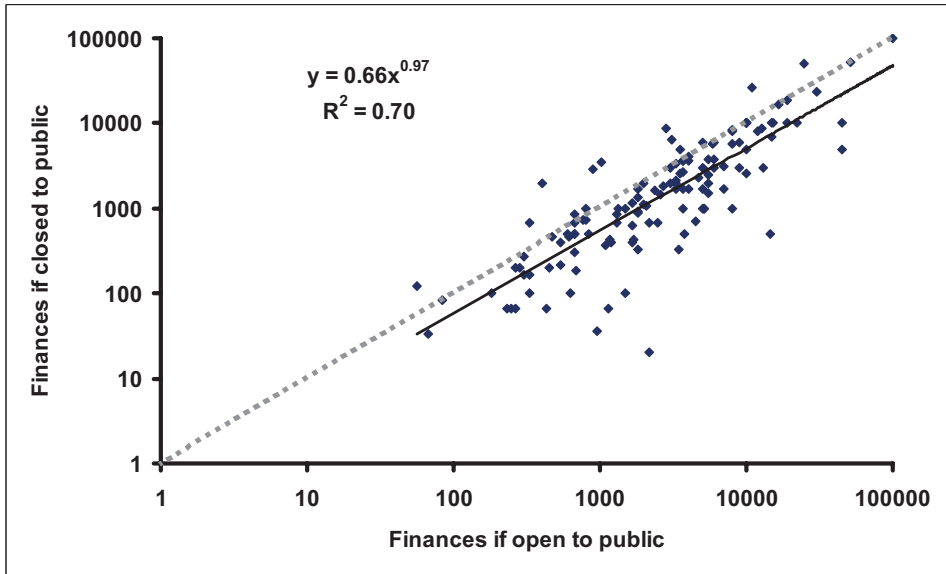


Fig. 4. Correlation between the WTP of the students from the Czech Republic (CS) and from Japan (JS) for preserving the specific type of Czech (CL) and Japanese (JL) landscape in cases of open or closed public access. The data are fitted by a power function. The grey dotted line indicates equal investments in both cases.

money, compared with Japanese students, and generally the students were willing to pay more money for the Czech, compared with the Japanese landscapes, especially in the case of landscapes B, C and D (Fig. 3, MANOVA, Table 1). The students were generally willing to pay more money in case of open, compared with closed public access to the landscape scenery (Figs 3 and 4). In case of open access, the students were willing to pay significantly least money in landscape A, followed by landscape F, and most money in landscapes B, D and E (Fig. 3, nonparametric t-tests with Bonferroni correction – Table 2). In case of closed access, the students were willing to pay significantly the least money for landscape A, followed by landscape F, and most money for landscape C (Fig. 3, nonparametric t-tests with Bonferroni correction – Table 2).

The correlation matrix in Table 3 revealed lots of significant correlations between the measured values. The most conspicuous ones were those, which are depicted in Figure 5 for totals and described in the next paragraph in detail, but there were strong correlations also between individual subsets of the whole sample, i.e., if only Czech or only Japanese students, or if only Czech or only Japanese landscapes were considered (Table 3). These include mainly positive correlations between aesthetic value and WTP in the case of open access, between aesthetic value and aesthetical motivation, between ecological motivation and WTP in the case of closed access, and negative correlations between economical motivation and WTP in the case of closed access (shaded in Table 3). Some significant

T a b l e 3. Correlation matrix for all measured variables. Codes: A – aesthetical value, FO – WTP, open access, FC – WTP, closed access, MA – motivation aesthetical, MEI – motivation ecological, MEn – motivation economical, last but one letter: C – Czech students, J – Japanese students, last letter: C – Czech and J – Japanese landscape, T – total. Only correlation coefficients larger in absolute value than 0.90 shown. The boldfaced correlations depicted in Fig. 5.

	ACC	ACJ	AJC	AJJ	AT	FOCC	FOCJ	FOIC	FOIJ	FOT	FCCC	FCCJ	FCJC	FCJJ	FCT	MACC	MAJ	MACJ	MAJJ	MAT	MEICC	MEICJ	MEJJC	MEJJ	MEIT	MEnCC	MEnCJ	MEnJC	MEnJJ	MEnt							
ACC	1.00																																				
ACJ		1.00																																			
AJC			1.00																																		
AJJ				1.00																																	
AT					1.00																																
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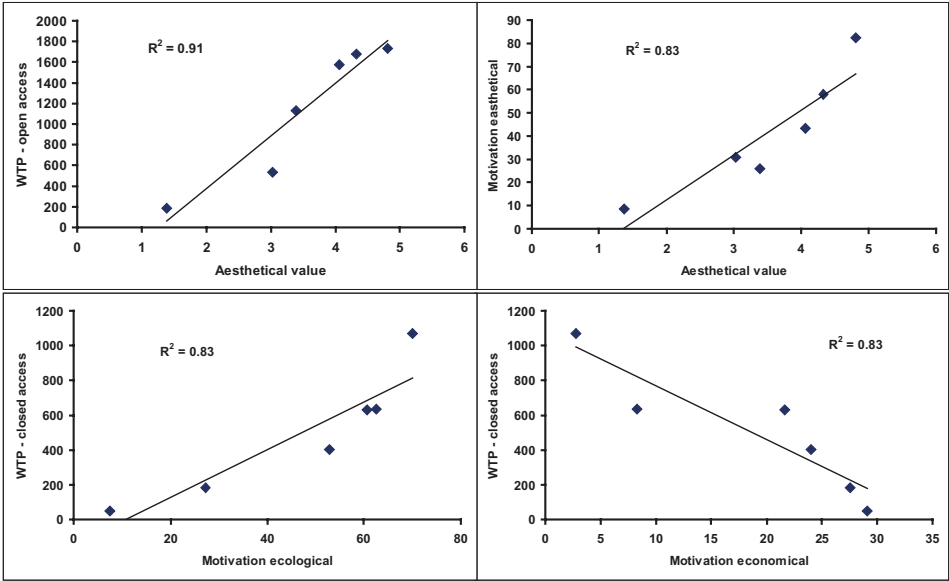


Fig. 5. Correlations between selected (shaded) pairs of variables in Table 1 – depicted only for total number of students and both Czech and Japanese landscapes: (a) aesthetic value of the landscape type vs. WTP for preserving the specific type of landscape in case of open access and (b) vs. percentage of cases in which this decision was motivated by aesthetical reasons; WTP as above, but in case of closed public access to the scenery vs. motivation to this decision by (c) ecological and (d) economical reasons.

correlations appeared also in other cases. Some negative correlations appeared between economical and ecological motivations and between economical motivations and aesthetic value of the landscape.

The most conspicuous in Table 3 were the close correlations, explaining 80–90% of the variation, between the aesthetic value of the landscape type and WTP in case of open access and between the aesthetic value of the landscape and the percentage of cases in which WTP was motivated by aesthetical reasons (Fig. 5). The WTP in case of closed public access was closely and positively correlated with the motivation to this decision by ecological reasons and negatively so with economical reasons (Fig. 5).

Discussion

Our results show that the landscape E, showing a park setting, was consistently considered to be the most beautiful one (except of CS-CL), while landscape A, showing an industrial landscape and shopping zones, as the ugliest one by all students, independently of their

nationality and of the geographic origin of the photograph. This suggests some nationality-independent common perception of certain extreme types of landscape (park vs. industrial areas). Clearly, landscapes with strong elements of industrialization (electric wires, shops, wide roads) are not seen as nice ones. This is also supported by the low preference of the Japanese sub-urban landscape F, with lots of electric wires and absence of natural elements, the evaluation of which was close to that of the industrial landscape A, independently of the nationality of the students. It is not, however, the opposite – the wilderness (landscape C) – which is preferred. Both Japanese and Czech students preferred a mixture of natural and cultural elements, represented by the park setting, E. This reveals aesthetical preferences of a “rural pattern” in terms of balance between natural and cultural patches, where park setting (E) represents an ideal combination of these, while industrial and shopping areas (A) are lacking natural patches and fallow landscape (C) is lacking cultural patches.

The tendency that a pure wilderness, which is lacking signs of human care, is not evaluated too highly, may be more significant than national cultural and geographical differences and seems to be a general phenomenon, as unmaintained wild vegetation was valued less by the respondents also in Tahvanainen et al. (2002) and in Akbar et al. (2003). In the survey performed by Arriaza et al. (2004), the perceived visual quality increased with the degree of wilderness of the landscape, but also with the presence of well-preserved man-made elements.

Quite interestingly, aesthetical evaluation of landscape C (both the Czech and Japanese one), made by the Japanese students was very low and – in the case of the Czech landscape – close to the evaluation of the industrial area, A, while the Czech students ranked landscape C always relatively high. This may indicate some cultural differences, the roots of which may probably be in the Japanese sense of order and their inclination to tiny nice details, represented in their traditions, e.g., in the Japanese gardens, ikebana, arrangement of food etc.

Landscapes B and D are closely connected with agricultural production, but the students did not make any difference between renewal and traditional land type in their aesthetical evaluation. The Japanese equivalent of the landscape was always valued less than its Czech counterpart. The only exception was the Japanese traditional rural landscape D, which was evaluated higher than its Czech counterpart by Japanese students. This exception may be due to natural inclination of the Japanese students to the type of countryside they are used to or they have grown at – its Czech counterpart may look rather strange to them.

WTP of the Czech students was larger, compared with that of the Japanese students. Perhaps two reasons could account for this difference: cultural background and practical experience with the CVM. For the Japanese students, it was very hard to imagine landscape as an object for payment. According to our discussion with Japanese experts (professors supervising the test) it is not involved in national tradition to connect money with landscape protection in the same way, as it is common in Europe. The Japanese concept of landscape is based on old symbols for water-mountain picture and derived from the popular “eight sceneries” (Aoki et al., 2003), which are rooted very deeply in Japanese history. This view is much closer to the ideal of Japanese gardens than to the European open landscape scale. The other aspect is that using CVM is very unusual in Japan. For the students, our test was their first experience with practical application of this method.

WTP was larger for open, compared with closed public access. This suggests that recreation value plays a considerable role among the students. Thus it seems that investments in landscape only for protection of its existence would not get a large public support, unless clearly motivated by ecological reasons.

Ranking the landscapes according to the WTP was the same as that according to the aesthetical value and the correlation between these two types of landscape evaluation was very close. Very conspicuous were the close correlations between the aesthetical value, motivation by ecological reasons and WTP, described in detail in the Results section. The role of economic reasons in the WTP was minute compared with the aesthetical and ecological reasons and the correlation between the WTP and economical motivation for the decision to pay was even negative. This all may mean that the young generation feels so safe in terms of food-supply that landscape is evaluated only on aesthetical or ecological scale in many cases, while the importance of agricultural production is not seen as too important.

This possible reality for tomorrow shows a relatively homogenous and cultural-independent picture of rural landscape based on aesthetical and ecological values more than on agricultural production. Even if we found that landscape perception is significantly affected by cultural background of the individual tested, nevertheless there is a common pattern emerging. The best-valued landscape, a park, represents both aesthetical attractiveness and possibility of recreation activities. The proportion between man-made and natural patches seems to play a great role in the perception: park represents an ideal of this balance, approached by renewal and traditional landscape. The low evaluation of industrial and shopping areas and of fallow landscape is probably caused by extreme predominance of anthropogenic patterns among the former and of extreme predominance of natural patterns among the latter.

The supporting data for the balance of anthropogenic and natural patterns are coming from the pilot study, too (Lapka, Cudlínová, 2004). This time, the students have direct experience with all the six cases; they have time to learn a context with the surrounding landscapes. We cannot compare statistically these data because of low number of 18 students and more qualitative approach. Instead of this fact, pilot research shows very similar results as to aesthetical as well as economic preferences. First three most aesthetical landscapes are the same, only B (renewal landscape) is on the first position while D (traditional rural landscape) and E (park) are very closed in terms of index of rank of aesthetical value (2.81 D and 2.84 E, the rank 1 = absolute hypothetic positive aesthetical value, the rank 6 = absolute hypothetic negative aesthetical value). On the opposite the A (industrial area) shows rank 5,75 and was on the same last position like in our international study, landscapes C (fallow) and F (sub-urban) occupied the also same position in both studies.

We cannot ignore that some students evaluated their expenditures unrealistically – after deduction of living expenses: no one could expect to devote almost 100% of own annual salary to preserve the landscapes, as is the case of several students (Fig. 4).

The validity of our results is also limited by the choice of the countries and experimental group within the country. In underdeveloped countries we would probably obtain another favorite picture of rural landscape and using CVM would be unrealistic under such conditions. One could also expect intergeneration differences. However, young generation (e.g.,

students) is the best predictor of the overwhelming perception in the future. In addition, our experimental subjects are future experts in landscape architecture and planning, and therefore their preferences today can become a reality tomorrow.

Conclusion

Despite of fact the validity of our results is limited by the choice of the countries and respondents, international and inter-cultural comparison of six situations in rural areas shows several tendencies. The proportion between man-made and natural patches seems to play a great role in the perception and aesthetic evaluation: park, renewal and traditional landscape are highly evaluated while the industrial, sub-urban as well as fallow areas are on the opposite aesthetical scale. It seems relatively homogenous and cultural-independent picture of rural landscape is based on aesthetical and ecological values more than on agricultural production.

WTP (willingness to pay) was larger for open, compared with closed public access. (We obtained the same results from pilot national study, Lapka Cudlínová, 2004). Thus it seems that investments in landscape only for protection of its existence would not get a large public support, unless clearly motivated by ecological reasons.

Process of landscape changes shows relationships between social and natural systems: landscape as reality and intrinsic social and cultural values are connected in human perception of rural landscapes and the possible future landscape changes are changes in our social and cultural construct what landscape is and what it should be.

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