TN 9: THREE METHODS FOR MEASURING THE ATTRACTIVENESS OF A PARK - A COMPARISON

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ABSTRACT

Three methodologies designed to measure the attractiveness of outdoor recreation areas are discussed in this paper. The discussion is on the attractiveness of 12 Saskatchewan parks. A good rank correlation agreement between the Ross ordinal measure of attractivity and the Cesario interval measure, but only a weak correlation between Cheung's interval attractivity measure and the other measures is demonstrated.

Regression analysis results indicate that Cesario measured the attractiveness of a site plus possibly what is around it, while Cheung measured only the attractiveness of a particular site. The regression relation derived between the Cheung and Cesario attractivity measure was used to calculate a corrected Cheung measure. But this "corrected" Cheung "destination area attractivity measure" had a lower rank correlation with Cesario's measure than Cheung's uncorrected measure.

The paper ends with the very tentative conclusions that: (1)Ross' and Cesario's indices of attractiveness can reasonably be considered to measure the same thing (though Ross in ordinal and Cesario in interval scale terms); and (2)Cheung measures something different from Ross and Cesario: specifically, Cheung does not measure the attractiveness of "general" destination areas but develops a site-specific measure. In a way, the article offers proof that ad hoc definitions of measures such as Cheung's are, as would be expected, inferior to measures that are based on behaviour. This implies effort should focus on getting and using behaviour based measures of attractivity.

INTRODUCTION

The relationship between the use and the attractiveness of parks has intrigued many outdoor recreation researchers and, consequently, a number of sophisticated studies on park attractiveness have been generated. It is generally agreed among outdoor recreation researchers and planners that park-use levels are affected to a large extent by the attractiveness of parks. This general agreement evolved as the result of the simple observation that one park receives relatively more visitors than another (over the same time period) from a population centre, indicating that the difference in distance of the two parks from the population centre is clearly not the only factor leading to the different levels of use.

If attractiveness is a valid concept, knowledge of attractiveness factors will enable a planner to make rational decisions about providing, preserving or developing factors/facilities/resources to make parks attractive, at least to a certain group (market). Thus there are both practical and academic motives for conducting attractiveness studies.

It would be tedious to continually reiterate that Cheung, Ross, and Cesario's measures of park attractiveness are considered recognizing that taking into account attractiveness *to whom, for what* **has not been adequately addressed**. It is accepted that the Cheung, Ross and Cesario attractiveness measures discussed are only meaningful for a fairly well defined type of park user. In other words, in what follows there is no endorsement of the idea that attractiveness of a site has meaning except in the context of a "reference group" of users, e.g. main destination nature-oriented day-users. Admittedly the group just specified and even more so the group *day users* which was studied is not homogeneous. A more elaborated analysis should define week day and

weekend attractivities separately and consider attractiveness in relation to main trip purpose (e.g picnicking, fishing, etc.). Specifically, this analysis for main destination day-users is predicated on the assumption that, for the parks considered, the category is homogeneous enough (e.g., because of a large relatively homogeneous subgroup) so that the attractiveness measures are good approximations of the perception of attractiveness for the majority of **main destination day-users**.

REVIEW OF LITERATURE ON PARK ATTRACTIVENESS STUDIES

More than a decade ago, Clawson and Knetsch (1963) suggested the possibility of developing specific and "rather objective" rating scales to measure the attractiveness of outdoor recreation areas. Subsequently, various schemes to assess attractiveness were devised and reported. One type of attractiveness measure involved a particular characteristic of the site under consideration. For instance, Grubb and Goodwin (1968) and the Corps of Engineers (1969) used the surface area of a reservoir as a variable reflecting its attractiveness (see also Wennergren and Neilsen 1970). Extending the concept of using a physical characteristic of a site as a variable reflecting site attraction, Cesario and others (Cesario, Goldstone and Knetsch 1969) used several site characteristics to construct an attraction index for parks.

Taking a different approach, Van Doren (1966) conducted an "evaluation" of site attractiveness. In a camper study, he devised a camping attractiveness index for each of fifty Michigan state parks based on fifty-five variables related to (a) outdoor recreation activities, (b) natural environmental resources, and (c) camping facilities and services. Ellis used and developed Van Doren's approach to obtain measures of attractiveness that he employed in systems models. He also developed a measure of his own (see Ellis 1967, 1969; Ellis and VanDoren 1966) Recently, Ellis and Ker (1972) used the Van Doren approach to study the attractiveness of skiing areas, while Auger (1974) used it to study the attractiveness of Quebec parks.

Both of the approaches described to this point have something in common, in that they relate park attractiveness to the characteristics of a park rather than deducing a park's attractiveness from the behavior of its uses. Cheung followed the inductive approach of Clawson and the others cited and suggested that the attractiveness of a park for main-destination day-use is a function of the following form (for details, see TN 1):

(1) $T(j) = \Sigma S(e) \Sigma R(m) Q(m)$

WHERE:

T(j) = attractiveness of park j,

S(e) = relative popularity rating of activity e, R(m) = relative importance rating of facility m, 0(m) = rank or score of facility m, according to its quantity or quality.

In defining the measure it is accepted "*that although not everybody will judge a facility in the same way, or perceive the same site factors as being the determinants of site attraction for day-visitors, one expects a general concensus which can be reached*" (quoted from unpublished material by Cheung). Indeed, Clawson and Knetsch (1966) have remarked, "Individual tastes vary greatly, yet there is some concensus as to what is good and what is fair, and there would often be general agreement as to what is poor".

In contrast to procedures that define park attractiveness based on park characteristics, Ross (see TN 2) suggested that the attractiveness of a site be defined by studying consumer preferences. This is based on certain conditions being satisfied. Basically, the condition is that going to a site that is further than some alternative that would "*serve their visit purpose*" shows a

preference for the more distant site. Employing logic to make deductions from his assumptions, Ross devised a three-step scheme to derive attractiveness measures for the same Saskatchewan parks for which Cheung had computed attractiveness figures based on his formula.

The Ross and Cheung attractiveness measures are two of the three measures compared here. The third measure discussed is based on park users' numbers of trips to destinations. Cesario (see 1971, 1973A, 1974, 1975 and TN 4) hypothesized that the number of visits, V(i,j), made from an origin (i) to a destination (j), is a function of a number of explanatory variables related to (1) some characteristics of an origin (i), (2) some characteristics of a destination j, and (3) some costs due to the spatial separation of (i) and (j). He proposed:

(2) $V(i,j) = kE(i)A(j)f(C(i,j))e(i,j)$

WHERE: V(i,j) = number of visits made from origin (i)to destination (j) during a time period,

k = a proportionality constant,

E(i) = emissiveness, or origin effect, of (i),

A(j) = attractiveness, or destination effect, of (j), f(C(i,j)) = a function of the cost, C(i,j), for getting to destination (j) from origin (i)

e(i, j) = an error term.

The fact that Cesario discussed how to derive the relationship between his attractiveness measure and park characteristics should not be taken to indicate that this measure is like the Cheung measure. Cheung defines the relation between attractiveness and park characteristics, while Cesario obtainins an attractiveness value for a particular type of use and then analyzes attractiveness values to see how attractiveness relates to park characteristics. (TN 29 suggests a related strategy for assessing people's response to the supply of facilities available to them.)

THE ATTRACTIVITY MEASURES ANALYZED

As noted earlier, Cheung and Ross obtained main-destination day-use visitation attractivity indices for the same twelve Saskatchewan parks. Because their day-use attractiveness measures were available, Cesario calculated his measures for the same parks, assuming that emissiveness of origins was proportional to the number of people resident in the origin areas. (On why this could or should be done see TN 4.) Thus, the attractivity measures presented in Table 1 were available for analysis.

Comparison of the attractivity measures should not be made using the Pearsonian correlation coefficient because Ross' measure is ordinal, so analysis was begun by computing the rank correlation coefficients shown in Table 2.

DISCUSSION

When Table 1 is examined, it becomes clear that a major reason for the high rank correlation of .77 between Cesario's attractiveness measures and those of Ross is that six parks have almost the same ranks on the two measures. Actually, the ranks of six parks agree fairly well when the Cheung and Cesario attractivity measures are compared, but in this case an overall rank correlation of only .25 is observed.

However, having seen how well the Cesario and Ross attractivity measures agree, one should note that the Cheung measure possibly should not exactly agree with the Cesario attractivity measure. Cesario claims that his emissiveness measure includes an alternative factor component and because of the symmetry of his equation it is plausible to suggest that attractivity is also affected by a destination alternative factor. Cheung's measure, on the other hand, deals only with a given site. It is possible that Cesario's measure reflects both positive and negative

effects of the area around a park. (This point is elaborated in TN 33.)

TABLE 1: THE ROSS, CESARIO, AND CHEUNG ATTRACTIVENESS INDICES FOR TWELVE SASKATCHEWAN PARKS

Park	T(r)*	Rank	T(f)*	Rank	T(c)*	Rank
Buffalo Pound	.190	12	0.155	12	96.1	5
Cypress Hill	.732	2	3.083	2	45.2	11
Duck Mountain	.730	3	2.609	4	126.40	1
Echo Valley	.277	10	0.477	10	112.05	3
Good Spirit	.390	9	0.666	9	76.5	8
Green Water	.456	7	0.898	6	61.4	9
Prince Albert	.821	1	1.416	5	88.7	7
Moose Mountain	.473	6	3.846	1	113.11	2
Pike Lake	.614	5	0.704	7	96.1	6
Rowan's Ravine	.266	11	0.683	8	59.01	10
Battleford's	.619	4	2.886	3	104.28	4
Besant	.4	8	0.	11	2	12

*T(r) - Ross' attractiveness indices; T(f) - Cesario's attractiveness indices; and T(c) - Cheung's attractiveness indices

TABLE 2: RANK CORRELATION COEFFICIENTS BETWEEN THE ROSS, CESARIO, AND CHEUNG ATTRACTIVENESS INDICES FOR 12 SASKATCHEWAN PARKS

	T(r)	T(f)	T(c)
T(r)	*	.77	.21
T(f)		*	.10
T(c)			*

Consider that T(r) - Ross attractiveness indices and T(f) - Cesario attractiveness indices need to be adjusted by alternative factors to be equivalent to T(c) - Cheung attractiveness indices. This is expressed in Equations 3 and 4.

(3) T(f) = f(T(c), A(c)) which might be:

(4) T(c)/T(f) = CO - C1 A(c)

(5) T(f) = T(c)/27A(c) - 125

The possible existence of such a relation is demonstrated by the results presented in Table 3. In particular, it is interesting to note that by using Equation 5, based on parameters for Regression (1) of Table 3, one predicts the twelve "corrected" values of Cheung's attractivity measures given in Table 4. But when rank correlations are carried out using the "corrected" Cheung measure, one observes that the correlations reported in Table 4. The correction has not improved the rank correlation as might have been expected.

Even though the results raise questions without providing impressive evidence for a given answer, the relation defined by Regression (1) and, in fact, the relation implied by any significant regression coefficient of the alternative factor means that when a site is "imbedded" in a collection of other sites, its "true" or "absolute" (Cheung type) attractivity is not estimated by the Cesario attractiveness measure. In fact, a significant coefficient suggests that persons may be making decisions based first on selecting a region and then selecting a site within a region (rather than considering all sites as discrete). It is possible to believe that persons may view a number of parks in an area as equally attractive (in Cheung's sense). They may view similar parks in the same area much as

they view a single park with a number of different day-use areas. In this case, visitor flows to an area, not to each site, would be what reflect regional attractivity. In fact, a sophisticated analysis of total flow might give an overall attractivity number that could be "decomposed" using flows to each one of several sites in an area to get absolute Cheung-type site-specific attractivity measures. (See TN 33.)

TABLE 3: RATIO OF CHEUNG'S ATTRACTIVENESS MEASURE, T(c), TO CESARIO'S ATTRACTIVENESS MEASURE, T(f), EXPLAINED BY A DESTINATION ALTERNATIVE FACTOR, A: T(c)/T(f) = CO 4· CIA

Regression Number	C0	C1	A = Alternative Factor defined by	F-test Significance Level	R^2
1	126	7	No. of alternative sites within 100 mites of the park under consideration	10%	0.30
2	49	44	1/D **1/2 as used by Cheung 1972	Not Significant	0.18

CONCLUSION

The preceding has glossed over what may prove to be the most important point made in this article - that Cheung (see TN 1), following the lead of others, found it appropriate to suggest that the use of a site will be influenced by the number of sites around it and their relative attractivity. Work carried out after the first version of this paper was written (see TN 33) has shown that if the kind of effect that Cheung thought existed did in fact, exist, Cesario would estimate it as part of his attractiveness measure. Cheung's attractiveness measure obviously does not depend on what is around a park. So, the relationship between the Cheung and Cesario measure considered here was to be expected on theoretical grounds. However, a problem in establishing a relation is that because Cheung's measure is ad hoc, it may not really measure attractivity in a way that relates to behaviour.

In light of these findings, two tentative conclusions are clear; (1) Ross' and Cesario's indices of attractiveness can reasonably be considered to measure much the same thing (though Ross in ordinal and Cesario in interval scale terms) and (2) Cheung measures something different from Ross and Cesario in that he does not measure the attractiveness of "general" destination areas, but develops a site specific measure. A problem is that it is based on hypotheses not behaviour.

An overshadowing concern in this paper has been that one must determine the attractiveness of a park in terms of the types of activities it offers to the visitors who are there for a given reason. Attractivities of "activity packages" for different types of users must ultimately be a focus of attention. A park may be very attractive to a certain group of people having a certain time budget, (and depending on their interests) while it may be not at all attractive to another group of people, either because of the facilities offered or time constraints. In this analysis the visitors' perceptions of attractiveness have been aggregated to some degree in considering main-destination day-users as a homogeneous group of users by considering that they use parks for a single reason and that all such users have the same "utility" scale.

If a great value of site attractiveness studies lies in providing insights - into the social psychology of participation in outdoor recreation much interesting work remains to be done on measuring attractivity, particularly as it relates to attractivity to whom, for what. It seems clear that Ross and Cesario have given important, new and highly related measures that can be used in pursuing research and planning ends related to measuring the attractiveness of recreation sites or areas.

TABLE 4: RANKINGS OF ATTRACTIVENESS OF TWELVE SASKATCHEWAN PARKS BASED CESARIO'S MEASURE AND AN ESTIMATE OF IT BASED ON THE ESTIMATION RELATIONSHIP: $T_c(f) = T(c)/(-126 + 27A(c))$ (with rank correlation of T(f) and $T_c(f) = 0.23$)

Park	Rank of T(f)	T(f)	Rank of $T_c(f)$	$T_c(f)$
1	12	0.15	9	0.345
2	2	3.08	12	-2.514
3	4	2.60	2	2.006
4	10	0.47	5	0.778
5	9	0.66	8	0.532
6	6	0.89	4	0.976
7	5	1.41	1	9.861
8	1	3.84	6	0.661
9	7	0.70	3	1.525
10	8	0.68	10	0.234
11	3	2.88	7	0.610
12	11	0.37	11	0.156

***$T_C(f)$ = estimated Cesario attractiveness factor and T(c) = actual Cheung attractiveness factor for the park; and A(c) = number of parks that are within 100 miles of the park.**