TWO SIMPLE DELIMITATIVE MODELS FOR DESIGN OF PUBLIC SPACE

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ABSTRACT:

Sometimes a designer faces the subversive question of how to articulate a problem that has parts either unknown or not known with certainty. Consider public space, for instance. People are inventive and they adapt their public spaces and objects for uses beyond strictly-programmed ends. The current paper is an articulation of that problem. It presents problem solving as a triangulation: problem analysis, representation, argument.

1. INTRODUCTION

Here is a question of interest: How do urban so-called public spaces get used? For one answer, we quote Quentin Stevens (2007) as he opens *The Ludic City*. He began this way:

> *Urban design often pursues such clear-cut instrumental goals as comfort, practicality and order. But the scope of everyday life in urban spaces is never completely subordinated to the achievement of predefined, rational objectives. People can be capricious and unpredictable. Urban spaces and the activities which occur in them constantly generate disorder, spontaneity risk and change. Urban public spaces offer a richness of experiences and possibilities for action.* (p. 1)

Stevens' observations articulate a design problem. While spaces are usually programmed to serve decided functions, the people that use them can sometimes be ingenious, other times quixotic, their behaviors unpredictable regarding how they will use the spaces. The designer is caught up in dealing with a *wicked* problem (Rittel & Webber 1973), where not all the parameters are certain. To establish control, a designer has to delimit the problem--set constraints within the problem. In this paper, we articulate a pair of models that might be used by a designer to develop her argument about controlling the design problem of space usage. First, we shall survey a range of ways in which urban public spaces get used, generally beyond their original programs. Afterwards, we will constrain our current exploration to the specific case of space usage where, mostly, action is decided and carried out without obligation/coercion (i.e. freely) and often in the spirit of recreation/play. Around that problem, we will propose two arguments or models.

Stevens (2007) provided a wealth of examples of uses of space which are more spontaneous/improvised than programmed. Two employees of an electronics store operate radio-controlled cars in the public path in front of their store. A protester holding a large sign positions himself in the middle of a pedestrian pathway. Somebody creates pavement art in the middle of a paved walkway. Such types of improvised activities are not just limited to pathways, however. Skaters *grind* along edges of urban artifacts. *Parcours* athletes reinvent uses of walls, surfaces and other built objects. *Dragons and Dungeons* players appropriate cities as campaign settings. Stevens (2007) described in-line skaters skating up the arch of a bridge. He also described a collective "bike lift" in the middle of a street intersection in Melbourne.[1] Haydn and Temel (2006) provided account of appropriation of train coaches (on the Circle Line in London) for a party.

There are other uses of public space. Loukaitou-Sideris and Ehrenfeucht (2009) discussed the preemptive use of sidewalks by street and mobile vendors. Sometimes conflict arises with established or abutting businesses (and at other times with middle and upper-class citizens). Seen a different way, however, though sidewalks are useful to them, abutters' interests often "differ from the interests of other sidewalk users," especially *if* one considers sidewalks as "functional parts of the roadway" (ch.4; para.2). In the end, it is not all so far-

[1] We note: A playful seme (demonstrated) for a serious cause

fetched, considering that people demonstrate a habit of using public spaces for personal interests: "have private cell-phone conversations, act intimately with lovers, have business meetings, [etc.]" (ch.4; para.7).

Hou (2010) framed his and co-authors' discourse of public space use around resistance. He outlined a typology of intentional action in public space usage: appropriation, reclamation, pluralization, transgression, uncovering and contestation. Within those frames we encounter narratives such as those of dancers appropriating space under a freeway pass in Beijing (Chen 2010) and *Rebar* (Merker 2010) pushing limits by first paying a parking meter in downtown San Francisco and then filling the parking space with a lawn, a large tree and a park bench for the duration of the metered time--an "experiment" appositely named *Park(ing)*.

Low (2000) carried out an ethnography of two plazas. She generated a portrait of the dynamics of space creation, usage and appropriation, with different constituencies staking areas at different times: shoeshiners, vendors, workers-for-hire, pensioners, youth, evangelical healers, gamblers, bands and so on. Whyte (1980, 2007) presented additional ethnographic narratives from a different place. In his accounts, people appropriate street corners or the center of pedestrian paths (even when jostled by crowds), "camera bugs" occupy a south wall of an outdoor space, people watchers push to front seats in public plazas, and so on.

Although this paper will not discuss it, it is valuable to note that public space as space of political action (free assembly, dissent, identity establishment, etc.) has been discussed extensively (e.g. see Loukaitou-Sideris and Ehrenfeucht 2009, Hou 2010, Low 2000, Smith 1992). Its relevance to our discussion is that in those actions, spaces sometimes are used in ways different from their original program.

As has already become obvious, it is not just simple elements of the urban setting (e.g. sidewalks, walls) that become so-called props for action. Integrated elements of the urban fabric become stages for activities that are spontaneous, unanticipated, unprogrammed and so on, and so the discourse surrounding use of city spaces and artifacts can be extended into other metamorphoses. One example is provided in the following observation by Lloyd and Clark (2001) in their discussion of Chicago. They noted how "spaces of the gritty industrial past [have] become mined for their aesthetic potential" with, for instance, such things as "bars or theaters locating in former steel plants" (p. 371). Another specimen city is Berlin, which has emerged as an urban setting where "experiments" with *Freiräume* have materialized (LaFond 2010). Haydn and Temel (2006) provide an array of creative urban space interventions, from appropriation for shelter, to theatre, to social interaction. Although these discourses have been framed around issues such as social reengagement, sustainability, economics, arts, politics and so on, the idea of human shaping of material and space which has invested urban spaces with configurations that make them rife with potential and allows them to tempt with dynamic possibilities is underscored.

Finally, we return to our delimited frame of exploration--the use of space for free, play-oriented ends. Stevens (2007) suggested that understanding play is more usefully done, not by considering it as a separate category of experience, but as one enmeshed and unfolding dialectically with everyday life. Hence we might better extrapolate to insights about play and actions of (or *in*) play in the context of dialectics such as order-disorder, control-release, morality-desire, intention-surprise, 'deferred satisfaction'-'immediate pleasure' and production-destruction (p. 48).

Play is *fun*, wrote Huizinga (1950), but that quality defies logical interpretation. The reality of play, he suggested, "cannot have its foundations in any rational nexus" because its reality "extends beyond the sphere of human life" (p. 3). Agreeing with Plato, he noted that humans are, in most respects, puppets of nature (though "having a small part in truth"), have then to live according to nature and since nature leads one to play, "life must be lived as play" (p. 212). *Homo Ludens*, he fundamentally argued, will have need to play and so we can expect her or him to do playful things.

Thus, it could be considered that human predilection for improvisation--as happens with actions in space--might signal a natural disposition, that some room might be allowed for it and that the issue might be rearticulated optimally within the design problem. Within that world view, improvised uses of space could be seen as playing a role in the enrichment and fulfilment of urban life by its allowing for such things as freedoms of different sorts (e.g. occupation, speech, claim to collective proprietary rights, appropriate pursuance of intent to preserve the space), active use for one's well-being, interpersonal engagements, pleasures and more. In that case, it might be worthwhile for a designer to consider not designing against all fickle public intentions.

The designer faces a problem, however: How is she to make a decision on which random activities to anticipate so as to acknowledge them within the design solution?[2] One response is *constraining* the problem through an analytic process--and for that we present a pair of

A. **Social --> Solitary (SS)**
Activity requires other people -> is performed alone

B. **Skilled --> Non-skilled (SNs)**
Activity requires trained abilities -> does not

C. **Passive --> Active (PA)**
Activity does not require notable vigor -> does

analytic arguments. We invite the reader to engage the following as a meditation on design process.

2. METHODS AND OUTCOMES

In this section, we describe processes employed in creating two devices.

1. Image of an inhabited urban plaza was projected onto a screen. A group (n = 37, students), individually, generated a list of activities they would freely do in the space. Redundant items were removed. An edited list yielded 61 items.

2. The 61 items were prepared for a card-sort, one item per card. Five independent judges sorted the items (cards) by free clustering based on similarity between activities. They also provided justification for grouping activities together. One set was discarded due to complications in sorting.

3. From free sort, a dissimilarity matrix was generated based on percentage overlap (Dunn-Rankin, Knezek, Wallace and Zhang 2004).

4. Cluster analysis was performed to reduce items using average-linkage-between-groups. Clustering was used exploratorily; resulting clusters became partial basis for selecting items to be used in a questionnaire. Based on follow-up, theory and experience, the researcher modified the list by adding or removing a few items.

5. A 14-item checklist was created, with a scale (0 to 10) attached to each item. On the scale, a respondent would rate likelihood of doing one of the activities listed. Zero meant "absolutely not" while 10 meant "would [certainly] do it."

Picture of an inhabited urban plaza was attached to each questionnaire. Referring to the image, 99 respondents (college students) rated likelihood of engaging in itemized activities.

2.1. MODELS

Following the steps above, we proceeded to ask the question about how such data might be employed in the design process to inform the designer. There are different ways that could happen. In our case, we outline two constraint devices/arguments a designer might employ for articulating potential space activities that are aligned with situational realities. We propose these as *shapes* of models--i.e. they describe processes of model building. We will use our data to illustrate accordingly.

2.1.1. MODEL I: GRAPHICAL (OR VISUAL) CATEGORIES MODEL

Step 1: Generation of Categories

1. Data can be coded into categories as a data-reduction strategy. Below, we present an emergent one--which utilizes anchoring pairs--from our study (Figure 1).

One advantage of categorization is that categories are derivations that have capacity to transcend particularities (or peculiarities) of specific situations/activities and thus allow, among other things, for application of them beyond their source. For instance, categories below can be applied even to activities not included in our model.

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[2] Acknowledgment might include rejection/prevention, containment, conciliation, enhancement, etc.

Figure 1: Categories *signifying/enframing* discrete attributes of activities[3]

2. Next, a designer is able to dispose activities of interest into the polarized categories (Figure 1) such that each activity is fit into a space within each dichotomy (Figure 2).

Anchors					
<––––––––>		<––––––––>		<––––––––>	
Solitary	**Social**	**Skilled • requires special skill**	**Non-skilled • does not require special skill**	**Passive/mildly active**	**Active**
Hop on things	Toss ball	Skate	Hop on things	Hop on things	Skate
Skate	Water gun fight	Bike tricks	Dance	Dance	Bike tricks
Dance	Hold rally	Play guitar	Splash water	Splash water	Toss ball
Bike tricks	Have festival		Catch nap	Play guitar	Water gun fight
Splash water	Tea with friend		Chalk art (free)	Catch nap	
Play guitar			Feet in fountain	Chalk art (free)	
Catch nap			Toss ball	Feet in fountain	
Chalk art (free)			Water gun fight	Hold rally	
Feet in fountain			Hold rally	Have festival	
			Have festival	Tea with friend	
			Tea with friend		

Figure 2: Activities deployed into categories in Figure 1

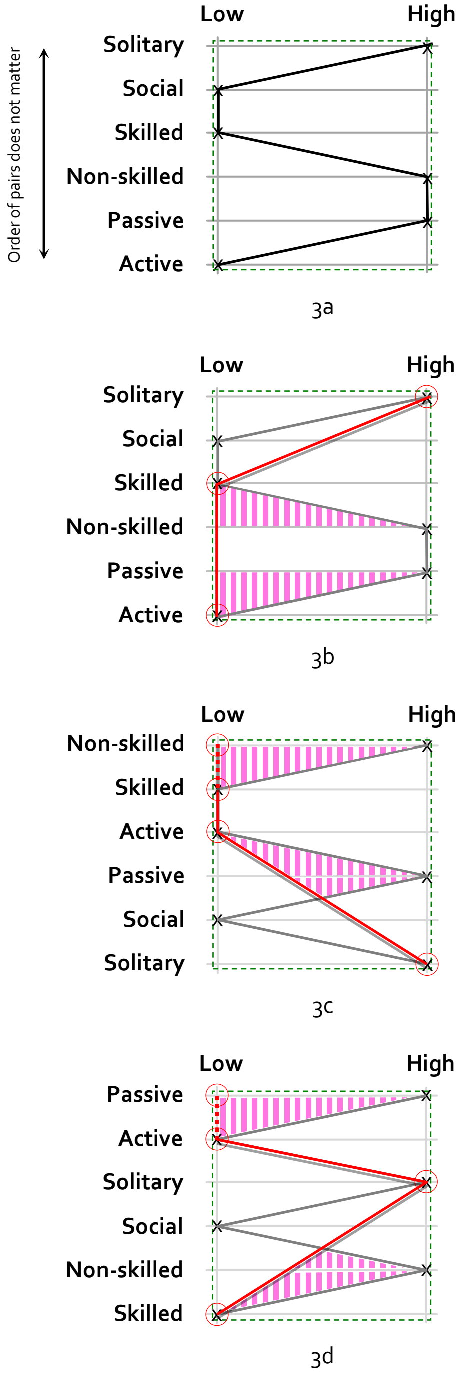
Step 2: Model Construction and Application

Following classification of activities, a decision making "tool" could be created and used as follows. (Refer to Figures 3a to 3d.)

1. Data are set into a graphic scale.
2. The scale is dichotomized, with simple levels, "low" and "high" [likelihood].
3. A system of placement of value is based on simple, intuitive, examination of the category table: Anchor in Figure 2 with longer list gets "high." Its types/genres of activities tend to happen more easily. (Note: Assignment of value based on another form of quantifying is in next model.)
4. Anchors are plotted and connected (Figure 3a). Call this the *base plot* or *master plot*.
5. The designer selects an item from a list of potential suspect activities. (The list might be derived from a sample survey or it could be generated by the designer.)
6. The selected item is first transposed into the categories (e.g. on table: skating is transposed into solitary, skilled and active). It is then plotted. Call this the *irruptive plot*.

[3] We found "feature of site" to be a potential predictor--i.e. a feature of site plausibly facilitates activity type. It is not included in our illustrative models, however, as we believe its dynamics require further exploration.

7. The *irruptive plot* is superimposed on the base plot. (We have provided an example of skating. See Figures 3b, 3c and 3d for *irruptive plots* in red and *base plot* in black/grey).



Figures 3a-3d: 3a is base plot for 3b. 3b-3d are variations of combined *base* and *irruptive plots* for skating

8. The plot combination is read by examining the areas above the *irruptive plot*, but below the *base plot* and within the *plot frame*[4]. That area--we call it the *lost zone*--represents area that skating (in our example) loses or yields to likelihood of happening. Three versions of the skating example are illustrated (in Figures 3b, 3c and 3d). The larger the combined area of the *lost zone*, the less likely, the designer decides, the activity will take place (i.e. it has lost much likelihood of occurring). The reader will notice that the areas added together remain constant in all versions of the plot. We reiterate the convention: The higher/greater

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[4] Line of the *irruptive plot* must be "resolved" to the end of the *plot frame*. See dotted **red** lines in Figures 3c & 3d.

the area of *lost zone*, the less designer has to worry--because activity has lost "too much" likelihood of occurring. The lower/less the area of *lost zone*, the more designer has to be concerned about possibility of activity--because it has not lost much likelihood of occurring.

9. For ease of articulating it, we have noted the areas in terms of number of triangles. Two triangles that, together, form a rectangle, define the area between two related anchors (e.g. between solitary and social).

10. There is a way to read *lost zones*, however.

(i) On the plot, one must begin by assuming no continuity between the dichotomies. Taking Figure 3a as example, solitary-social is contained and does not continue to skilled-non-skilled. So, the rectangle between them is considered "empty." For convenience, we shall name such a rectangle, *empty rectangle*. In like manner, there is no continuity between skilled-non-skilled and passive-active, and the rectangle between them is considered "empty."

(ii) When an *irruptive plot* is superimposed, remember that the *lost zone* is area that comes above its lines, but below the base plot lines. If the irruptive plot crosses an *empty rectangle* flatly on the "low" side of that rectangle (i.e. it runs along the rectangle's edge, where it says "low"), the area within that rectangle does not count--even if the *base plot* line crosses above the *irruptive plot* line within that *empty rectangle* space. Note: If the *irruptive plot* line crosses on the "high" side, it would not matter since any area below the *irruptive plot* line does not count.

(iii) Any time, however, the *irruptive plot* crosses an *empty rectangle* obliquely, area above it--if below a *base plot* line within that space--will count.

11. Maximum *lost zone* (in this model) is 3 triangles. A designer might set a convention that any activity showing greater than 33% *lost zone* (i.e. more than one triangle area) presents little enough concern so as not to be considered an issue within the design solution.

Some global observations on the graphic model are as follows (1 and 2 are disadvantages; 3 and 4 are advantages):

1. At first, estimating areas of triangles not constituted as a right-angled half of the main rectangular division might seem irksome. (The issue goes away, however, once one becomes familiar with the few basic areas/shapes.)

2. The model is coarse, a quick-and-rough estimator.

3. Many designers tend to embrace or appreciate use of a graphical medium for problem solving or *communication* of their problem solving process. This model fits that inclination.

4. The model is relatively easy to create and easy to use.

2.1.2. MODEL II: AN ADDITIVE TYPE MODEL

1. As is model 1, this is a heuristic device. Using extant data, the objective is to generate an argument for likelihood of an activity occurring based on individual population member valuation of the activity as one she or he would likely perform in a given space.

2. During initial data examination, of the 99 cases reported above, 3 were deleted for either not following instructions or being incoherent. That left 96 cases. Diagnostics were run. More cases (n=12) were eliminated. The data set now included 84 cases.

3. For the next step, we derive, for all items, a score which would represent influence of the individual as well as the population. Our logic is this: Performance of a behavior is affected by a personal value set. It is possibly also affected by the value set of the population (community) to which the individual belongs, particularly if it is an activity to be performed in public.

(i) We standardize scores across the sample, but also across the individual, yielding a pair of values per score.

(ii) Since we wish to work with probabilities, we convert both scores into probabilities.

(iii) We then calculate a product of the two to represent their interaction.

(iv) This new score (calculated for every original raw score) is then used to replace all raw scores.

4. To create a compact model, we use the same categories of activities generated in Model I. They replace specific activities.

5. *Category score*: To create a score for each category, first we argue that a person could engage in any of the activities listed per category, but we will assume engagement in only one activity at a time. So it is: activity[1 or 2 or 3...or $n_{category}$]. Then we apply the

addition rule. Each individual's score per category is an addition of probabilities of items in that category (e.g. Jenny's score on "Solitary" would be an addition of all her scores on items in the "Solitary" category).

6. Our categories are arranged as dichotomies (Figures 1, 2). Let our three dichotomies represent k = 3 events, each with two possibilities. So, we have 8 possible combinations of these characteristics of activities. If we represent the three dichotomies as A1-A2, B1-B2 and C1-C2, then we have the following 8 combinations: A1B1C1, A1B1C2, A1B2C1, A1B2C2, A2B1C1, A2B1C2, A2B2C1, A2B2C2. Let us refer to them as [activity] *types* (Figure 4).

Categories	***Types***	
A1 = Solitary	A1B1C1	Solitary-Skilled-Passive
A2 = Social	A1B1C2	Solitary-Skilled-Active
B1 = Skilled	A1B2C1	Solitary-NonSkilled-Passive
B2 = NonSkilled	A1B2C2	Solitary-NonSkilled-Active
C1 = Passive	A2B1C1	Social-Skilled-Passive
C2 = Active	A2B1C2	Social-Skilled-Active
	A2B2C1	Social-NonSkilled-Passive
	A2B2C2	Social-NonSkilled-Active

Figure 4: Activity categories and compounded types

Resulting Order of *Types*	
A1B2C1	Solitary-NonSkilled-Passive
A2B2C1	Social-NonSkilled-Passive
A1B2C2	Solitary-NonSkilled-Active
A1B1C1	Solitary-Skilled-Passive
A2B2C2	Social-NonSkilled-Active
A2B1C1	Social-Skilled-Passive
A1B1C2	Solitary-Skilled-Active
A2B1C2	Social-Skilled-Active

Figure 5: Hierarchy of types by "weight"

7. The combinations/*types* may be interpreted *intra*-group (i.e. intra-*type*) as "*and*"s. For example, a person could engage in an activity that might be classified as simultaneously social *and* non-skilled *and* active. That could be re-written as social*non-skilled*active (the *type*). Thus, we apply the *multiplication* rule to create each individual's score per *type* (we multiply the category scores derived in step 5 above). A designer could take any identified activity and fit it into one of these *types*.

8. In the final step, we add scores by *type* (i.e. everyone in a *type* is added together) to get a "weight" per *type* (i.e. likelihood of this *type* occurring in the population). The order of likelihood by *type* which resulted (after adding scores within each type to get "weight") is in figure 5, starting with the most likely *type* (largest "weight").

9. Some intra-model observations (within our example) are as follows:

(i) It appears as if effect of "non-skill(ed)" is strong on likelihood of occurrence.

(ii) Solitary activities seem more likely to be carried out (but removal of "non-skill" could affect that significantly).

(iii) Passive activities tend to be more likely than active ones.

3. CONCLUSION

Investigating the problem of physical public space raises questions about use and unpredictability. In this paper, we suggested two constraining devices: a graphic model and an additive model. The former is an easy, but *coarse*, method. Further replications/refinements of the model could consider: (1) Increased range or versatility--use of continua over dichotomies (e.g. passive-*moderately active*-active). (2) Inclusion of a "feature"-"no feature" category (broached earlier). (3) Threshold at which a designer draws the line of low "likelihood" of occurrence so as not to make an activity prominent in design problem solving. The latter model perhaps involves more time commitment. We have attempted to abate the issue, however, by fashioning a tool which does not depend on assumptions of a “true” predictive model.[5] Numeric (quantitative) logic, also, seems to "make sense" easily to many people when hierarchy is in consideration.

In both models, it should be noted that how activities are assigned to or treated in conditions/categories will have effect on outcomes/conclusions.[6] Our models are tools, and tools should be used with a dose of good judgement.

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[5] Model as more rigorous *idea*: If one was able to arrive at a fairly comprehensive list of possible behaviors in space and was able to reduce them *reliably* >> If an interpretable y-score was possible, a model such as this: $y = b_0 + b_1(A1B1C1) + b_2(A1B1C2)...+b_8(A2B2C2) + e$

[6] Interested readers might explore e.g. Simpson's paradox; standardization (e.g. Wainer 2005; Terwilliger 2004; Zuzovsky, Steinberg and Libman, 2011).