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## Places

### Title

Cognitive Standards and the Sense of Campus [Research and Debate]

### Permalink

<https://escholarship.org/uc/item/5hs8z28g>

### Journal

Places, 17(1)

### ISSN

0731-0455

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### Publication Date

2005-01-15

Peer reviewed

# Cognitive Standards and the Sense of Campus

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Many colleges and universities are expanding their campuses nowadays to accommodate increased enrollments and/or specialized teaching, research, commercial and/or athletic facilities. Alternatively, like Columbia and Harvard, they may be planning entirely new campus precincts on adjacent land. Such changes often raise important issues with regard to older, core areas that symbolize the identity of the institution. Is it possible to insert new buildings in such historic areas without damaging their valued qualities? Do conflicts emerge when one links across existing boundaries to areas long thought of as “off-campus.”

Such issues highlight the sense of separateness and containment that often characterizes the American university campus. Is this sense really unquantifiable, or can measurable standards be discovered behind this perception? In planning for future growth, are there demonstrable thresholds that designers and planners should not cross?

The field of cognitive sciences may hold some answers to these questions of identity and design. By looking to the basic processes that inform our perceptions, we may gain a better understanding of what a campus actually is — what some of its physical requirements may be. More precisely, by making implied values explicit, it may be possible to make better decisions more easily with regard to campus-planning issues. Such an examination might also throw light on how people make sense of their surroundings in a more general way.

## An American Construct

The idea of a university “campus” appears to be an originally American one. According to the *Oxford English Dictionary*, the first recorded use of the word to describe “the grounds of a college or university; the open space between or around the buildings” came in 1774 in reference to Princeton University.<sup>1</sup>

In contrast, the first British use did not occur until 1958. The earlier English word for a college field was “yard.” For the most part, however, the oldest medieval universities, such as those in Bologna and Paris, had been fully integrated into the fabric of their respective cities. Among classic English universities, neither Oxford nor Cambridge had a central core; they were composed of individual colleges built around separate courts, or yards.

Today, designs for new American colleges and universities may be choosing to imitate this earlier, more urban arrangement of space. But it is still the campus as an arrangement of buildings in the open, separate from the structure of a surrounding city, that remains the ideal form. Indeed, at many older American colleges and universities

such a historic campus may provide a powerful symbol of higher academic life. It is the ivory tower translated into open space. While the institutions may ultimately extend far beyond these limits, these relatively open areas remain their symbolic hearts.

In the context of a city, a sense of openness is essential if such a core campus is to be perceived as separate from surrounding areas. A sense of openness also serves to emphasize the unity and special quality of the particular institution. These qualities may also symbolize learning as something apart in terms of time, money, and social class. It is here where the sons and daughters of privilege, and those who rise from lesser means to join them, have traditionally been allowed to spend the years between adolescence and adulthood developing their particular talents and interests supposedly free from the business of earning a living.

Whatever its historical, ideological, or cultural messages, this American core campus is ideally — and usually — a place apart, an open precinct of a certain size separate from its surroundings.

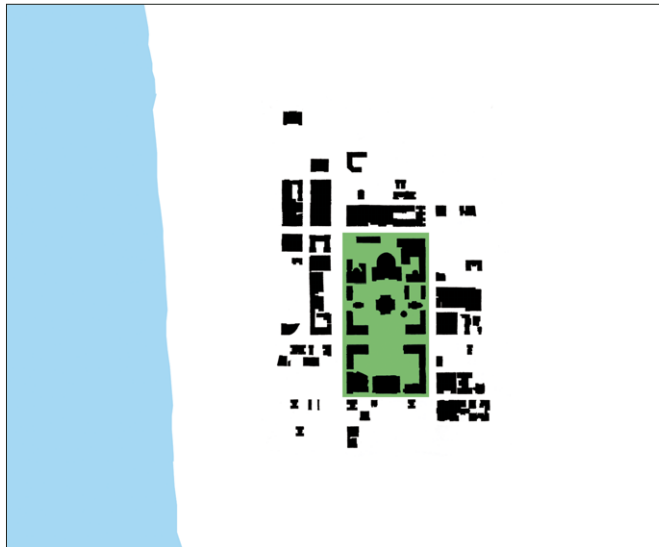
## Where to Build?

Because of these qualities of openness and separation, within the science of perception, a core campus is also a cognitive entity. As such, different or additional parts of our brains are involved in its perception than are used in perceiving its surroundings.<sup>2</sup> The exact size that a core campus must be to seem sufficiently separate is a question to be explored elsewhere. The question here is whether there is any physical or cognitive standard that might help planners and designers determine when further building might endanger its important sense of openness.

Certain university building efforts in the late 1960s and early 1970s may be particularly instructive in helping examine the case for such a threshold. In those years, three of the nation’s oldest Ivy League institutions planned or actually constructed underground buildings on their core campuses: Yale completed a library under its Cross Campus; Harvard built the Pusey Library beneath the southeast corner of its Yard; and Columbia announced plans, later changed, for a gymnasium under its South Field (between the Low and Butler libraries).

These universities had previously expanded well beyond their core campuses. But the nature of the new facilities was such that it made sense to site them in central, accessible locations. In addition, each institution had recently experienced opposition to further off-campus building. In some cases this took the form of local neighborhood

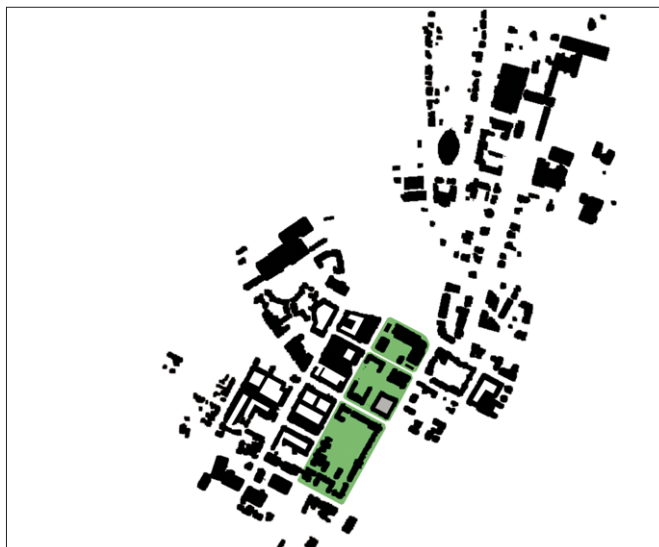
Tables of Core Campus Building Ground Coverage and Acreage



<b>Columbia University</b> 120th Street – Amsterdam Avenue – 114th Street – Broadway	<b>Building Ground Coverage</b> 33.3%	<b>Area in Acres</b> 29.4
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<b>Harvard University</b> Broadway – Quincy Street – Massa- chusetts Avenue – Peabody Street	<b>Building Ground Coverage</b> 25.9%	<b>Area in Acres</b> 25.4
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<b>Yale University</b> Grove Street (excluding Elm and Wall Streets) – College Street – Chapel Street – High Street	<b>Building Ground Coverage</b> 31.2%	<b>Area in Acres</b> 19.5
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<b>Princeton University</b> Nassau Street – Washington Road – a line just south of Witherspoon, Clio and Whig Halls – University Place	<b>Building Ground Coverage</b> 30.9%	<b>Area in Acres</b> 26
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opposition; in others it came from city administrators concerned about further loss of tax revenues. Whatever the case, a combination of such factors established building in the historic core campus area as the preferred option. And in those years none of these areas had a building-to-open-space ratio that was greater than 40 percent.

Given such circumstances, in which there was clearly room to build above ground, what reasoning or cognitive sense could have led these institutions to seek to build these facilities underground? The decision to build underground is an extreme one, presumably only made when other alternatives are unacceptable. Underground construction is more expensive than construction above ground because greater excavation is needed. Moreover, the resultant building is almost certain to be somewhat claustrophobic.

Today the evidence suggests that underground construction was carried out in two cases (and preferred in the third) because of certain cognitive constructs related to the sense of openness. The evaluation the universities made may be summarized as follows: additional building above ground would have intruded into the field of the core campus to such an extent that the coherent openness of the place would have been lost, and the sense of the university as a whole would have been jeopardized. In other words, those charged with protecting the symbolic value of the core campus became concerned that new buildings would damage important qualities that allowed it to be read in relation to the ideal of an American university. In particular, they might cause the perception of campus to “flip” from being an open area with buildings in it, to one where a collection of buildings was surrounded by residual open areas.

Such concern for an open core campus might be discounted as simply a matter of nostalgia or aesthetics. But it was so general in these three instances — and in many ways so obvious — that it may also indicate the presence of a cognitive standard which determined the actions of these universities.

### Measurements of Openness

These three university core campuses are widely known and loved by their alumni/ae, and thus may be presumed to be large enough — yet not too large — to embody the campus ideal. But the more general question here is how open a sufficiently large core campus area (and other areas of similar size, whether a housing development, a playing field, or a major parking lot) must be in order to seem open. Conversely, at what point is such an area so occupied — whether by structures or densely planted trees or

hedges — that it can no longer be thought of as open?

The accompanying table gives the core campus areas, excluding streets, of Columbia, Yale, and Harvard as of 1974 and, in each core campus, the percentage of ground covered by buildings at that time. For comparison, these same statistics are given for the northern portion of Princeton’s campus (with Nassau Hall at its center). Maps of these core campus areas and buildings as of 1974 are shown in the accompanying figures.

The four universities discussed exhibit two basic development patterns. The Columbia and Yale core campuses comprise an almost continuous perimeter of buildings around a central open space. The building ground coverage for Columbia is 33.3 percent. The total building ground coverage for Yale, excluding streets, is 31.2 percent (made up of the following components: the Old Campus — 26.7 percent; Cross Campus — 35.4 percent; and Beinecke Plaza — 36.2 percent). Thus, if the desire to build underground indicates that these places were approaching a threshold beyond which a sense of openness would be lost, the maximum possible ground coverage in cases where buildings establish a strong perimeter is probably a little under 40 percent.

Of the two examples, Columbia eventually built its new gym, the Dodge Fitness Center, in the northwest corner of its core campus. The land drops off steeply here, and this allowed the building to be constructed into a natural slope so that its roof formed a terrace at the level of existing portions of the core campus. Further research is needed to learn whether students and faculty think this area successfully continues the core campus pattern of open area surrounded by buildings. But the siting of the building did allow the university to maintain nearly the previous percentage of open space in the core campus area.

Compared to Yale and Columbia, the buildings of Harvard and Princeton are spread more evenly over their core campuses. Many of these individual structures can be seen from all sides and do not constitute as much of a barrier between their institutions and the surrounding streets as at Columbia and, to a lesser extent, at Yale. Harvard’s core campus, the Yard, had the lowest ground coverage (25.9 percent) of the three universities wishing to build underground in the 1960s and 70s. But this area consisted of two inner spaces, each smaller than the corresponding open areas at Columbia and Yale. It is indeed difficult to think of a place where an additional building could fit comfortably.

The ground coverage of the northern portion of the Princeton campus, with Nassau Hall at its center, is somewhat higher (30.9 percent). While circumstances have not

yet forced Princeton to build underground in this core area, the extent of the university's expansion elsewhere suggests that ground coverage much in excess of 30 percent is sufficient to jeopardize its sense of openness.

### A Common Standard

To summarize, it seems that where buildings are evenly dispersed, we are unable to think of an area roughly the size of these core campuses as open if ground coverage much exceeds 30 percent. If buildings are organized around a perimeter, it seems similarly difficult to maintain a sense of openness if ground coverage reaches 40 percent. The experiences of these universities suggest that these standards are probably maximum percentages beyond which it is no longer possible to perceive an area as open.

Other areas of this size, whether campuses or housing developments, may not seem open even with ground coverage lower than these maximums. But the issue clearly involves cognitive mechanisms. In what ways do ground coverage and other factors affect how our brains process information about our large-scale surroundings? What causes us to perceive paths in an open landscape? When do adjacent building facades begin to form streets, whether or not that was the intention of the architect or planner? Conversely, at what point is street continuity broken by the absence of coherent building facades or the presence of large plazas or courtyards?

The answers to these questions depend on additional factors as well as on ground coverage. Topography; building height; the arrangement of buildings, streets and parking lots; lighting; how far one can see into an area; one's sense of safety; and cultural variables all come to mind.<sup>3</sup> However, in evaluating these factors, brain processes are crucial. The percentage of ground coverage and other physical standards are only superficial ways of getting at what these brain processes may be.

In certain ways it is so obvious as to be hardly worth stating that some areas seem open and some do not. It is surprising that it should be necessary to demonstrate that our cognitive processes are measurably governed by the pattern of development of an area and its ground coverage. We readily accept that there are definite cognitive limits to our interpersonal and social interactions, varying only slightly according to culture.<sup>4</sup> Why should there not be almost equally definite cognitive standards regulating reactions to our large-scale physical surroundings such as campuses?

### Acknowledgment

I am most grateful to Frances Halsband and other editors of *Places* for their helpful suggestions, and to Adam Taubman of R.M. Kliment & Frances Halsband Architects for the maps and specific ground coverage percentages in this article.

### Notes

1. The full citation from the *OED* is as follows: "1774 in J.F. Hagemon Hist. Princeton (1879) I.102 Having made a fire in the Campus, we there burnt near a dozen pounds [of tea]."
2. For a general description and overview of the "what" and "where" pathways, see M. Mishkin, L.G. Ungerleider, and K.A. Macko, "Object Vision and Spatial Vision: Two Cortical Pathways," *Trends in Neurosciences* 6 (1983), pp. 414-17. For a more specific examination of the perception of enclosure, see R. Epstein and N. Kanwisher, "A Cortical Representation of the Local Visual Environment," *Nature* 392 (1998), pp. 598-601.
3. For an examination of environmental features affecting a sense of openness or enclosure, see Arthur E. Stamps III, "Enclosure and Safety in Urbanscapes," *Environment and Behavior*, Vol. 37, No. 1 (2005), pp. 102-33.
4. For examples of interpersonal limits, see Edward T. Hall, *The Hidden Dimension* (New York: Doubleday & Company, 1966); and Robert Sommer, *Personal Space: The Behavioral Basis of Design* (New Jersey: Prentice-Hall, 1969). For an example of a roughly 100-second time limit to the perception of street networks, see Barbara Hadley Stanton, "The Incidence of Home Grounds and Experiential Networks: Some Implications," *Environment and Behavior*, Vol. 18 No. 3 (1986), pp. 299-329.