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Preference and Tranquility for Houses of Worship

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Preference and Tranquility for Houses of Worship

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Abstract

Participants rated houses of worship for one of seven variables: preference, tranquility, age, visual richness, building care, potential for recovery from fatigued attention, and potential for reflection. Factor analysis of the preference ratings yielded four content categories: “contemporary,” “traditional,” “unusual architecture,” and “older red brick churches.” Preference was positively correlated with visual richness and building care in the contemporary and traditional categories and had a positive partial correlation with age in the traditional category. Tranquility was positively correlated with preference, building care, recovery, and reflection in the contemporary category but only with reflection in the traditional category. Tranquility was rated higher overall than preference. Preference and visual richness were lower for contemporary architecture than for the other categories, but there were no differences in tranquility. Apparently, raters felt they could achieve tranquility in most houses of worship but preferred those higher in visual richness.

Keywords

preference, tranquility, restoration, attention, houses of worship

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Many studies attest to the importance of religiosity and religious involvement in the lives of adults and young people (e.g., Greenfield, Vaillant, & Marks, 2009; Homan & Boyatzis, 2010; O'Keefe, 2008; Smith, Faris, Denton, & Regnerus, 2003). Much of that involvement occurs in settings formally designed for religious activity and known collectively as houses of worship. Environmental psychology has begun to explore the importance of such settings as places where psychological restoration can take place. Specifically, the connection between spirituality and self-reported restoration has been documented for monasteries (Ouellette, Kaplan, & Kaplan, 2005) and generic houses of worship (Herzog, Ouellette, Rolens, & Koenigs, 2010). Curiously, the vast literature on environmental preferences contains little on preferences for houses of worship. One recent study (Manning, Watkins, & Anthony, 2009) surveyed parishioners at two Roman Catholic churches, one with a traditional Romanesque design and the other with a contemporary post-Vatican II design. The contemporary church was rated higher on overall environmental quality and spatial design. The traditional church was rated higher on sacramental design features, including paintings, statues, stained-glass windows, and tabernacle placement and also on its ability to evoke deeper spiritual and mystical aspects of the faith. The few studies cited here point to the potential benefits of studying houses of worship as environmental settings.

The general goal of the research reported here was to study affective reactions to houses of worship as buildings. We focused on two such reactions. First, to fill the void on preferences for houses of worship, we obtained preference ratings. Second, to explore the connection between houses of worship and perceived restoration, we obtained ratings of tranquility. Tranquility refers to the perception of a setting as a quiet, peaceful place and a good place to get away from the demands of everyday life. According to attention restoration theory (ART), such settings should enable psychological restoration. Tranquility has been distinguished empirically from preference and used successfully as a predictor variable in several studies (Herzog & Barnes, 1999; Herzog & Bosley, 1992; Herzog & Chernick, 2000).

Preference

Our approach to predicting preferences for houses of worship was guided by existing theory and research on predicting preferences for urban buildings in general. Two themes seem prominent in that literature, informational predictors and content. The first emphasizes the role of predictors such as those in the Kaplans' preference matrix (R. Kaplan & Kaplan, 1989; S. Kaplan & Kaplan, 1982). Based on an evolutionary and functional analysis of human spatial needs, the Kaplans proposed four predictors of environmental preference:

coherence (how well organized the immediate scene is), *legibility* (how well the arrangement of the environment supports way finding and the building of a useful cognitive map), *complexity* (how much is going on in the immediate scene), and *mystery* (how much the environment encourages one to enter more deeply into the setting with the promise that one could gain interesting new information). Coherence and legibility satisfy the basic need for understanding, whereas complexity and mystery provide opportunities for exploration. Several studies in which the settings consisted primarily of urban buildings have supported the utility of the preference-matrix predictors (e.g., Day, 1992; Herzog, 1992; Herzog, Kaplan, & Kaplan, 1976, 1982; Nasar, 1983; Stamps, 1991, 1994; Widmar, 1984).

A preference predictor for buildings with a complicated history is perceived building age. There is general agreement that building age is relevant but unresolved controversy about the direction of the prediction (Frewald, 1989; Herzog & Gale, 1996; Herzog & Shier, 2000). The role of perceived age is likely to be context dependent and obscured by covariation with perceived building care. Frewald (1989) showed that older buildings were rated higher in preference than modern buildings matched for building care. The older buildings were also rated higher on physical features contributing to visual richness (similar to complexity), legibility (distinctiveness), and mystery (opportunity for exploration, promise of further information). Herzog and Shier (2000) found that perceived building age interacted with complexity (a composite of visual richness and several other indicators of facade ornateness or decoration) in predicting preference. Complexity was positively related to preference at all values of perceived age, but the relation was stronger for older buildings. We conclude that both the perceived age of buildings and the preference-matrix predictors seem to be relevant but how they work together in accounting for preferences remains unclear. Furthermore, the extent to which any previous findings may apply to predicting preferences for houses of worship is yet to be determined.

A second prominent theme in the environmental preference literature concerns the role of content. Content usually matters in accounting for preference and has typically been empirically defined by factor analysis of preference ratings, resulting in perceptual categories of settings. This approach has been dubbed Category Identifying Methodology (CIM; R. Kaplan & Kaplan, 1989, chap. 2 and 3). Average ratings on preference and other rated variables can then be compared across content categories to assess the role of categories. When this approach has been used with built environments, age and type of architecture have often emerged as bases for categorization, and categories have typically differed in average preference in ways that were insightful.

We sought to explore the influence of informational predictors and content categories on preferences for houses of worship by obtaining ratings for a large sample of houses of worship. Using separate groups of raters, we obtained ratings of preference, visual richness, perceived age, and perceived building care. We expected that preferences for houses of worship would be positively related to both visual richness and perceived building care. Based on Herzog and Shier (2000), we also thought that perceived building age would be involved in predicting preference. However, to see clearly the nature of the age-preference association would require controlling for perceived building care. We expected that CIM analysis would yield consistent categories across our stimulus sets and that perceived age and type of architecture would be involved in defining those categories. We also expected differences in mean ratings across categories for some of the variables. Specifically, categories composed of older houses of worship with traditional architecture should be higher in visual richness, a valued attribute, and thus also higher in preference. Finally, we suspected that the pattern of relationships between the predictors and preference might differ in interesting ways across the categories.

Tranquility

As translated into a rating variable by Herzog and colleagues (Herzog & Barnes, 1999; Herzog & Bosley, 1992), tranquility involves two related judgments. First, is a setting a quiet and peaceful place? Second, is it a good place to get away from the demands of everyday life? The first question asks whether a certain cluster of feelings (calmness, serenity, and peace) is evoked by a setting. As an affective descriptor, Russell and colleagues (Russell & Snodgrass, 1987; Russell, Ward, & Pratt, 1981) have shown that tranquility and its synonyms are relatively independent of an excitement cluster of descriptors and positively related to a pleasantness cluster. Likewise, the studies by Herzog and colleagues (Herzog & Barnes, 1999; Herzog & Bosley, 1992) have shown that tranquility is positively related to, but distinct from, preference reactions. The second question asks for a cognitive judgment about whether the setting is a good place to get away from life's demands. That aspect of tranquility was inspired by ART.

ART (R. Kaplan & Kaplan, 1989; S. Kaplan, 1995, 2001) holds that directed attention, the kind that requires an effort, can become fatigued from prolonged use, leading to the inability to focus attention voluntarily. Directed attention fatigue (known colloquially as mental fatigue) has several unfortunate consequences, including performance errors, inability to plan, social incivility, and irritability. Restoration of directed attention capacity requires a

setting that is different from the ones that led to fatigue (being away), has sufficient scope and organization to occupy one's mind (extent), holds attention without requiring an effort (fascination), and supports one's inclinations or purposes (compatibility). All four of these properties are essential for a successful restorative experience. ART notes that ordinary natural settings have all of the features necessary for a restorative experience. The restorative merits of natural settings, as compared with urban settings, have been verified in a plethora of studies involving self-report and behavioral measures (e.g., Berman, Jonides, & Kaplan, 2008; Berto, 2005; Canin, 1992; Cimprich, 1993, 1999; Felsten, 2009; Hartig, Evans, Jamner, Davis, & Garling, 2003; Hartig, Mang, & Evans, 1991; R. Kaplan, 2001; Kuo, 2001; Kuo & Sullivan, 2001; Taylor, Kuo, & Sullivan, 2001, 2002; Tennessen & Cimprich, 1995; Wells, 2000). In addition, Berto, Baroni, Zainaghi, and Bettella (2010) have recently used a behavioral measure to show that fascination contributes to restoration independent of nature content.

S. Kaplan (1995) distinguished between hard and soft fascination. Hard fascination is very intense, riveting one's attention and leaving little room for thinking things over. By contrast, soft fascination is of moderate intensity, enough to hold attention while still leaving room for reflection. Settings with soft fascination also include an aesthetic component, which can help offset any discomfort that may accompany reflection. Both types of fascination can permit fatigued directed attention to rest, but settings with soft fascination enable the additional benefit of the opportunity for reflection. Herzog, Black, Fountaine, and Knotts (1997) provided empirical support for the distinction between recovery of directed attention and reflection as separate benefits. Herzog and Barnes (1999) view tranquility as a term that describes the affective reaction evoked by soft fascination. The definition of tranquility suggests that it may also involve the restorative requirement of being away. As such, tranquility can be seen as an indicator of the perceived potential of a setting to provide a broad array of restorative benefits.

To explore these ideas involving tranquility and restorative benefits, we also obtained ratings of tranquility, perceived likelihood of recovery, and perceived likelihood of reflection for our settings. Again we used separate groups of raters for each variable. The questions we asked of the data and our expectations are best thought of as inspired by ART but not a direct test of the theory because raters provided self-reported perceptions. A direct test would require behavioral measures of the key variables.

We expected that rated tranquility would be positively correlated with both recovery and reflection and that recovery and reflection would be positively correlated with each other. Given the analysis described above, these

expectations flow directly from ART. We had no firm basis for expecting differences across content categories in tranquility or its benefits. When services are not in session, houses of worship of any age or architectural style should provide equal opportunity for peace and quiet, recovery from mental fatigue, and reflection.

Preference and Tranquility

From the earlier research of Herzog and colleagues (Herzog & Barnes, 1999; Herzog & Bosley, 1992), we anticipated that preference and tranquility would be positively correlated but not excessively so. They should be distinct constructs. For the same reason, we also expected that the pattern of relationships with the other rated variables would differ somewhat for preference and tranquility.

Method

Participants

The sample of raters consisted of 1,230 undergraduate students (303 men, 920 women, and 7 raters who failed to report their gender) at a university in the midwestern United States. Aside from gender, no demographic information about the raters was obtained. However, when we surveyed the same population a few years ago, religious affiliations were reported as Protestant (34%), Catholic (32%), other (31%), and Jewish, Islam, Eastern, or none (3%). Participation fulfilled a course requirement for introductory psychology. A total of 55 sessions were run, with the number of self-selected participants per session ranging from 10 to 31.

Stimuli

The settings consisted of three sets of 60 color images of building exteriors. Within each set, half of the images were of houses of worship and the other half were of other urban buildings. Our interest and our analyses focused on the houses of worship. The other buildings consisted of a great variety of types and functions, but we avoided residences, factories, and buildings where signage or other indicators made the function of the building clear. This is in contrast to the houses of worship where we relied on indicators like steeples, crosses, signs, stained-glass windows, and the generally sacred design of the

building to make its function crystal clear. The denominations represented were almost exclusively Christian (we could not be certain about a small number of the houses of worship), and none represented a local congregation. The only constraint on the sampling of settings was that we attempted to have half of each building type consist of older buildings and half of modern buildings, according to our judgment. The settings were randomly sampled from four large pools of images corresponding to older and modern churches and nonchurches. The goal was to have 15 of each building type and apparent building age within each stimulus set. Otherwise, the buildings varied naturally on our predictor variables like visual richness and apparent building care and on other design features. None of the images contained people. The images were presented as PowerPoint slides on a screen in an ordinary classroom. All images were photographed in good weather and were horizontally oriented. Figures 1 to 4 provide examples of the houses of worship.

We constructed two presentation orders for each stimulus set. The first was a random ordering of the 60 images with the constraint that there could be no more than three nor less than two settings from each building category within each successive group of 10 images. The second presentation order was derived by interchanging the halves of the first randomly ordered stimulus set.

Procedure

All participants in each session rated each of the 60 settings on only one of the seven measured variables. All ratings used a 7-point Likert-type scale. For all variables except recovery and reflection, the scale ranged from A (*very high* [highest possible rating]) to G (*none at all* [lowest possible rating]). For recovery and reflection, the scale ranged from A (*an excellent setting* [highest possible rating]) to G (*a terrible setting* [lowest possible rating]). The letters A through G were later converted to the numbers 7 through 1, respectively, for analysis. The variable definitions provided to raters are given in Table 1. For all variables except recovery and reflection, participants were asked to rate each setting on the named variable using the scale defined above. For recovery and reflection, participants were asked to rate each setting on how good a place it would be to accomplish the goal that had been specified for them in the brief scenario they had just read, using the defined scale. The definition for preference is standard in the environmental preference literature. The definition for tranquility was borrowed from Herzog and Barnes (1999). The definitions for age, visual richness, and building care were borrowed from

Figure 1. Examples of houses of worship in the contemporary architecture category.

Figure 2. Examples of houses of worship in the traditional architecture category.

Figure 3. Examples of houses of worship in the unusual architecture category.

Figure 4. Examples of houses of worship in the old red brick churches category.

Table 1. Definitions of Rating Variables Used in This Study.

Preference—How much do you like the setting? This is your own personal degree of liking for the setting as a setting, NOT as a picture. You do not have to worry about whether you are right or wrong or whether you agree with anybody else.
Tranquility—How much do you think that this setting is a quiet and peaceful place as well as a good place to get away from the demands of everyday life?
Age—How old does the building appear to be? Remember, you are rating for OLDNESS. OLD buildings get a HIGH rating; NEW buildings get a LOW rating.
Visual richness—How much variety does this building have? That is, how much is there to look at?
Building care—How well cared for does the building seem to be? Is it in good condition?
Recovery—You have just spent your day performing dull attention-demanding tasks that required intense concentration. You have lost your ability to concentrate and focus your attention because of performing these tasks. You feel it is important to regain your ability to concentrate. Regaining your ability to concentrate and focus your attention is your goal.
Reflection—You have just finished breakfast and have only one thing on your agenda for the day. You have some very serious personal problems that you need to think about. You have set aside your entire day to think about these problems. Thinking deeply about these problems is your goal.

Herzog and Shier (2000). The brief scenarios for recovery and reflection were borrowed from Herzog et al. (1997).

Sessions proceeded as follows. After explaining the task and obtaining informed consent, the first 10 slides were shown briefly (5 s per slide) without being rated to familiarize participants with the range of settings to be encountered. Then participants rated 60 settings, presented in two blocks of 30 settings each, with a 2-min rest between blocks. Viewing time was 15 s per slide in all sessions. Each session used one of the three stimulus sets and one of the two presentation orders. Each combination of stimulus set and presentation order was used 3 times with preference and 1 time with the other six rating variables. In total, that made for 54 sessions, which were run in a random order. Afterward, an extra session was run with preference and one of the stimulus sets to get the total number of raters for that combination in the range where we wanted it. Larger sample sizes were obtained for preference to enable factor analysis of the preference ratings. Final sample sizes for the three stimulus sets ranged from 126 to 148 for preference, from 42 to 52 for tranquility, from 45 to 50 for age, from 47 to 50 for visual richness, from 39 to 49 for building care, from 33 to 46 for recovery, and from 41 to 50 for reflection.

Results

Except where noted, analyses were based on settings as the units of analysis and setting scores as raw scores. A setting score is the mean score for each setting based on all participants who provided ratings for a given variable. Thus, for each rated variable, every setting had a setting score. Only the setting scores for the houses of worship were used in the analyses. Internal-consistency reliability coefficients (Cronbach's α), based on settings as cases and participants as items, were computed for each rating variable within each stimulus set. All of the reliability coefficients exceeded .80 except for one of the coefficients for recovery ($\alpha = .44$) and one for reflection ($\alpha = .79$). We have no explanation for the one very low reliability coefficient. Unless noted, alpha for significance testing was set at .001 to avoid Type I errors.

Content Categories

We performed factor analysis on the preference ratings (principal-axis factoring and varimax rotation), separately for each stimulus set, to discover the content categories embedded in the ratings. The factor solutions accounted for from 43% to 52% of the variance in the preference ratings. Given the random assignment of settings to the stimulus sets, it should come as no surprise that, with one exception, factor analysis yielded parallel factor structures for the three stimulus sets. Sample images of pure loaders (settings with rotated factor loadings of at least $|\cdot40|$ on one factor only) for each of the four factors are in Figures 1 to 4. For each stimulus set, the pure loaders on the first factor (from 9-11 settings, a total of 29 across the three stimulus sets) consisted of contemporary houses of worship devoid of striking architectural features. We named this category "contemporary architecture." Pure loaders on the second factor (from 7-11 settings, a total of 26) consisted of traditional-style houses of worship, and the vast majority shared at least one of two features: a gray or cobbled-stone exterior. We named this category "traditional architecture." Pure loaders on the third factor (from 3-4 settings, a total of 11) consisted of houses of worship sporting a modernistic design and strikingly unusual architecture. We named this category "unusual architecture." The fourth factor appeared only in the factor analysis of one of the stimulus sets. It had five pure loaders, all traditional houses of worship sharing one conspicuous feature, a red brick exterior. We named this category "old red brick churches." After verifying that stimulus set and content category did not interact and that there was no main effect of stimulus set on the setting

Table 2. Descriptive Statistics for Each Rating Variable in Each Content Category.

Rating variable	Content category			
	Contemporary architecture	Traditional architecture	Unusual architecture	Old red brick churches
Preference				
<i>M</i>	3.54	4.73	4.64	4.78
<i>SD</i>	0.42	0.60	0.71	0.59
Tranquility				
<i>M</i>	4.67	5.06	4.77	4.89
<i>SD</i>	0.35	0.48	0.36	0.49
Age				
<i>M</i>	3.80	5.63	3.32	4.59
<i>SD</i>	0.56	0.55	0.72	0.27
Visual richness				
<i>M</i>	3.43	5.08	5.45	5.54
<i>SD</i>	0.59	0.81	0.65	0.65
Building care				
<i>M</i>	4.83	4.29	5.16	5.38
<i>SD</i>	0.55	0.81	0.74	0.47
Recovery				
<i>M</i>	3.99	4.34	4.56	4.33
<i>SD</i>	0.30	0.40	0.33	0.44
Reflection				
<i>M</i>	4.05	4.48	4.28	4.25
<i>SD</i>	0.55	0.81	0.74	0.47

Note: $n = 29, 26, 11$, and 5 settings for the contemporary architecture, traditional architecture, unusual architecture, and old red brick churches categories, respectively.

scores for any of the rated variables, we elected to combine pure loaders across all three stimulus sets in further analyses.

Preference

Table 2 presents descriptive statistics for all rated variables as a function of content category. The effect of category was significant ($p < .001$) for all variables except tranquility. Post hoc tests (Tukey's honestly significant difference, $\alpha = .05$) revealed that for preference and visual richness, the contemporary category was rated lower than the other three categories, which were equal. For age, the contemporary and unusual architecture categories were equal and

Table 3. Correlations Among Rating Variables for the Contemporary Architecture (Above Diagonal, $n = 29$ Settings) and Traditional Architecture (Below Diagonal, $n = 26$ Settings) Categories.

	1	2	3	4	5	6	7
1. Preference	—	.75**	-.43	.76**	.55*	.86**	.74**
2. Tranquility	.22	—	-.49*	.38	.61**	.64**	.76**
3. Age	.47	.08	—	-.03	-.72**	-.40	-.34
4. Visual richness	.86**	-.19	.55*	—	.15	.66**	.40
5. Building care	.59*	.04	-.21	.53*	—	.49*	.59*
6. Recovery	.63*	.41	.10	.42	.64*	—	.59*
7. Reflection	.45	.77**	.07	.12	.41	.71**	—

* $p < .01$. ** $p < .001$.

rated lower than the old red brick category. The old red brick category was rated lower than the traditional category. For building care, the traditional category was rated lower than the unusual architecture and old red brick categories. The results for age confirm our impressions in naming the categories. The results for the other three variables demonstrate that houses of worship with either traditional or unusual architecture are preferred to those with contemporary designs. This appears to be due at least in part to their higher visual richness, and for traditional houses of worship, despite being rated lower in building care.

Table 3 presents correlations among all rated variables within the two largest content categories, contemporary and traditional architecture. Given the small numbers of settings involved (29 and 26), we have flagged correlations for significance at both the .01 and .001 levels. These results show that preference was positively correlated with both visual richness and building care within both categories. A striking difference between the categories occurred for the correlation between preference and age. Although neither correlation was significant, the simple correlations suggested a negative correlation in the contemporary category and a positive one in the traditional category. However, a more realistic view is obtained by controlling statistically for building care, which was negatively correlated with age (significant only in the contemporary category). When that was done, the partial correlations between age and preference were $-.05$ in the contemporary category and $.75$ in the traditional category. There is still a striking difference but after controlling for building care, age mattered only in the traditional category where older buildings were higher in preference. Among the predictor variables, there was a significant negative correlation between age and building care only in the

contemporary category. In contrast, visual richness was positively correlated with both age and building care only in the traditional category.

Tranquility

The mean ratings in Table 2 show relatively restricted ranges across the content categories for tranquility, recovery, and reflection. Only the means for recovery and reflection differed significantly across the categories. However, the Tukey test revealed no differences among the category means for reflection, and only the two extreme means differed for recovery. The trends for all three variables suggest that there might be a slight advantage in perceived prospects for restoration in traditional houses of worship as compared with contemporary ones, but in general, there is very little difference across content categories.

The correlations in Table 3 show that in the contemporary category, tranquility was negatively correlated with age and positively correlated with building care and both restorative benefits. The restorative benefits were also positively correlated with each other. In the traditional category, the only significant correlation involving tranquility was its positive correlation with reflection. Again, the restorative benefits were positively correlated with each other. As we saw earlier, it is always wise to control for building care when examining correlations between age and an affective reaction to environmental settings. In this instance, the partial correlations between age and tranquility were $-.08$ in the contemporary category and $.09$ in the traditional category. A reasonable inference is that except for building care in the contemporary category, perceived prospects for restoration are not strongly associated with the predictor variables in this study.

Preference and Tranquility

As indicated in Table 3, preference and tranquility were positively correlated with each other but the correlation was significant only in the contemporary category. These correlations confirmed our view that the two variables represent similar but distinct constructs. A number of other lines of evidence point to the same conclusion. For example, visual richness was strongly correlated with preference but not with tranquility (Table 3). Mean preference ratings differed across categories, but mean tranquility ratings did not (Table 2). Finally, the mean ratings over all content categories were 4.24 and 4.85 for preference and tranquility, respectively, and the difference was significant. This last distinction between the two constructs also demonstrated that perceived potential for restoration exceeded preference for houses of worship.

Discussion

Our goal was to explore preference and tranquility for houses of worship. Based on theoretical analyses of the two affective reactions, we sought to show that in the context of houses of worship, they can be distinguished empirically. This should be reflected in positive, but not excessive, correlations between the two rated variables, in different patterns of relations with rated predictor variables, and in different mean ratings across empirically derived content categories. Bearing in mind that our results are necessarily limited to exterior views of houses of worship and to college-age raters (other limitations are discussed below), what have we learned?

Preference

Among the rated variables we examined, the single strongest predictor of preference for houses of worship was visual richness. Its correlation with preference was strong and positive within both of the largest content categories. Furthermore, the differences in preference across content categories were exactly mirrored by similar differences in visual richness. Some of the covariation between the two variables might be attributed to the implicit value judgments in the variable names. Richness carries a positive connotation and so does preference. However, even after adjusting for that possibility, it makes sense that liking for isolated objects such as buildings would depend on the amount of information they provide to occupy and stimulate the observer's mind. Theoretically, visual richness is akin to complexity in the Kaplans' preference matrix, and in that account, complexity serves the informational need of involvement or exploration by providing the mind with a sufficient amount and variety of input to keep it occupied. When considering an entire setting, other variables like mystery and legibility may blunt the role of complexity, but when considering objects such as individual buildings, complexity may well play a more prominent role in determining preferences than some of the other preference predictors. The practical implication of the results for visual richness seems obvious. If a favorable reaction from users is a goal of building design, then finding a way to include visual richness that is compatible with other design criteria is recommended.

A second strong predictor of preference for houses of worship was content category, as determined by factor analysis of preference ratings. As in past studies of other built environments, the categories of this study were defined by a combination of perceived age and architectural style. In this study, age and unusual architecture were enough to raise the average preference for houses of worship by over one full point, as compared with contemporary buildings

with minimal ornamentation. As noted above, one problem with the contemporary category is a relative lack of visual richness. What could be done to address this issue? One approach is to go avant-garde and strive for a bold idiosyncratic architectural statement. However, caution should be exercised because people can become desensitized to frequent novelty. The challenge for designers is to introduce visual richness in a way that retains the contemporary character of the category.

Age and building care also contributed modestly but positively to preferences for houses of worship. Perceived age, although prominently involved in defining content categories, plays a more subtle role in accounting for preference. As in past studies, its influence must be disentangled from that of building care. In this study, after controlling for building care, age had a strong positive partial correlation with preference in the traditional category and no partial correlation with preference in the contemporary category. It would appear that age matters for traditional houses of worship and its influence is positive. Taken together with the fact that both content categories consisting of older houses of worship were rated higher in preference than the contemporary category, it appears that age can be a valued attribute of houses of worship. These findings have implications for preserving older houses of worship.

When we examine the broader question of the prediction of preferences for urban buildings, we see some convergence of results across studies as well as some issues that remain unresolved. Our study agrees with Herzog and Shier (2000) in showing that visual richness and perceived building care are positive predictors of preferences for buildings. The two predictors may interact with other predictors, but the nature of the interaction is to vary the strength of the positive relationship, not to eliminate or reverse it. Thus, the positive role of these two predictors probably has broad generality. However, perceived age has produced mixed results in both its simple and partial relations with preference (e.g., Herzog, 1989, 1992; Herzog & Gale, 1996; Herzog & Shier, 2000; Stamps, 1991, 1994; Widmar, 1984). Although building age has consistently played a role in defining perceptual categories, its role as a predictor of preference has been limited and seems to vary with the context. One consistent finding about perceived age is that it tends to be negatively correlated with building care. Thus, to get a clear reading on how age relates to preference, it is necessary to control for building care.

Tranquility

Tranquility had only one significant correlation with a predictor, building care, and only within the contemporary category. Tranquility was unrelated to

content category. We know of only one other study that examined predictors of tranquility for urban settings. Herzog and Chernick (2000) found a modest positive relationship between tranquility and setting care, just as we did. From existent research, we can say very little about what might predict the perception of tranquility in urban settings. It is an area that is ripe for study. On a more optimistic note, we found positive correlations between tranquility and two purported benefits of a restorative experience, perceived potential for recovery from fatigued directed attention and for reflection. These correlations are in agreement with expectations based on ART.

There is a hint in our findings of a possible distinction between the restorative benefits of recovery and reflection that may be worth following up in future research. Tranquility was more strongly correlated with reflection than with recovery in both of the two largest content categories (Table 3), with the difference especially pronounced in the traditional category. Just the opposite was true for preference. It had a stronger correlation with recovery than with reflection. This makes sense if we consider that reflection is an inward process that may not be as dependent on the exterior environment; recovery, by contrast, is more stimulus dependent and as such more closely tied to preference.

Preference and Tranquility

Our study agrees with two previous studies (Herzog & Barnes, 1999; Herzog & Bosley, 1992) in showing that preference and tranquility are positively related to each other but not so much as to question their distinctness as constructs. In our study, the positive relationship between preference and tranquility also varied across content categories. It was stronger in the contemporary category than in the traditional category. Preference and tranquility also tend to have a somewhat different pattern of relationships with predictor variables. For houses of worship, the most notable difference is that visual richness is more strongly related to preference than to tranquility. Although visual richness may make a modest contribution, houses of worship probably rely far more on other features to achieve a sense of tranquility. Two likely candidates, consistent with ART, are the fact that houses of worship are different from the settings that cause mental fatigue (being away) and that they are quiet places. Other building categories, such as museums, which have these features, have also been shown to be restorative (S. Kaplan, Bardwell, & Slakter, 1993). The distinction between preference and tranquility agrees with the typology of Russell and Snodgrass (Russell & Snodgrass, 1987; Russell, et al., 1981) and with the implicit prediction from ART that restoration is not the same thing as preference, although the two constructs are related.

Houses of worship were rated higher in tranquility than in preference. Add the fact that rated tranquility did not vary across content categories, and it seems that houses of worship are seen as generally good places for achieving tranquility. This agrees with other recent results for spiritual settings (Herzog, et al., 2010; Manning, et al., 2009; Ouellette, et al., 2005), and it adds to the growing evidence that such settings are good places for restorative experiences.

Strengths and Limitations

Our sample of settings, although not random, was likely to be representative because it was so broad (90 houses of worship) and was randomly selected from a larger pool of images. The large setting sample afforded us good statistical power even though we used settings as the units of analysis. This state of affairs was made possible by having each rater respond to a randomly selected subset of one third of the settings. By combining the setting scores across the three stimulus sets (after verifying that the stimulus sets made no difference in the results), we were assuming that it should not matter who rates a setting as long as the sample of raters is unbiased. That is likely because raters volunteered for sessions devoted to a single rating variable, the rating variables were randomly assigned to the sessions, and the raters did not know the rating variables prior to the sessions. As raters are limited in the number of settings they can react to before fatigue sets in or excessive time commitment discourages participation, the number of settings in a study is limited if one insists that all raters react to all settings. Provided the assumptions are met, the subset maneuver allows researchers to overcome these limitations. The cost is that one has to run x times as many sessions, where x is the number of stimulus subsets. If raters and time to complete a study are both plentiful, this strategy buys statistical power and aids in achieving setting sample representativeness while keeping the task reasonable for each rater.

The study had a number of potential limitations. First, our raters were college students and primarily female. Results from such a sample of raters might not generalize to other age and gender groups (Balling & Falk, 1982; Herzog, Herbert, Kaplan, & Crooks, 2000; Zube, Pitt, & Evans, 1983). However, a meta-analysis by Stamps (1999) suggests that results from college students may generalize to the general population. Second, use of color images to represent environmental settings may raise concerns (e.g., Heft & Nasar, 2000; Scott & Canter, 1997), but the validity of this approach for aggregate results and static visual attributes of environments is supported (e.g., Hershberger & Cass, 1973; Hull & Stewart, 1992; Stamps, 1990; Zube, Simcox, & Law, 1987). Third, our use of tranquility as a rough substitute for perceived restorative

potential might be questioned. In defense, tranquility does directly ask about the perception of some key requirements or aspects of restoration (peace and quiet, being away), and it does have a track record in previous research. As already noted, our results cannot be generalized beyond exterior views of houses of worship. Likewise, we cannot know the effect of interspersing other urban buildings in our stimulus sets. However, our results do seem similar to those in many other studies of environmental preference, which did not include this methodological feature. Finally, it is not clear whether our results generalize to non-Christian houses of worship. In all of these cases, further research is needed to determine the generality of findings.

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