Exploring the Nature of Space for Human Behavior in Ordinary Structured Environments

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EXPLORING THE NATURE OF SPACE FOR HUMAN BEHAVIOR

IN ORDINARY STRUCTURED ENVIRONMENTS

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What is the nature of the built environment? Built environments are the settings within which people carry out activities and emerge from the specific combining of spatial conditions with specific social content for the setting. The social content and the spatial conditions form a core-defining relationship that serves to distinguish one structured setting from another. A core-defining relationship such as this refers to the essence of the built environment. What are the implications for human behavior that emerge from conceptualizing built environments in this manner? I argue that space, through its essential relationship with the contexts of daily living (i.e. social content), qualifies, or transforms how environmental information of those conditions appear. In order to interpret and recognize inherent meaning within those spatial conditions, people rely on a shared set of cultural norms and expectations concerning the built environment. Should the relationship between the social content of a setting and the spatial conditions that structure a setting be disrupted or misunderstood, users of the setting will have difficulty interpreting and carrying out their intended activities. To test this assumption, the case study assessed participants' evaluations of images of ordinary settings in two presentations, first where the spatial conditions remained unaltered and second where the

spatial conditions were disrupted in a random non-meaningful manner. A content analysis was employed to generalize participant narratives and provide necessary data to perform a two-factor analysis that assessed the potential for groupings among participants' evaluation of the images. Results of the study suggest that people rely on spatial conditions for interpreting built environments in their consideration for the potential to carryout activities and social engagements. When spatial conditions are lacking or meaningless, participants express frustration and confusion and are unable to articulate how they might engage in social activity within the image. Further, the study illustrates that the social-spatial core relationship is a necessary component in the environmental knowing process for built environments.

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CHAPTER 1: EXPLORING THE NATURE OF BUILT ENVIRONMENTS AND IMPLICATIONS FOR PERSON-ENVIRONMENT-BEHAVIOR RESEARCH

What does it mean to study people, their behavior, and environments? Ittelson (1973, p. 18) notes, "Man is never encountered independent of the situation through which he acts, nor is the environment ever encountered independent of the encountering individual." In a foundational study on environmental perception, Ittelson provides a fundamental postulate of the transactional perspective to human-environmental relations. He notes:

> It is meaningless to speak of either as existing apart from the situation in which it is encountered. The word 'transaction' has been used to label such a situation, for the word carries a double implication: one, all parts of the situation enter into it as active participants; and two, these parts owe their very existence as encountered in a situation to such active participation—they do not appear as already existing entities which merely interact with each other without affecting their own identity. (1973, p.18)

For Ittelson, to understand this relation requires that we study in equal parts people, their perceptions, intentions, and purposes, as well as the physical settings in which they transact. As Ittelson notes above, the word transact is intentionally selected to describe the relation observed between people and environments because transaction more clearly exemplifies the nature of person-environment-behavior (PEB) relations where there is an action or activity that involves both the person and the setting reciprocally influencing each other. Over the past three decades, researchers who focus on PEB relations conclude that they cannot simply assess people or the environment (Altman, 1974;. Bechtel &

Churchman, 2002; Wapner et al., 2000). Rather, PEB research must apply equal consideration to human behavior and the settings they transact with on a daily basis.

PEB researchers seek to understand the complexities and interactions across a full spectrum of human behaviors and associated settings. PEB researchers rely on the long theoretical traditions born out of social psychology, the cognitive sciences, behavioral geography, environmental psychology, and the design sciences. Early within the field of social psychology, Kurt Lewin (1947) observes, in his paper "Behavior as a Function of the Total Situation," that relations between behavior and environments are observable and analyzable. He argues that we must devise a scientific method that "should be analytical in that the different factors which influence behavior have to be specifically distinguished" (1951, p. 240). He continues:

> In science, these data have also to be represented in their particular setting within the specific situation. A totality of coexisting facts, which are conceived of as mutually interdependent, is called a field. Psychology has to view the life space, including the person and his environment as one field. (1951, p. 240)

For Lewin, field theory provided a framework that linked behavior to a larger context of the social and environmental situation.

In this introductory chapter, I highlight key conceptual topics that provide the foundation to assess the nature of the built environment. I fully explore each of the topics introduced in this chapter throughout the remaining chapters of the dissertation. Through the arguments articulated in the dissertation, it should become clear that the social and the environmental situations are inextricable from one another. The implications from the

research and the case study strongly suggest that people rely on a social-spatial core relation that is central for the environmental knowing process. The research in this dissertation relies on environmental knowing and transactionalism models of cognition to explore the nature of built environments. Models of PEB relations from environmental knowing and cognitive perspectives permit us to evaluate individual perception, cognition, and actions with regard to built environments and in turn expand our understanding of PEB relations. Guided by these frameworks, I explore the role of space in the structuring of built environments and the implications for human behavior through logical arguments discussed in Chapters 2 and 3. I follow these discussions with an empirical assessment where I focus on whether and how people make use of the presence of spatial conditions in their evaluation of ordinary built environments. Chapters 4 and 5 provide an in-depth discussion of the design of the experiment and the results. But first, what is the nature of a built environment?

Nature of the Built Environment

People engage in a series of interrelated and routine activities that comprise their daily behavior. They perform these activities in structured settings with regularity and predictability (Barker & Wright, 1954). For example, we go to work, go to school, shop for groceries, get our hair cut, or take our children to daycare. We go to work or school using transportation systems and spend our workday in a work place that is different from where we go to purchase groceries or have a haircut. We do so routinely and without much thought or consideration of the association between our activity and the setting. But why is that the case?

The design of ordinary built environments relates purposefully to the use of such settings. Ordinary environments denote places, settings, or surroundings where individuals commonly carry out activities associated with day-to-day living. Ordinary built environments result from purposeful design where designers interweave social content with spatial conditions to produce a setting that is consistent with its desired function. The function of a setting is dependent upon its intended use and is a product of shared knowledge between members of a given social-cultural system (Rapoport, 1990a). Environmental design maintains a congruency between a setting's appearance and the observed or expected behaviors that occur within that setting. The functionality of a setting is a direct result of a designer's success in materializing environmental affordance in the construction of the built environment (Rapoport, 1990b).

Built environments have two facets, social and spatial, that when intertwined defines a particular setting and distinguishes it from all other categories of built environments (Amedeo et al., 2009). Built environments are physical locations where social processes occur. The meaning, purpose, and functions of a setting as well as the expectation of appropriate or inappropriate behaviors embody the social content of built environments. Spatial conditions, then, relate to the structure of built environments. Spatial conditions include the physical properties such as the location and positioning of objects that pertain to the arrangement, placement, and order within a setting. Spatial conditions of a setting provide the appearance of an environmental type and in effect, structure built environments. In this research, I am interested in understanding the relationship between the two facets of the built environment. For example, do people rely

on one aspect more than the other for environmental knowing; or, must we consider both the social and the spatial?

Inextricable Connections between Social Content and Spatial Conditions in Built Environments

Environmental designers produce distinctive environmental types by establishing a social-spatial core-relationship. Designers establish the relationship by selecting a design scheme that is consistent with the intended uses of the resulting setting. A structured built environment emerges from the systematic transformation of social content into spatial form that is recognizable to users of a setting. The environmental design process provides physical manifestation of the social context of a situation in the built environment because designers also share expectations about a setting that are consistent with the users of the setting (Moore et al., 1982).

In Chapter 2, I elaborate further and define the nature of the social-spatial core-relationship between social content and resulting spatial conditions that serve to define and differentiate a given setting from all other settings. Then in Chapter 3, I explain the necessity for environmental designers to recognize the social-spatial core-relationship when implementing the design process for the production of plausible and distinctive environmental conditions. I entertain such questions as, how do designers define a design scheme for a built environment, what type of information do designers share with users of a setting, and how does design contribute to our understanding of the nature of the built environment?

Environmental Distinctiveness: Relating Spatial Conditions with Social Content through Environmental Design

Each built environment consists of two facets that together distinguish one type from another. The social content of setting includes those aspects that relate to social norms, rules, shared expectations for social interaction, and engagement. Spatial conditions, then, refer to the physical properties of built environments such as the locations and positioning of objects and information. Environmental designers qualify or transform social content through their use of spatial conditions in the design of built environments (Nasar, 1998; Wohlwill, 1976). From a basic design perspective, distinctions among ordinary environments (such differences as those observed among a dentist's office, gas station, grocery store, elementary-level classroom, hair salon, or a bakery) would seem to depend on the nature of an environment's spatial makeup, its social content, and, in particular, the successful entwining of these two facets. People identify a setting because of the successful, or logical, relating of social content with spatial conditions through environmental design.

Effective environmental design must develop and maintain a social-spatial core-relationship defined by relating social content of a setting with meaningful spatial conditions. Each environmental type within a given social-cultural system exhibits its own unique social-spatial core-relationship, which exemplifies its distinctiveness to designers and users alike.

Through the environmental design process, designers schematically translate social and behavioral expectations through the development of spatial forms, which provide environmental cues that serve to prompt such behavioral expectations from users

of the setting (for example, see papers in Nasar, 1992). From the perspective of the designer, then, the distinctiveness of any environment would ultimately depend on the overall design scheme they choose. The scheme is unlikely to be random or unguided. More likely, a designer relies on his or her own experience along with shared knowledge of social and cultural norms when selecting a design scheme. The environmental design chosen must be consistent with the social practice of interactive behavior for that situation. For example, the design scheme selected for the construction of a kitchen must be consistent with the activities, such as preparing food, that are likely to occur in the kitchen. Additionally, the resulting environmental design must be recognizable by those who transact with the setting. The resulting scheme relates all social content spatially by positioning such information and provides a meaningful location and spatial relationship between items and content within the setting (Norman, 1988). The design scheme serves as a template in the environmental design of a built environment. This template constitutes a designer's cognitive representation for that setting. The scheme selected to achieve this can be, from the perspective of its image form, referred to as the designer's schema. Schemata are represented in the human mind and serve to organize related information (Mandler, 1984). Designers rely on environmental schemata for planning, configuring, and representing the social-spatial core relationship identified and developed for a particular setting. In Chapter 3, I elaborate on designers' abilities and the mechanisms they employ to produce distinctive environments and focus users' attention on affordance within the built environment.

Congruent Environmental Schemata for Environmental Design

Environmental distinctiveness must be apparent for users of a setting as well for designers. The process of environmental knowing relies on certain cognitive abilities to pick-up pertinent information from the built environment and integrates with other sources of information such as memory. The spatial conditions of a built environment provide patterned external information capable of evoking certain combinations of sensory and mental reactions useful for recognizing, identifying, and interpreting the built environment. People rely on cognitive templates or schemata developed during their prior experiences with built environments to organize the external and integrate with the internal sources of information in order to determine if the built environment affords the opportunity to carry out their intended activity.

Generally, we might observe that environmental design results because designers purposefully select a design scheme that highlights information about what is or is not afforded through the spatial conditions of the built environment. Environmental affordances, however, are only available should the design scheme successfully translate social content of the situation into spatial conditions of the setting (Zaff, 1995). Affordance in this sense is defined as the ability to carry out a particular activity. The resulting spatial conditions in a setting, therefore, serve to display, alert, cue, or prompt users' transactional possibilities within that setting. Users rely on their own environmental schemata to apprehend, process, and interpret external information from a setting (Neisser, 1976). A user develops his or her schema through prior experience in order to rationalize social content of a novel situation based upon how they have encountered such as spatial presentation before in the built environment. Should there be

no structural and contextual correspondences between a user's environmental schema and environmental design of a setting, integration of internal and external information sources would be superfluous or useless in the particular instance of the designer's intention and the user's purpose. In Chapter 3, I expand on environmental perception and cognition and people's construction, maintenance, and use of schemata for the environmental knowing process.

Experiment Examining Removal of Spatial Conditions from Built Environments

A mutual understanding between designers and users forms the foundation of the environmental design process. However, what happens when little or no congruence between a resulting environmental design and a user's schema exists? How might we explore the importance of spatial conditions for the coherence of built environments? What does this tell us about the plausibility of the social-spatial core-relationship?

Through an empirical assessment presented in Chapters 4 and 5, I explore the answers to these questions. I specifically am interested in knowing how people assess built environments, if at all, if we remove or disrupt spatial conditions in a setting. By simulating the removal of spatial conditions from a setting, I am in effect disentangling the social-spatial core-relationship observed in the built environment. In order to explore the effects of this disentanglement, I assess participant responses to images of three environments in their normal presentation. For example in Figure 1.1 the spatial conditions of the image appears as expected for a generic kitchen scene. I then assess participant responses to the environments where I intentionally disrupted the spatial

conditions (Figure 1.2). In Chapter 4, I elaborate further on the details of the research design and methodology for this empirical assessment.

Figure 1.1 Image of kitchen with preserved spatial conditions.
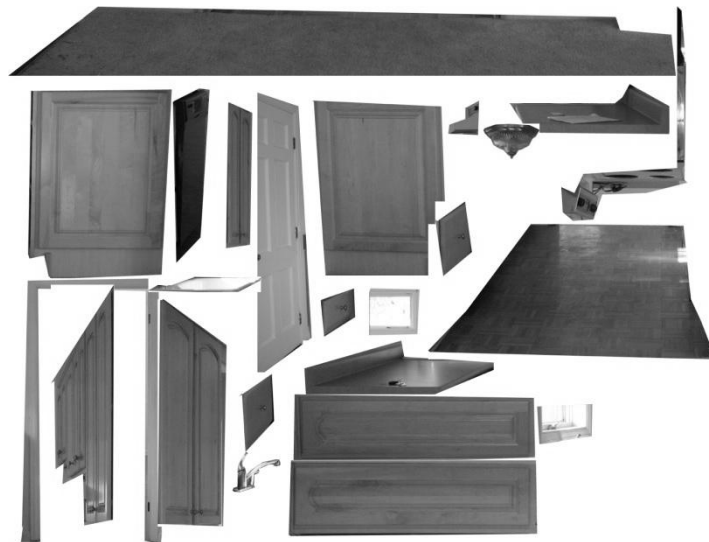
Figure 1.2 Image of kitchen with spatial conditions removed.

The narratives collected from participant interviews provide a robust dataset to explore the themes that I have outlined throughout the present chapter. These include the nature of built environments, the role of spatial conditions in environmental assessment, congruency in schemata and environmental design. My research illustrates that spatial

conditions are key components of the built environment that people routinely rely on for assessing their surroundings. Results from the principal component analysis performed identify structure within the narratives I collected, suggesting that people have and make use of environmental schemata to formulate opinions about the built environment. I explore these findings in more detail in Chapter 5.

Implications of this Research for Environmental Design and Person-Environment-Behavior Relations Research

The nature of built environments emerges from the systematic integration of social content with spatial conditions for a given setting. Any one environment is distinctive from all other settings because their coherence or logic is heavily dependent on the manner that spatial conditions structure social content for that setting (Amedeo et al., 2009). Disrupting the core relationship between social and spatial may lead to ambiguous interpretation of environmental conditions. For example, "removing" space from how it has been designed to code, structure, or relate the social content of a particular built environment would, in effect, eliminate structure from the built environment that is critically dependent on locations, positions, contiguities, proximities, arrangements, and configurations and ensure the collapse of the distinctiveness of the environmental structure in question.

Any segment of social content in a setting, then, occupies a relative position or location and is variously contiguous to other segments of that content. The designer determines the spacing and proximity of segments of social content in a setting based on the environmental scheme selected. "Removing" space from a built environment, then, eliminates those spatial parameters vital to the defining order inherent in and

characterizing the appearance and identity of that setting. The disruption in the social-spatial core relationship further suggests that the cuing or prompting associated with the way space typically functions in an environment is eliminated as well. The expectation, then, is that external information that users make use of for environmental recognition and for carrying out their activities, would not be accessible. The result, we may expect, would render unless at best the effectiveness of the environmental schema (internal information) they must utilize to assist them in environmental knowing or perception. Visual reception, at least, of that social-spatial order would be severely impaired because environmental affordance is not readily apparent. We can expect users to express confusion and perhaps frustration in their assessment of the array.

The research from this dissertation illustrates that designers at a minimum must:

1. Identify the social-spatial core-relationship of built environments;
2. Select design schemes that are consistent with the social-spatial core-relationship; and
3. Construct built environments that afford expected behaviors through proper translation of social content of a situation into the spatial conditions of that setting.

If designers do not adhere to the above principles of the environmental design process, they risk producing environmental designs that prompt confusion, disorder, and frustration among users of the built environment. In Chapter 6, I provide a more thorough discussion of the implications of the research for environmental design and for our understanding of PEB relations. I also detail limitations of the case study and make some recommendations for future research endeavors. To begin, I consider the nature of structure in the built environment.

CHAPTER 2: STRUCTURING THE BUILT ENVIRONMENT: RELATING SOCIAL CONTENT WITH SPATIAL CONDITIONS

As indicated, the broader intention in this dissertation is to explore the nature of built environments with regard to Person-Environment-Behavior (PEB) relations. This means that I am especially interested in understanding the complexities involved in environmental design and environmental recognition and their implications for human behavior in the built environment. I want to explore complexities by assessing how people conceptualize built environments. This chapter will investigate how PEB research has expanded our knowledge of what constitutes the built environment, what is involved in the development of the built environment, and what are the fundamental aspects of the built environment.

Conceptual Framework and Identifying the Unit(s) of Analysis

The research in this dissertation relies on cognition and transactionalism models of person-environment relations. Ittelson relates people to their settings within a transactional perspective; he indicates that "it is meaningless to speak of either as existing apart from the situation in which it is encountered. The word 'transaction' has been used to label such a situation" (1973, p. 18). Altman and Rogoff observe that people and their settings 'jointly define one another and contribute to the meaning and nature of a holistic event" (1987, p. 24). A transactional approach, then, takes the event or situation in its entirety as the unit of analysis (Ittelson, 1973; Ittelson et al., 1974).

How, then, does space enter this reasoning? The reasoning Ittelson proposes to treat the individual engaged in activity and the environment as the single focal point of that activity. Similarly, Neisser (1976) reflects on cognition and human transactions with

the built environment, suggesting that cognition theorists should "pay attention to the details of the real world which perceivers and thinkers live, and the fine structure of information which that world makes available to them" (p. 8).

Vischer (2008) in an attempt to build theory centered on the user's experience of the built environment argues: "the first postulate of a theory centered on users' experiences is that the built environment exists to support the activities of users that it shelters" (p. 234). Vischer suggests that to understand the built environment we must focus research efforts on understanding users' experience of the built environment. In order to accomplish such a task, we must agree on what is meant by users' experiences as well as how to define the built environment. She summarizes (p. 235) a user-centered approach by suggesting that the complexity of the "user-environment relation is dynamic and interactive" and "it is reciprocal." She continues:

> The user is not a passive receptacle experiencing the built environment statically, as input. The user moves her chair, closes the drapes, paints the walls, puts up signs, talks, and in fact can be seen as continually acting on her environment. Thus, the user's experience of the environment is itself transformed by the activities she is performing in that environment, in fact a continuing process of transformation. (p. 235)

However, Hillier (2008) cautions against an approach to the built environment that favors a simplistic social construction of spatial relations. For Hillier (2008, p. 217) the "designing and planning of the built environment is about adapting the physical and spatial surroundings for human purposes." He continues, adding:

> In practical terms, the usable outcomes are patterns of shaped and interlinked spaces intended to facilitate social aims. The translation of

social purposes into space then presupposes that something is known about how patterns of living and working can be affected, for good or ill, by the physical and spatial forms imposed on them. (p. 217)

Hillier argues that designers rarely seek to understand the implications such patterned spaces have for behavior. He argues that an approach is likely to begin by assessing the evidence for social processes in the resulting spatial conditions of the built environment (p. 218).

Proshansky (1976) suggests that the built environment results from the combined effects of spatial conditions and social contexts. He observes:

There is no physical setting that is not also a social and cultural setting. What this means, in effect, is that regardless of how focal we make the physical setting in studying the person's relationship to his or her environment, that setting has a social definition and purpose. Indeed its use, function, and consequences are as much a result of these definitions and purposes as they are of its actual physical properties—perhaps even more so. (p. 308)

Amedeo and colleagues (2009) note of the social-spatial relation in the built environment that:

Space is not *causal* in any direct sense of determining activity and experiencing, but exerts, instead, its generic influences through inextricable conjunctions it has with other important effects in environments ... the meaning of space to humans experiencing its effects in activity and experiential contexts does not depend directly on space's inherent properties but, rather, on individual personal and/or sociocultural translations of them. (p. 15)

They further conclude "to more fully understand human activities and experiences, it is necessary to observe them as they happen in and with respect to actual environments and to treat person, environment, and behavior as conceptually linked for such an analysis" (2009, p. 15).

The research in this dissertation recognizes the transaction perspective between people, both the designers and users, and the built environment. Its focus is in the design scale of ordinary built environments that people transact with on a daily basis.

Learning the Built Environment for Daily Living

Overwhelmingly commonplace activities that are necessary for daily functioning constitute our everyday living. We engage in such activities routinely in familiar settings whose purposeful design facilitates the task. Daily tasks may be characterized as a string of behaviors that constitute daily living such as personal hygiene, eating, drinking, dressing, housework, earning a living, managing personal finances, communicating, exercising, and caring for others. These activities are expected, necessary, and routine in our daily functioning. They involve a persistent preoccupation with daily functioning and rely on settings considered relevant to activity.

Psychological studies observe that humans develop from an early age the ability to learn associations between behavior and structured settings (Reed & Bril, 1995; Rovee-Collier & DuFault, 1991). Lewin (1951) reminds us that our world, however, is a function of ourselves and changes throughout our life course. He puts it this way:

> In general terms, behavior is a function of the person and of his environment … the state of the person and that of his environment are not independent of each other. How a child sees a given physical setting (for

instance, whether the frozen pond looks dangerous to him or not) depends upon the developmental state and the character of that child and upon his ideology. The worlds in which the newborn, the one-year-old child, and the ten-year-old child live are different even in identical physical or social surroundings. (p. 239)

Lewin concludes, "Behavior and development depend upon the state of the person and his environment" (p. 239). He states it in another way by suggesting:

To understand or predict behavior, the person and his environment have to be considered as one constellation of interdependent factors. We call the totality of these factors the life space of that individual. The life space, therefore, includes both the person and his psychological environment. (pp. 239–240)

The routine nature of daily living permits the development of learned behaviors that an individual can transfer to novel situations. Perkins and Salomon (1992) define transfer in this way: "Transfer of learning occurs when learning in one context or with one set of materials impacts on performance in another context or with other related materials" (p. 2).

Much of the assessment of transfer occurs in educational psychology and the education sciences, but, as a concept, transfer has important implications for understanding how people relate to the built environment as well. For example, in an experimental assessment Geusgens and colleagues (2010), building on the foundational work of Park et al. (1994), found that novel environmental situations had an effect on daily task performance in older adults. The authors asked adult participants to perform two daily tasks, making coffee and making a sandwich, in two different environments, their own kitchen and at the research institute. Participants in the study took more time to

complete the daily tasks and their scores for process ability, or the "the capacity to logically organize and adapt a series of actions over time to complete a task," were lower (Geusgens et al., 2010, p. 935). The authors conclude that their findings have important implications for those who seek to understand how older adults and disabled populations relate to their environments (see also Gitlin et al., 2002; Gitlin et al., 2010; White et al., 2010).

As they have long done, humans continue to construct and alter built environments in order to facilitate changes in daily living, resulting in an incredible variety of settings when you consider cross-cultural and trans-temporal examples. Archaeological research illustrates a differentiation of activities based on spatial patterning across cultures and throughout human history (Binford, 2001). Amos Rapoport (1994, p. 460) suggests that this patterning is a product of purposeful activity. While the enormous variability and variety as well as the particularities of any one setting in any one culture is of interest and value in specialized research, it is more fruitful, in order to better comprehend the nature of PEB relations, to examine the generic relationship between humans and their environments. For example, consider the role of space in environments and its implication for human activity and experience within ordinary environments for daily functioning. Many of our daily activities occur in structured environments that we transact with on a routine basis. However, what is the nature of that structure and how is it realized? Our routine encounter of settings establishes frames of reference from which we can build expectations about our surroundings. This suggests that the routine nature of our activities has a relationship to our surroundings. Daily living therefore occurs within the design scale or in "real space" and conceptualized, for this

dissertation, as the ordinary everyday built environment that people transact with routinely. Hillier (2008) for example, conceptualizes "real space" as "the shaped and linked spaces which people inhabit in an everyday sense" (p. 218).

Ordinary, or everyday structured settings, differ noticeably from the macro-level places such as the "Boehme" neighborhoods of Greenwich Village, Los Angeles, or Paris (Figure 2.1). That is to say, ordinary environments tend to be more highly focused around making a routine activity possible. For example, gas stations have a particular spatial structure that facilitates getting fuel. They are generally more compact, simpler in structure, and smaller in scale than extraordinary places. They are commonly found throughout a given social system and are its most predominant category. Schools, markets, doctors' offices, banks, and the like are common settings that people routinely visit and transact with on a daily basis. As settings, people repeatedly transact with them for the purpose of engaging in ordinary activities associated with daily functioning.

Figure 2.1 Examples of ordinary environments that people encounter on a routine basis for daily functioning.

Structure and the Built Environment

Ordinary environments are characterized as patterned, organized milieus of social content expressed through the spatial conditions of the setting. Peponis and Wineman (2002) describe built space in this manner: "Built space can be defined as a field of structured copresence, coawareness, and encounter. The boundaries that divide and the connections that reunite built space organize the way in which behaviors, activities, and people come together or remain apart" (p. 271). These three attributes of a setting may be assessed for their structural and regulating effects for behavior(s) in settings. As an example, Peponis and Wineman (2002) cite a number of studies looking at strong and weak program buildings. Strong program buildings maintain layouts that serve to constrict or "control movement, interaction, and encounter in prescribed manner" (p. 280). They provide the example of a courthouse where movement of different users of the setting are limited based on social norms (what Peponis and Wineman refer to as the "program") for judiciary figures, prisoners, and visitors. Weakly defined settings, then, are designed in such a fashion to regulate movement based on the layout of the setting rather than constriction within the program.

A particular spatial form emerges because of the specific entwining between social content and spatial conditions. A designer, working with the confines of physical laws, decides what elements are included and which are excluded in the design of setting. For example, a kitchen is likely to include elements of design that facilitate behaviors associated with preparing a meal. A designer then chooses those elements, integrates them with particular social considerations to create a structured setting that is recognizable by others, and facilitates their transaction with the setting.

The transactional perspective of PEB relationships suggests that the two aspects of built environments, social and spatial, are not mutually exclusive. We can characterize space and its relationship to social content as participatory in nature. This is a non-causal relationship where space is present in social structure and social processes; but so, too, are social structure and social processes present in spatial forms. The relationship between spatial and social may be described as ecological in nature where feedbacks exist between persons, environment, and behavior (Michelson, 2000; Michelson & Reed, 1974; Reed, 1996). Similarly, Vischer (2008) suggests that users of built environments are part of the built environment and cannot be thought of as outside their setting.

Recall once again that Ittelson (1973, p. 18) observes that an individual "is never encountered independent of the situation" and neither is a setting "encountered independent of the encountering individual." Consider a well-defined environment, for example a hair salon, from both its spatial form and social context. Spatial conditions facilitate movement, exploring, searching, and positioning and the many other behaviors associated with the activity of having one's hair cut, whereas the social context assists in recognition of the situation and potential for social interaction, activity, and choice for individuals within the hair salon. The ability of a designer to intertwine the two facets of a structured setting, which constitute a hair salon, is necessary to fully account for the nature of that environment, to make a hair salon a hair salon and not, say, a dentist's office. An effective effort is necessary to communicate social content through spatial conditions not only for the definition of the "hair salon," for example, but also for the recognition and the ability to transact with the hair salon by users of that type of setting.

That is the case because a mutualistic relationship between the social content and spatial conditions was construed to connect them in the first place.

If such a pattern, for example, is disengaged from the systematic entwining of social content and the spatial condition of a setting, then by definition, the condition is, in effect, destroyed. This is because their joining is a necessary and sufficient reason to reach that condition, namely, the structured environment. If the outcome-condition (as in the hair salon example above) cannot be logically sustained when disengaging the spatial form from the social content, then the entwining relation is considered an inextricable one for the preservation of that condition. Inextricability refers to a type of systematic joining or entwining of two or more dimensions (e.g., as in spatial conditions with social content) for creating a particular condition like a structured environment. Because of this relationship, the way we discern our surroundings cannot be thought of as independent from either the spatial or the social context (Proshansky, 1976). Disengaging the structure of a setting is more than losing a patterned array; it is losing what makes a setting distinctive from all other patterned arrays.

Social Logic of Structured Environments

This research, then, considers how social content of a situation manifests in structured environments. The purposeful design of spatial conditions coordinates this effort. Space, therefore, is not abstract but orchestrates practically with our own prescribed meanings in ordinary settings. Space is not simply the result of physical laws such as gravity but how we structure space is practically relevant for how we transact with our surroundings based on our purposes and intentions. This effort is experientially

relevant to individuals who use ordinary settings. For example, Peponis and Wineman (2002) state:

> To ask whether space has a "social logic" is to ask how such pattern becomes entailed in everyday behavior, in the structuring of social relationships, and in the way in which society and culture become intelligible through their spatial form. (p. 271)

Social logic of structured settings, therefore, refers to the intertwining of social contexts with spatial conditions in such a manner that the logic is fully comprehended by all members of a shared social-cultural system. A structured environment may be processed perceptually, affectively, and cognitively in an efficient and quick manner regardless of its complexity (Urlich, 1983, p. 98). For example, successfully designed settings, then, contain a generic quality so that individuals do not spend too much cognitive effort in assessing affordance of a setting; it is readily apparent.

People use space as a fundamental dimension of orienting themselves in the external world. People rely on orienting schemata, or mental imagery, for modeling solutions and making decisions about the external world. They are adept at apprehending spatial information and identifying with complex manifestations of space through attachments and place identities from a variety of spatial forms such as places, regions, homes, landscapes, neighborhoods, sacred locations and the like (Massey, 1994; O'Toole & Were, 2008; Proshansky, 1976; Proshansky et al., 1995).

Implications of space are found throughout a society. Conventions or rules and traditions about spacing play a fundamental part in interpersonal exchanges between members of a society (Hall, 1963; Hall & Whyte, 1960). Recently scientists have directed

more of their attention to proxemics, social distance, and personal space to virtual environments (Jeffery & Mark, 2003; Nassiri et al., 2010). Space is said to be integral in approach or avoidance behaviors of a society and commonly manifests in social distances, personal spaces, and territories (see for example Altman, 1975; Bechtel, 1977). We study and explore how space manifests in association with social content across a range of scales from the overall physical layout in a society's villages, towns, cities, and metropolises to the spacing people maintain while in conversation or commuting to work on busses, trains, and freeways. Spatial conditions provide the location of social content observable through myriad ways in which it manifests amid social exchanges. The presence of space is observable in social exchanges such as how a bank teller positions herself relative to a customer, a lecturer to an audience, or a hair stylist to a client. However, to understand the social logic of space we must explore the nature of how spatial conditions map social content in the built environment.

Essence of the Built Environment: Defining the Social-Spatial Core Relationship

We can see that the built environment is composed of spatial conditions and social content; but what, precisely, is the nature of this relationship? Hillier (2008) recognizes the relation in this way:

> The design and planning of the built environment is about adapting the physical and spatial surroundings for human purposes: to make communities work, to facilitate business, to make organizations efficient, to support family life, and so on. In practical terms, the usable outcomes are patterns of shaped and interlinked spaces intended to facilitate social aims. The translation of social purposes into space then presupposes that something is known about how patterns of living and working can be

affected, for good or ill, by the physical and spatial forms imposed on them. (p. 217)

To elaborate further on the importance of social content of a setting, we observe that an individual's behavior has purpose and intentionality. For example, Cohen and Cohen (1985, p. 217) assert, "We do not walk to a shopping mall in order to walk. [Rather,] there is a purpose to the activity."

A setting is construed to facilitate human activity and experience through the purposeful development of spatial conditions that reflect or translate social content of a setting. For example, Hillier and Hanson suggest "the ordering of space in buildings is really about the ordering of relations between people (1984, pp. 1–2)." They consider that architecture is not a "social art" because of buildings' visual aesthetic nature; instead, buildings have strong spatial impact and facilitate social process through their arrangement and ordering of space.

Peponis and Wineman observe the relationship in this manner:

For any given building type there are some labels that are typically used to describe the component parts by activity (e.g. "dining room"), social rule (e.g., "private room"), or function (e.g., "reception"); it is intuitively known, however, that a list of component spaces is not a building. Buildings set component spaces into particular patterns of relationships. The precise patterns vary from design to design. (p. 272)

We may explore further with some examples of how environmental design facilitates a user's acquisition of social context. One may think of the design of a classroom and reason that its structure and scale of objects are reflective of its intended use and function. Designers may choose to alter the design of a classroom with changes

in curriculum goals, or because of teacher, student, or administrative preferences (Amedeo & Dyck, 2003; Rivilin & Rothenburg, 1976). A designer must have expectations for how a potential user is likely to transact with a setting in order to create a functioning space. The resulting design, a structured environment, will differ based on these use-expectations. A preschool classroom, for example, has very different spatial and organizational form than a lecture hall. The spatial form is rooted in the needs of those who transact with the setting. It is not enough to suggest that space is a social construct; rather, we must fully understand how users of the built environment interact and respond to spatial conditions for the purposes of carrying out activities, social interactions, and experiences.

When social content is properly mapped for a setting, meaning has a physical location within the built environment. Meaning is about sense, significance, intending, requiring, etc. Hence, it is information that relates to things, circumstances, happenings, experiences, connections, and the like. Moreover, for most cases, two sources of information are utilized simultaneously for construing meaning: external and internal. One involves the acquisition of information through sensory receptors (e.g., through literally transacting with environments) and the other involves mental activity for remembering it, relating that information, interpreting it, integrating it, connecting it, recognizing it, storing and retrieving it, rationalizing it, and so forth.

Social-Spatial Core Relationship and the Coherence of Built Environments

I suggest that we conceive of the social-spatial core relationship as an inextricable and complex set of rules that guide environmental design. The relationship suggests something about the social content for social situations and provides guides for how that

information should relate spatially and be expressed via spatial forms in the built environment. Consider the nature of that relationship; for example, space is not causal in any direct sense of determining activity and experience (Amedeo et al., 2009, p. 12). The relationship between space and our use and experience of a setting is complex and intricate. Space maintains a significant influence in concert with other external cues and internal information relevant to one's purpose and intention as well as prior experience for a given setting (Cohen & Cohen, 1985; Peponis & Wineman, 2002). These are purposefully selected by environmental designers and are governed by social norms, rules, and expectations. Other factors are necessary because we do not transact with a setting based solely on the inherent properties of space (Franck, 1984). Instead, an emphasis must be placed on our personal and social translations of those spatial properties based on our intentions, purposes, and goals. For example, Meinig (1979) asks us to take a field trip with a group of individuals and have them each look out across the landscape from the same advantage point. He observes that:

> Even though we gather together and look in the same direction at the same instant, we will not—we cannot—see the same landscape. We may certainly agree that we will see many of the same elements—houses, roads, trees, hills—in terms of such denotations as number, form, dimension, and color, but such facts take on meaning only through association; they must be fitted together according to some coherent body of ideas. (p. 1)

Meinig discredits a universal interpretation of our surroundings by illustrating that people will group in their interpretation of what lies in front of them. This leads to an expectation that humans develop mechanisms for interpreting the external world. These mechanisms may rely on physical properties of environments and external cues or

prompts such as signs. Physiological and biological entities are necessary for gathering information about the external world. The mechanisms must also rely on the ability to recall and integrate information from prior experiences.

Purcell (1992; Purcell et al., 2001) examines such mechanisms for environmental perception in a series of studies where participants are asked to respond to a range of environmental settings. Where Meinig (1979) was concerned "not with the elements but with the essence, with the organizing ideas we use to make sense out of what we see" (p. 1), Purcell is interested in understanding the mechanics of cognition through knowledge structures and how those mechanisms vary across members of a group. Purcell (1992) defines knowledge structures in this way: "Within a particular domain, knowledge varies in how abstract or specific it is. At the most concrete level, knowledge structures represent purely perceptual attributes; at the most abstract level conceptual knowledge is represented" (p.161). Purcell is drawing on the works of cognitive scientists Jean and George Mandler (J. Mandler, 1984, G. Mandler, 1984), Galambos et al. (1986), and Kolodner (1985) whose collective works define the fields of schema theory and integrated memory and experience in learning. In a series of experimental studies, Purcell (1984, 1987, 1992) applies these ideas to environmental perception and concludes that:

> The relationship between the physical attributes of a scene and the mental representation or schema developed through an implicit learning process based on long-term exposure to the regularities present within the environment. In this model, affective experience depends on differences or discrepancies between the particular example and the relevant schema(s), with the type and intensity of the emotion depending on extent of the difference. (2001, p. 95)

Purcell and his colleagues are untangling the role that spatial conditions of scenes play in peoples' perception and experience of those settings. He (2001) calls our attention to understanding how spatial conditions affect environmental perception and suggests an avenue for further research. He notes:

> It may be that variations in both preference and the restorative value of scenes depends on their underlying geometry, with high preference and restorativeness being associated with fractals and low preference and restorativeness being associated with, for example, underlying Euclidian geometry typical of built environments. This may be the case, or it may be that variables such a physical complexity or the spatial qualities depicted can be shown to be the physical basis for restorative value and preference. (p. 105)

As noted above, space is involved in nearly all that humans do and react to, and in much of what they imagine. Despite the pervasive presence of space in structural and behavioral circumstances in social systems, little understanding of the effects of space would be gained by an all-encompassing definition of space in the activity context. We do not interpret space at a universal or abstract level but translate its effects practically in terms of its social context and the specific meaning we assign (Jackson, 1979). Nevertheless, we observe the uniform regularity in environmental recognition across members of a social group. We can expect that people's interpretation of distinct settings should easily be discerned and will likely vary little from individual to individual across different settings (Barker, 1968). The confluence of these two assertions permits the conclusion, as argued by Hillier and Hansen (1984), that for a given built environment, the social and spatial facets reflect a congruency where the social context has spatial

implications and the spatial arrangement within a setting will influence social activity. How, then, does space contribute to the resulting coherent environmental condition?

Space exercises situational and conditional influences on human activity and experience through two effects, structure and scale effects. Structuring effects influence the manner in which we perceive our external world (Amedeo et al., 2009). These effects provide a sense of organization, configuration, and arrangement in a setting. Urlich asserts, "An environment that is a structured environment may be processed perceptually, affectively and cognitively in an efficient and quick manner regardless of its complexity" (1983, p. 98). A structured environment provides a road map by which people explore and make decisions about the external world. For example, a hotel lobby has a structure that facilitates and guides movement through the environment as well as orders social interactions amongst guests and between guests and hotel staff.

Scaling effects, on the other hand, influence how the external world is construed, how we apprehend environmental information, and how we respond affectively to the external world (Amedeo et al., 2009). We can conceptualize scale as a mechanism that manages information and summarizes our observations about the world (Cook & Fjuisaka, 2004). Scale is treated here as a relative evaluation of the external world. We rely on scale effects, with regard to environments, for our interpretations of complex relationships that exist between objects and persons, objects and objects, persons and persons, ourselves to objects, ourselves to other persons, ourselves to a setting, and the interaction between each of these dualities. Hillier recognizes the importance of linking social theory to environmental conditions at a level that is consistent with the level at which designers operate. For example, he states:

The question of relating the built environment to social theory then comes down to a lead issue: how to replace the shifting beliefs that guide the way one tries to link the built environment to social outcomes with more testable and theoretically grounded propositions which, at the stage at which the environment is created, are better able to reflect the realities of social behaviour and outcomes. (p. 218)

Hillier is speaking of environmental scale as that level in which social processes occur within the built environment. Scale, however, is not a given feature of the built environment; environmental design produces scale effects that convey social content from the environment to people within the environment.

Gibson and colleagues (2000, p. 218) observe that scale effects are fundamental in four areas. They suggest that we rely on scale fundamentally for the identification of patterns and problems, in the explanation of those observed patters, in the generalization of propositions made at one level of a scale and applied to another level of the same scale, and in the optimization of some process or function. If scale effects are disrupted or missing from a setting, then, the four fundamental areas in which we rely on scale for analytic purposes disintegrate, and our ability to make sense of that external information is compromised.

Structure and scale influence what is to be known about a setting. These two effects are not independent of one another nor are their effects immediately apparent from a solely spatial perspective. They must be grounded within the social context of a situation, but what does this imply for understanding the nature of built environments?

Structure and scale are generic across all situational circumstances. They are basic components of space that result from environmental design. It is how these intrinsic

influences of space interrelate with the social content that "define" an environment (Montello, 1993). Further, spatial structure and scale qualify, or exert a distinct influence on, all the features of an environment (Amedeo et al., 2009). Taken together, this influence highlights a particular configuration and exemplifies differences in that setting from all other coherent surroundings. A designer clearly configures a bathroom differently than a gas station. The coherence of a setting fundamentally relates to the maintenance of the social-spatial core relationship. Scale and structuring effects result as designers choose spatial conditions that transform social content into structured environments.

Human behavior does not occur without venue but, rather, occurs in such geographic-type settings as our everyday surroundings, including places, environments, scenes, and landscapes. The particular spatial conditions of a setting, therefore, affords opportunity for appropriate functionality and human activity for a given setting because those conditions exert structuring and scaling effects on all geographic-type settings through their appropriate joining with social. In a broad sense, the spatial conditions have decisive effects on our immediate surroundings because space manifests as socially defined spatial patterns.

Demonstrating the Significance of Spatial Condition for Person-Environment-Behavior Relations

These thoughts on whether and how spatial conditions matter in ordinary environments may be explored more directly for their plausibility. A central, or core, relationship must exist between spatial attributes and social context of a setting given the necessary entwining of social and spatial facets for the emergence of structured

environments. We can evaluate the plausibility of this relationship by disrupting one or both members of the core relationship.

One plausible expectation is that separating space from social contexts, however it might be accomplished, is likely to hinder perceived recognition of the environment and interfere with the way it would ordinarily be categorized and conceptualized by the perceiver. A frame of reference for translating social contents into spatial conditions could no longer be assumed or inferred. In effect, any prior notion of a setting will not be brought forth by a perceiver nor considered relevant to the disrupted information presented before them. The lack of structural information in the deconstructed environment will not provide necessary orienting schemas or method of interpreting the spatial meaning of such a presentation. In effect, this means, that the congruency between social context and spatial attributes for a given environment would be lost. This further suggests that the core overriding modal relationship itself would no longer be perceived because the property of inextricability no longer holds. By property, I am referring to two components that interrelate to form a new component or novel situation. In this case, the property of inextricability refers to the inextricable interrelation between spatial conditions and social content manifest as a built environment.

Such logic leads us to ask whether space is important for our ability to perceive and understand environments. Must we consider space when comprehending everyday human activity and experience in ordinary environments? How is space involved or how does it function in ordinary settings? What are the fundamental effects of space in the identities and distinction of everyday environments, and do people perceive their absence

if space was not present? In Chapter 4, I present a research design that empirically assesses these issues.

A second set of questions emerges as relevant for human conceptualization and categorization of environmental information. How is space's involvement in ordinary environments relevant to human assessment of external information found in the built environment? How does this involvement of space in the composition of everyday environments affect the manner in which humans perceive information in these settings? Do people conceptualize and categorize environmental information similarly? What conceptual categories define our operationalization space and its place in ordinary environments? Chapter 3 explores these themes through a discussion that relates the environmental design process to users' expectations for built environments by examining the relationship between environmental affordance and distinctiveness and the use of schema by designers and users alike.

CHAPTER 3: MECHANISMS FOR CONSTRUCTION AND CONCEPTUALIZATION OF THE BUILT ENVIRONMENT

The composition of the built environment involves an intricate weaving of social content with spatial conditions. In this chapter of the dissertation, I explore the nature of that relationship and its implication for how people conceptualize the built environment. This entails looking at the environmental design process, environmental distinction and affordance as well as the mechanisms people employ to conceptualize the built environment.

Until recently, inquiries about environment and behavior have placed more effort on assessing the social facet of settings than the spatial. Peponis and Wineman (2002), for example, observe that:

> Studies of environment and behavior, in the broadest sense, are often stronger on describing behavior and dealing with intervening social, psychological, cultural, or organizational variables than they are on describing environment and the spatial structure of environment in particular. (p. 287)

Notice the observed focus on elements of behavior and social influences, independent of the environmental context and/or the spatial structure of which they must be a part. These authors argue that assessment of person-environment-behavior (PEB) relations from solely a social perspective falls short of our understanding PEB relations in their entirety. They remind us that if we want to understand PEB, we must consider both the social and the spatial aspects of built environments.

Implications of the Social-Spatial Core Relationship for Environmental Design

When research considers the spatial facet, it often does so in a physical determinist manner, in the sense that it treats the physical aspects of geographic and architectural elements as the agents that determine behavior (Franck, 1984). Franck (1984) points out the weaknesses of this approach to PEB research. She argues that physical determinism exaggerates the influence of the environment on behavior by ignoring or underestimating the effects of other factors. A physical determinist approach assumes that the environment has only direct effects on behavior and portrays people as passive participants in the environment with no goals or decision-making abilities. However, as noted earlier by Vischer (2008), users of built environments are active agents in their surroundings.

Balconi (2010, p.3) elaborates by including among the attributes that distinguish a person's awareness in their actions "awareness of a goal, of an intention to act, and of initiation of action, as well as awareness of movements, sense of activity, sense of mental effort, sense of control, and the concept of authorship." How these attributes interact is unclear, but Balconi (2010) notes that the sense of agency or the judgment of agency

strongly depends on the degree of congruence *vs* incongruence between predicted and actual sensory outcome. Congruence of the predicted with the actual outcome leads to attribution of the sense of agency to oneself, whereas incongruence indicates another agent as the cause of an action. (p. 6)

Balconi provides a framework for us to understand the relationship between users' intentions, purposes, and goals in a setting and the behavior opportunities that result from

the spatial conditions and configurations of the setting. He finds that people have a stronger sense of agency when they find themselves in situations that meet their expectations for those situations.

How might this reasoning reflect on the environmental design process? One fundamental aspect of the environmental design process is the systematic entwining of social content with spatial conditions. Eastman (2001) describes the process in this manner:

> A central task of design is defining its context. This includes both the
> *external context*, ranging from the physical, social and cultural setting of a
> building to the mechanical, control and human interfaces of a mechanism,
> to the fabrication technologies, operating capabilities and resources
> available for making and operating the product. (p. 6)

What Eastman refers to as context, I refer as the social-spatial core-relationship. It is this core-relationship, the design context, that guides the environmental design process for ensuring congruence in users' expectations for a given design scheme. Put another way, when environmental design adheres to the social-spatial core relationship, users of that design scheme find themselves in situations that meet their expectations for that setting.

Franck argues that a determinist perspective is a "given and immutable entity" and "ignores the process of creation, modification, and design of environments" (1984, p. 412). Similarly, Hillier (2008) distinguishes purposeful design from determinism in this way:

> Space not only behaves lawfully when manipulated, but also these laws
> are the means by which it has agency in human affairs—not agency in the

old sense of spatial determinism, but in the sense that spatial configurations provide the conditions for the emergence of different kinds of complexity in human affairs, given only the continuation of everyday activity, and the fact that human beings consistently and knowledgeably manipulate space for social purposes. (p. 228)

Franck (1984) provides a detailed review of literature on the description of environmental conditions as having direct or indirect effects, but more importantly, she calls our attention to interactional effects. She suggests that an interaction effect

Refers to a particular type of influence that two or more independent variables in combination exert on another variable, such that the effect of either independent variable on the outcome variable will vary according to the value of the other independent variable. (p. 418)

Hillier asserts that space, itself, is a variable notable of consideration for study. He argues:

The social behavior of space can only be understood by first understanding its potential to behave at all, and this means studying space itself as a variable phenomenon. (2008, p. 228)

These observations suggest that the relationship between people and their settings is complex and not assessed through unidirectional causation models. Rather, environmental design must observe, recognize, and explore the nature of a social-spatial core relationship in the built environment.

Environmental Design and Structured Environments

In the design of environments for everyday living, the ultimate goal is to produce a setting that promotes recognition about normal functioning among users and between

users and an environment's elements. How do designers accomplish such a task, what are the mechanisms employed, and how might we conceptualize the design process?

Eastman suggests that designers produce a representation that best accounts for the context in which they are designing. He suggests that designers do so by producing a designed response and define it this way:

> The *designed response* responds to the context by changing or adding something into it, in realization of some goals or intentions. Defining the context and the repertoire of materials and methods that make up the designed response are core issues in effective design. All design fields assume that designers rely on a wider base of information than is explicitly taught; experienced designers draw upon both formally learned knowledge and also information continuously learned experientially i.e., "in the field." (p. 6)

Eastman continues by recognizing that designers successfully envision the design processes because "a designer's conception of a design and its context is built up over time, using information from the designer's already gained knowledge and experience, and from external sources of information" (p. 5).

Cross (2001) presents a review of the design process with a focus on design cognition in three substantial areas. He first assesses how designers formulate problems, then how they generate solutions to design problems and finally how process strategies that designers employ bridge the problem-solution divide. He summarizes his review by observing that:

> Designers are solution-focused, not problem-focused. This appears to be a feature of design cognition which comes with education and experience in

designing. In particular, experience in a specific problem domain enables designers to move quickly to identifying a problem "frame" and proposing a solution conjecture … The designer's attention oscillates between the two [problem/solution], forming partial structurings of the two "spaces" of problem and solution. Designing appears to be an "appositional" search for a matching problem-solution pair, rather than a propositional argument from problem to solution. (2001, p. 16)

Lawson (2004, p. 1) also recognizes the "significance of experience in expertise" and focuses his discussion on the way "precedent stored in the form of episodic schemata is used by experts to recognize design situations for which gambits are available." Through analysis of designers' conversations, Lawson illustrated how designers share the complexity of their concepts, ideas and design information through schemata. He provides as an example the word "belvedere" and observes:

For experienced architects the concept or schema of "round shapes in square containers" includes not just the simple idea of that geometry but the whole game of contrasting the curved and straight lines, and all the examples and variations have been developed by other architects. For MacCormac's practice members, the schema of "belvedere" was not restricted to the commonly shared idea of a viewing tower. For them it was not a matter of a building typology at all but rather a whole series of devices for organizing space vertically in order to afford dramatic views that helped building users to build mental maps of their surroundings. (pp. 3–4)

Designers develop schemata through theoretical study, but Lawson's analysis finds more importantly that designers rely on experiential means. Through designers' experiences, they develop precedents, patterns, and gambits or "tricks of the trade," that are known to work (Cross, 1982; Lawson, 2001, 2004). He concludes suggesting that:

> Design knowledge is more heavily dependent on this experiential or
> episodic memory than the knowledge used in many other professions.
> Now there are some sound reasons why designers depend so heavily on
> this. One in particular seems important and that is the integrative nature of
> the design solution and its very messy mapping onto the design problem.
> (2004, p. 9)

Both Cross and Lawson provide a discussion that relates design knowledge and practice with the complexity of design outcome. Some of the complicating factors, what Lawson recognizes as the "design solution's messy mapping onto the design problem"; in environmental design are the negotiations between designers and users. Designers must maintain not only design schemata but also behavioral schemata that are congruent with users' schemata. Designers understand how the effects of spatial conditions and social content define the context for the built environment. This is the nature of the social-spatial core-relationship and its utility for environmental design.

Good design provides a distinctive spatial template, which serves to stimulate thoughts about how one has encountered such a pattern before (Appleyard, 1969; Mandler, 1984; Purcell, 1992). Think for a moment about a super market. You will have a notion of how to navigate that environment based on the physical layout; in the design of a market, there will be cues, or signs, which guide and facilitate movement through that space. You can also generalize your experience of past markets to navigate in a novel market to achieve your current goal. The active process, whether conscious or not, projects expected associations of a setting which a user links with information gathered from the current situation to assess what options for behavior are available. The ability to integrate external cues present in the built environment with internal sources of

information permits environmental recognition. I will expand my discussion on cognitive tools employed for environmental knowing shortly, but first I want to discuss what constitutes environmental distinction what its implications are for human behavior.

Environmental Distinctiveness and Affordance in Built Environments

Environmental design serves to distinguish any one setting from all other settings. Designers accomplish this through the careful selection of design schemes that serve to highlight affordance within the environment by constructing spatial conditions that facilitate the transfer of social content for that particular situation. Much of the recent research in environmental distinctiveness originates from urban planning and urban renewal (see for example Bishop, 1994; Gill, 1989; and Green, 1999). While these studies clearly recognize a social-spatial relationship they do not provide precise conceptualizations of terms like environmental distinctiveness. The term is used here more in line with how Weber et al. (1976) express visual distinctiveness. Weber notes the importance of visual distinctiveness by linking Lynch's (1960) work on orientation with Kaplan's (1973) thoughts on environmental knowing:

> Visibility should be important because it would serve to orient a person with respect to his or her environment (Lynch, 1960), and avoid the psychological discomfort of becoming lost or disoriented, a consideration often neglected by environmental planners. As Kaplan (1973) has pointed out, knowing where we are is perhaps the most fundamental knowledge there is because it is presupposed by any planned activity involving space (Weber et al., 1976, p. 159).

Abbas Zadeh and Sulaiman (2010) expanded environmental distinctiveness by linking the spatial conditions of a setting with the social context. In their assessment of a

street in the city of Mashhad, Iran, they find that the local culture influences and shapes the street's physical characteristics. Through their assessment of residents' responses, the authors discover that the street reflects a sense of place for members of the city and the uniqueness of the street as cultural value and serves to distinguish it from other places within the city. This in turn suggests that cultural aspects play a significant role in public life and are reflected in physical properties of the street. They concluded from their case study that the built environment

> manifests culture in line with [how] the physical characteristics enhance the uniqueness of the street and its cultural value which support distinctiveness and prominence of the street environment. (2010, p. 450)

The physical characteristics influenced by culture are important to support the liveliness of the street, which in turn attracts many people. The livelier places on the street are the ones that are better able to satisfy the range of physical, social, and psychological human needs.

Environmental distinctiveness emerges because of commonalities that exist between environmental design and users expectations of the setting. Barker (1968) and Barker and Wright's (1954) extensive studies on behavior settings illustrate that environments exists for specific functioning, and generally people's behavior mirrors expectations for a given setting. Barker and Barker (1961) define behavior settings in this way:

> Behavior settings are highly visible behavior phenomena … [,] entities with features which can be identified as precisely as those of organisms, mountain ranges, or gas jets. [They] are behavior entities, but their laws of operation are not the laws of individual psychology. (p. 141)

Behavior settings are environments that provide a patterning consisting of highly structured, plausible arrangements of objects and events, which serve to prompt behavior responses collectively from members of a group. For example Barker and Barker (1961) note of a local café:

> In the functioning of the Pearl Cafe in Midwest, for example, the availability and the price of food, the season of the year, the prevailing temperature, the size, lighting and ventilation of the building, the state laws concerning hygienic practices, the customers, and the employees are all involved. We have only the beginning of an understanding of how these incommensurate phenomena are combined into the reliable, nonerratic entity known so well to Midwest residents. None the less, behavior settings are, even now, useful units for the ecological study of behavior. (p. 141)

Barker and Barker and Barker and Wright's collective work explores the uniformity of behavior settings and a consistency observed in collective behavior within a given social-cultural system. For Barker, the built environment has structure and provides the natural unit for analysis of behavior (1968, p. 15).

Identifying behavior settings as a unit of analysis, and an important one in the consideration of environment-behavior relations, provided the foundation for ecological psychology. Gibson (1977, 1979, 1986a, 1986b) expanded on Barker and Barker and Barker and Wright's works by exploring the relationship between environment and behavior through assessment of individual perception processes. Specifically, Gibson investigated visual perception, where he distinguishes between activities of viewing a room versus seeing a room in his conceptualization of the human visual system (1986a); he suggests,

Perceiving is an achievement of the individual, not an appearance in the theater of his consciousness. It is a keeping-in-touch with the world, an experiencing of things rather than a having of experiences. It involves awareness-of instead of just awareness. It may be awareness of something in the environment or something in the observer or both at once, but there is not content of awareness independent of that of which one is aware. (pp. 239–240)

Gibson's work culminated in the development of a theory of affordances. He defines an affordance as "a specific combination of the properties of its substance and its surfaces taken with reference to an animal" (1977, p. 67). Notice that for Gibson, an affordance has physical properties but its description is perceptual and in reference to whatever it is that perceives the affordance. A key component missing from Gibson's theory is the role of higher cognitive processes (Neisser, 1984), a point I return to later in the chapter. Nonetheless, Gibson suggests that a theory of perception should begin with what it is that the perceiver can perceive. For example through affordance theory, he explains "how the 'values' or 'meanings' of things in the environment could be directly perceived" (Gibson, 1977, p. 67) with regard to the particular animal and its environmental setting.

For Gibson and Barker, meaning in the environment is tied to the structure of the environment and not imposed by an individual; the difference in the two approaches is the unit of analysis. Barker suggests that the collective behavior is what defines behavioral settings and is important in understanding environment-behavior relations. Gibson, on the other hand, recognizes that individuals have the ability to perceive affordance within the environment. Heft (2001) suggests that studies of human and

environment relations would be strengthened through a combination of the two approaches as they are not mutually exclusive. Heft (1989) notes,

> There is an overall fittedness between behavior and the immediate environment. In the process of looking for an antecedent event, one is apt to overlook higher-order, relational factors, such as behavior settings and affordances, which may be in fact the more valuable explanatory constructs. (pp. 8–9)

According to Heft, behavior, at an individual level, is not solely the result of innate mental structures; rather, an individual integrates information from the structured environment with regard to his or her purpose and intentions. He provides the following example:

> Can one justifiably say that a typewriter affords typing? If affordances are limited to body-scaled objects, this makes little sense and may seem to be an unreasonable application of the affordance concept. Even though the design of a typewriter keyboard is scaled to the hand, the act of typing goes beyond mere manipulation of keys. It is a structured act both linguistically (in terms of language expression) and motorically (in that a particular manipulation of the machine's parts is critical). At the same time, when viewed as a structured act, typing can be seen as a goal-directed or intentional, situated behavior. The act of typing is realized through the body in conjunction with a machine configured in a particular way. Within the domain of this situated act, the typewriter affords a specific action. (1989, p. 13)

Returning to the physical manifestation of environmental affordance, Chemero (2003) asks, "Which aspect of the environment is related to which aspect of the organism and in which way?" (p. 189). For Chemero, affordances are relations between the abilities

of organisms and features of the environment. He concludes by observing that perceiving affordances is dependent upon the existence of an animal that could perceive them; they do not disappear when there is no animal in the vicinity to perceive them. Affordances are real entities within the environment, while their perception is subjective. He states that the "ontology of ecological psychology is not a simple form of realism," rather it is a realism about meaning; and it is this meaning that is a real part of the world and not one which exists only in individuals' heads.

Affordances are realized because of structure and scale effects resulting from particular spatial conditions relating social content to the person perceiving the affordance. For example, Gibson notes:

> A description of what the environment affords the animal can be given in terms of a list beginning with simple and ending with complex things. Such a list includes features of the terrain, shelters, water, fire, objects, tools, other animals, and human displays. In addition, the information that is available in ambient light for the perception of substances, their surfaces, and the layout of these surfaces must also be described. An attempt should also be made to connect the two, to show that the variables of substances and layout combine to make affordances. (1986b, p. 67)

Environmental design, then, serves to distinguish a setting through the purposeful translating of affordance into spatial conditions. For example, Kytta (2003) suggests:

> One central task for designers is to make affordances perceptible. A well-designed object will tell you directly how it should be used. In my opinion, environmental psychologists and architects should also be interested in the various degrees of usability of affordances. A playground as a whole can have appeal of various degrees for children, and its swings

may offer possibilities for various degrees of swinging. A swing may be such that even a heavier child can properly swing on it, or it may be too unstable for almost anyone. In the future in the study of affordances there should be analysis of the differences in the usability of affordances, as well as analysis of the connection that the degree of usability has with the appeal of an affordance. (p. 63)

Herzog and colleagues provide an example of the compatibility of environmental distinction in terms of design, affordance for behavior, and users' intentions. The authors define compatibility as a "fit between what a person wants to do or is inclined to do and the kinds of activities supported by a setting" (2011, pp. 90–91). Through an empirical assessment of over 500 participants, the authors find a positive correlation between compatibility of a specified goal and that typically afforded by a setting. The authors presented participants with a packet of scales, scenarios, and questions that asked them to rate the degree of compatibility of the built environment for the given scenario. Participants consistently chose an environment deemed compatible with their intentions for activity.

Uncertainty or ambiguity in users' perceptions of environmental affordance(s) has material implications for users of a setting. For example, Evans and colleagues (2002) examine the relationship between commuters' mental health and commuting environments. They observe that commuter stress has less to do with congestion in the environment and more with unpredictability of the commute. Similarly, Zimring, summarizing the empirical work of Evans (1980), Weisman (1979), Peake and Leonard (1971) and his own research (Zimring 1979), notes that:

A clearer picture emerges if the various links between environmental form, wayfinding, and stress are merged. All other things equal, environmental forms that encourage acquisition of accurate cognitive representations (and hence effective wayfinding) reduce stress. Conversely, forms that discourage accurate representations increase stress. (1982, p. 167)

These studies both illustrate how meaningful structure in settings is necessary to facilitate activity and identify the human ability to observe its absence. Structured settings therefore provide affordance opportunities for behavior that are compatible with users' intentions by the purposeful mapping of social content with spatial conditions that serve to facilitate such cognitive acts as perception, attention, recognition, problem solving, and decision-making for routine activities associated with daily living. However, the ecological approach put forth by Gibson, Barker, and their colleagues falls short of assessing the role of structure in built environments in higher cognitive processes that relate recognition, problem solving, and decision-making. In order to understand cognition and the built environment we must explore the mechanisms that people employ not only to perceive but also process the built environment.

Cognition and the Built Environment

As we have discussed it, the built environment does not, solely, have direct effects on behavior; rather, it provides external information that people rely on for conceptualizing and making decisions with regard to external situations. The works of Barker, Gibson, and their colleagues illustrate that the information related to social aspects of daily life manifest through spatial conditions. How, then, do people make use of information such as environmental cues, prompts, signals, or affordances? Neisser

(1967), expanding on the perceptual research of Gibson, suggests that it is both our perceptual and our cognitive systems that guide our ability to organize information from the external world. Perception includes the physiological, biological, and neurological mechanisms that permit us to acquire external information. Cognition, then, includes the high-order mental processing mechanisms in concert with sensory modalities and permits us to interpret meaning, symbolism, and affordance in the external world. This is accomplished through processes that link perception and cognition, where our perceptual system gathers information and the cognitive system integrates that information with prior experiences, memory, and affective responses. Cognition is shaped through our individual experiences as well as cultural processes at the group level (Bateson, 1979). The two processes are not mutually exclusive. Perception of environmental affordance is only one mechanism that people rely on for environmental recognition. Neisser (1976) offers a connection between environmental perception and higher mental processes. He recognizes that some cognitive activities are common to both perception and cognition. For example, Neisser (1987) observes that

> Assigning objects to categories … has a foot in both camps. Categorization begins at the basic level, where categories are so closely tied to looks and affordances that they seem at first to be perceptually given. The course of development soon moves beyond appearances, however: in some domains to the scripts and superordinate defined by culture, in others to an acceptance of internal or historical criteria that lie beyond immediate experience, in still others to scientific exploration or an appeal to scientific authority. In all this we are driven by a conviction that there is something coherent beneath the surface and beyond the present, and that it is knowable. (p. 22)

Human ability to conceptualize settings relies on the ability to structure both external and internal sources of knowledge. Neisser introduces the concept of schemata, defined as preexisting structures, which serve to direct perceptual activity. For Neisser, schemata were not static representations or rigid structures. Acts of perception modify schemata through an individual's experiences. "The schema is just one phase of an ongoing activity which relates the perceiver to his environment" (1976, p. 23).

Categorization is a mental process that humans (and other animals) rely on to process environmental information and relates to schemata. Categorization permits the mind to infer properties that we have not observed (Pinker 1997, p. 307). Categorization is not an all-or-none phenomenon rather, categories have fuzzy boundaries and are socially based. Forgas observes, "Such exclusive and non-overlapping categories are comparatively rare in everyday life (Tajfel & Forgas, 1981, p. 115)." Human ability to categorize groupings of people, objects, and events (and presumably environments) is based on an individual's actions, intentions or attitudes and not simply the input from an external source. Processes of categorization facilitate environmental interpretation utilizing schemata as mental structures (Gattis 2001; Mandler 1984; Rapoport 1982). How do these two processes, categorization and schemata, relate to one another?

Schemata and Environmental Categorization for Conceptualizing the Built Environment

Cognitive scientists continue to refine our understanding in how we categorize the external world through studies that focus attention on both individual process and collective knowledge. Schemata take many forms in order to encompass the complexity of human knowledge. Object schemata, then, include what Casson (1983, p. 441) terms

"concrete entities." Social schemata include categories relating kin structure, race, and ethnicity. Anthropologists are interested in the cross-cultural analysis of schemata and highlight that people generate schemata idiosyncratically, culturally and universally (Casson, 1983). Attribute categories, for example, may be based on a person's past experiences and preferences for remembering attributes, or they may be based on cultural norms. Some attributes such as color, geometric shape, and facial expressions are universal. Schemata are mental structures that organize information and facilitate cognition. Schemata are populated across a lifetime of experiences and are integrated at any one moment with contextual frames of reference (Bateson, 1977; Casson, 1983; Rapoport, 1984).

Jean Mandler (1984) compiles a series of case studies in which she presents a discussion of schema theory and its application in understanding human behavior. Her work expands our knowledge of schemata by identifying a thematic organization. She presents the case for schemata being organized as stories, scripts, and scenes. What she has accomplished is to understand how schemata are employed in social situations. The work relevant to this research resides in her discussion on what is termed "scene" schema (1984, pp. 86–93). This work was pioneered in a paper by J. Mandler and Parker (1976) to explore the effects of mental templates, or schemata, on people's ability to recall information from scenes. J. Mandler and colleagues demonstrate through empirical assessments that people rely on spatial patterning for necessary environmental clues in order to recall information about the environment. Mandler and her team asked participants to remember objects from a series of images. The images that contained spatial patterning congruent with an expected "scene," or an environment, elicited more

recalled objects than did images lacking expected spatial patterning. Their experiment demonstrates that space plays an important role in environmental interpretation and the categorization of the external world. Additionally, their work illustrates that a relationship exists between the patterned, structured nature of an environment and human ability to form expectations and assess predictability from a setting.

Geographers have a long tradition of studying mental structures for wayfinding behavior. Cognitive maps in the past were often referred to as mental representations of environments, suggesting some sort of static picture that we are able to view passively (see review by Downs, 1981). Neisser, however, suggests the term "orienting schema" as a more appropriate term for cognitive map because it emphasizes "an active, information-seeking structure" (1976, p. 111). An orienting schema acts as a processor of environmental information, a plan for action. Golledge (1976, 1977) and his colleagues (Golledge et al., 1995, 2000) have developed research methods for assessing people's cognitive structure of American cities. Their research explores the mechanisms people employ for conceptualizing large and small spaces. Golledge and his colleagues recognize the importance of experience with the built environment in the development and construction of cognitive representations. They observe:

> Usually the environment is conceived as consisting of stimuli or cues, such as buildings, and supports, such as paths or street systems. The "stimuli" and "supports" are associated in both sequential and hierarchical fashion. Residents build cognitive maps based on existing environmental features by selecting and organizing those that are meaningful to them. (Amedeo et al., 2009, p. 300)

Similarly, Pinker (1997) recognizes that schemata have practical and functional implications for information processing. He notes, "Pictures are ambiguous, but thoughts, virtually by definition, cannot be ambiguous. If a mental picture is used to represent thought, it needs to be accompanied by a caption, a set of instructions for how to interpret the picture" (p. 297). This set of instructions would have to guide a person to seek information from the environment that is useful and to ignore information, which is not. Mental imagery, therefore, is not useful in the representation of thoughts. Instead, mental imagery is useful for pragmatic representations that facilitate behaviors. These categorical representations of objects and complex situations like environments are necessary for environmental perception and serve to guide the perceptual system to seek environmental information useful for behavior (Reed, 1996) and exclude information that is not relevant for one's purposes.

The construction and maintenance of cognitive maps involves other mental structures in addition to our perceptual system. Experience is an integral feature for cognitive-map building (Moore, 1979; Moore & Golledge, 1976). For example, a number of studies have shown that people's cognitive maps evolve with increased knowledge of an area (McNamara, 1986; Peruch et al., 2006; Taylor & Tversky, 1992). In fact, this is not a unique feature to humans (Chapman et al., 2010). Information obtained from our sensory modalities integrates with information already maintained in memory and includes affective responses (Downs & Stea, 1973, 1977; Kaplan & Kaplan, 1982; Neisser, 1973).

Mandler submits that humans rely on schemata for daily functioning. She illustrates that mental structures are necessary for cognitive activities such as selection

and abstraction, interpretation and integration of external information (1984, pp. 112–113). However, the human mind is not solely a computation processor. Alternatively, Mandler recognizes that there is structure in environments and places less emphasis on mental processes and more emphasis on the fact that environmental structure must be learned through experience. She observes, "When it is learned, it becomes a mental structure that guides the course of future information extractions. The knowledge that is gained does not consist of lists of unrelated factors or a heap of haphazard associations" (p. 113). Schemata, therefore, are not static but serve as a template for which individuals continually refine and redefine with environmental information for unique situations.

Schemata serve as a mechanism for environmental categorization. Neisser (1987), however, notes that schemata are not categories. He acknowledges:

> I cannot say what they are: we will not know how to characterize the structural prerequisites [schema] for perception until we are able to describe the information that perceivers pick up. There is little reason to believe that those "prerequisite structures" have much in common with the cognitive models on which categorization depends; there is every reason to believe that they are exquisitely tuned to the ecologically relevant properties of the real world. (pp. 9–10)

Schemata are an orienting, a sort of quick guide for processing the built environment. What, then, is the nature of environmental categorization? Pinker reiterates the notion that categories are "arbitrary conventions that we learn along with other cultural accidents standardized in our language" (1997, p. 308). Given this, however, categories will only facilitate if they are found to be useful constructs grounded in the functioning of the real world.

Our ability to transact and function within a given setting is related then to our ability to perceive, recognize, and make sense of environmental conditions. As Pinker illustrates, the utility of mental imagery for environmental recognition is a result of its prototypical nature, a generalization of an environment. The use of this imagery is anticipatory and based on the predictability of an environment. Information integrates through a feature of the mind, which Pinker describes as compositionality. He states, "compositionality is the ability of a representation to be built out of parts and to have a meaning that comes from the meanings of the parts and from the way they are combined" (Pinker 1997, p. 118). This manner of compositionality is likely to account for how we apprehend an environment. The parts referred to are the unique spatial combinations of numerous social elements consisting of objects, signs, and symbols that compose an environment. The meanings of them are social with regard to their functions, utilities, identities, associations, affordance, and relationships, and in particular the manner in which they reflect the congruency between social contexts and spatial conditions of the environment.

Peponis and Wineman (2002) observe the relationship between environmental categorization and spatial form in this way:

> The labels that we use to describe built spaces (such as "conference room" or "dining room") encode information about the way building occupants understand how buildings are inhabited; they denote some of the categories of use, behavior, or function that apply to space use. (p. 283)

Levinson (1996) elaborates on the linkages between language, culture, and spatial cognition. For example, he observes:

The anthropology of space, though rich in its own right, is largely unconnected, as a result of the relative neglect of how people think and talk about spatial notions in everyday life. This review therefore concentrates on the low-level, fundamental, everyday spatial notions as discoverable, in both their generalities and cultural specificities, through analyzing language. A central theme is that linguistic patterns point to some systematic differences in the cognitive style with which individuals of different cultures deal with space, and that it is these underlying cognitive specializations that may help us to integrate diverse spatial features within a culture, from cosmology to domestic architecture down to the details of aesthetic preference and material culture. In short, cognition is the intermediate variable that promises to explain cultural propensities in spatial behavior, and language may offer us more than just privileged access to it. (p. 356)

The inextricable nature of meaning from the physicality of environments is observable in the material expressions of human perception and cognition of physical elements in the environment. For example, Hillier (2008) draws this comparison between language and our relationship with space:

The reason for this is that spatial relations, and relations in general, are so fundamental to how "embodied minds" exist in the world that they form part of the mental apparatus we think with, rather than of. In this sense space is analogous to language. When one speaks or hears, one thinks of the words, but with the syntactic and semantic rules that allows one to form words into meaningful sentences. It is this unconscious understanding of patterns that make speaking and hearing possible. Space is the same. One deals with complex spatial patterns competently but intuitively, and, again as with language, one does not really understand how this is done. (p. 224)

Hillier is suggesting that the process becomes less about what we think about the built environment and evolves into the very manner in how we conceptualize the built environment.

These mental structures, together with the structure in the environment, have important implications for both individual and collective behaviors. People routinely rely on the fact that behavior results from a combination of internal knowledge and external information and constraints. Norman (1988, p. 55) describes how it is possible for, "precise behavior" or the idea that behavior often varies little in a given routine situation and requires little cognitive effort, to emerge. First, he notes that much of the information necessary for a task resides in the world and suggests that behavior is guided by how this external information is integrated with internal information from memory. Second, he argues that great precision is not required. Our ability to integrate external information with our past experiences coupled with constraints permits us to operate with incomplete knowledge. These other constrains can be natural or cultural. There are certain natural constraints that limit our behavior—gravity, for example. Likewise, there are cultural constrains or norms that serve to limit or afford acceptable behaviors such as smoking areas in airport terminals. In other words, constraints provide limitations on the total possible behaviors of a setting.

Concluding Thoughts on the Environmental Knowing Process and the Nature of the Built Environment

The environmental knowing process relies on cognitive processes that integrate external and internal sources of information for behavior. People rely on this orchestration to process external information such as cues, prompts, signals, or

affordances in the built environment and to distinguish one setting from all others with respect to activity. The manner in which this information is preserved in built environments stems from the purposeful entwining of social content with spatial conditions in the very construction and definition of the setting. But what happens if that entwining is disrupted or not well defined? Does it result in something meaningful for users of the built environment or in something else?

This, then, completes my broader description of the investigation I intend to conduct in this dissertation. What follows throughout the sections of the next chapter are discussions describing the details of how I acquired information needed to pursue an empirical assessment. In Chapter 4, I describe in detail the data-collection procedures employed and the methods for analyzing the narrative information collected. To set the stage for these coming discussions, it is useful to recall once again that my intention in this dissertation is to explore the nature of the built environment with regard to behavior, how spatial conditions relate to social content, and the mechanisms that people employ to conceptualize the built environment.

How we experience our world and the settings around us is undoubtedly related to our personal attributes such as our beliefs, values, social and cognitive biases, our attitudes, past experiences, and things of that nature. Environmental perception and the cognitive processes that permit us to function in an environment are at one level personal, but the routine nature of many of our daily activities is ubiquitous in a given social or cultural group. Therefore, it is likely that some aspect of the environmental knowing process will be common for those experiencing a given environmental setting. I have designed an experiment to explore the nature of those commonalities; specifically, what

dimensions distinguish one group's environmental conceptualization from another's and how do these differ with regard to the presence or absence of meaningful spatial conditions in environmental settings? With that in mind, I begin the first section of the next chapter proving the initial task faced in this investigation: how can information concerning environmental conceptualizations be obtained?

CHAPTER 4: EMPIRICAL ASSESSMENT OF THE NATURE OF PEOPLE'S CONCEPTUALIZATION OF THE BUILT ENVIRONMENT

In this chapter, I describe the methods used to address the questions raised throughout this dissertation. Recall they include:

- Must space be considered when comprehending everyday human activity and experience in ordinary environments?
- If so, how might space be involved in ordinary settings?
- What are the fundamental effects of space in the identities and distinction of everyday environments?
- How is space's involvement in ordinary environments relevant to human assessment of external information found in the built environment?
- How does this involvement of space in the composition of everyday environments affect the manner in which humans perceive information in these settings?
- Do people conceptualize and categorize environmental information similarly?
- If so, how so; and if not, what is the variability in their assessment of built environments?

The research questions listed explore the nature of the built environment and the potential role of space in the environmental knowing process. It is expected that spatial conditions, when properly tied to social content, define built environments. Because of this relationship, the spatial conditions of the built environment are likely to influence how users of such settings respond to them. In order to assess how each of the questions raised above relate or combine to exemplify this influence, I assess participant responses to a series of images of three built environments presented in this case study.

Procedures Employed to Evaluate Research Questions

Participants provide detailed accounts of their assessment of three different built environments. These assessments take the form of, sometimes long, narrative accounts of

how each participant conceptualizes the image presented during an interview session. Through the empirical assessment, I consider the role of spatial conditions in each participant's conceptualization by having them answer a series of questions for two different presentations of each of the three environments. First, participants are asked to respond to an image of an unaltered built environment. Then, participants are asked to respond to an image of a built environment with the spatial conditions removed. Appendix A presents two resulting transcripts as examples of the range in participant narratives collected. Participant 6 provides a rather lengthy narrative and Participant 22 narrative is much shorter than that of Participant 6.

The narrative accounts from each participant provide the information necessary to explore the research questions outlined above. However, to make comparisons and generalizations between participants and to explore the nature of participant responses to the two sets of images, a coding and analysis procedure must be employed. Common themes exist in each of the participant's responses. The coding procedure is used to identify and extract those themes so that they may be explored in a more systematic manner.

The analysis procedure employed in this research is similar to Q-methodology, which is the systematic study of subjectivity, a person's viewpoint, opinion, beliefs, attitude, and things of that nature (Brown, 1993). In a traditional Q-methodology, participants are asked to rank-order a series of statements or images concerning some topic. By ranking these statements or images, participants are providing their subjective view or meaning to the statements. This ranking then provides a profile of how that participant views the material and constitutes a row in a data matrix. The next step in Q-

methodology is to subject the individual rankings to a factor analysis. This aspect of Q-methodology is most similar to the study presented in this chapter. In the empirical assessment presented in more detail below, participants are asked to provide their opinions concerning the images presented to them during each interview session. An open coding procedure is used to extract content themes from the narratives and record the frequency of mentions of categories. In this study a participant's profile, then, is the number of mentions or non-mentions of the categories. These profiles are then subjected to the factor analysis in a similar fashion as Q-methodology.

For this study, Q factor analysis provides information on the similarities and/or differences in participant conceptualizations of the six images. If each individual would have his or her own specific likes and dislikes, then their profiles will not correlate with one another. However, if significant clusters of correlations exist between participant profiles, they could be factorized, described as common viewpoints (or tastes, preferences, groups, similar conceptualizations), and individuals can be measured with respect to them (Stephens, 1935).

Prior to discussing in detail the methods I used to acquire my information and employ the coding and analytic procedures, I will discuss the characteristics of the participants who generously agreed to be part of my convenience sample. I refer to their kindness, because the demands for information from them for this very involved research problem required a great deal of their time, patience, and sense of humor. For example, we often met after their busy days at work or school, through adverse weather conditions and the height of the "cold and flu season." Nevertheless, even under these trying conditions, I was able to interview these participants on average of two to three sessions

extending over months. I will also discuss, in detail, the methods I used to order and organize the information secured from these participants. As will be seen, this will involve the use of coding procedures for content analysis and assessments of its structure for subsequent processing. Finally, I will discuss the analytical procedures I applied to the organized data in an attempt to extract information it suggests concerning the questions and issues emanating out of my research intentions. Let me begin first by describing the sample and the instrument employed for this research.

Data Collection: Characterizing the Sample and Describing the Instrument

I used a convenience sample by requesting participation in the study through email campaigns, flyers posted in public places, and referrals from other participants. In order for participants to be included in the study, participants must have met the criteria of being over the age of eighteen, mentally and physically suited for an hour's interview session, and physically able to meet the interviewer at the agreed upon location for the interview. The final sample included forty-eight participants who finished both interview sessions with thirty-one participants (twenty-two females, nine males) from eastern Nebraska. The remaining seventeen participants (eleven females, six males) were from northeastern Utah. The participants ranged in age from eighteen to sixty-five. All of the participants have lived in the United States for their entire lives with the exception of Participant 1, who has been in the US for ten years. The participants ranged in education and household income levels and represented many different occupations. Additional characteristics of the participants are shown in Table 4.1.

Table 4.1. Demographic characteristics of the opportunity sample, counts proceed percentage of total sample (N = 48).

Sex			Location		
Female	33	69%	Nebraska	31	65%
Male	15	31%	Utah	17	35%

Age Group			Education		
18-25	7	14%	Some college	3	6%
26-35	13	27%	Associates	1	2%
36-50	20	42%	Bachelors	13	27%
51-65	8	17%	Graduate	31	65%

Time in US		
6-10 Years	1	2%
21-25 Years	1	2%
All my life	46	96%

Participants met for two interview sessions where they were shown a series of images through a computer projection system. These images contained pictures of three different built environments. The first environment is a hair salon, the second built environment is a doctor's waiting room, and the third environment is a series of rooms in a house shown with the kitchen as the prominent feature. During the first session, participants observed three images where the spatial conditions of the built environment were 'removed' or altered from the setting. To mimic the removal of spatial conditions from the built environment, I used Adobe Photoshop to clip the objects from the image and paste in a random fashion across the page (see Figure 4.1d-f). The first interview session took on averaged 34 minutes to complete. I then met with participants and held a second interview after at least one week. During the second interview session, participants observed a series of five images of built environments (see Figure 4.1a-c, g-h). Three of the five images were the built environments used during the first interview session but in the second session the settings were presented with their spatial conditions

unaltered (compare Figure 4.1a-c with Figure 4.1d-f). I included additional images in the second interview in order to keep the participants from guessing the goals of the research project. The participant responses to the additional built environments, the park bench and the café, were not included in the analysis presented in this dissertation. The second interview session averaged 39 minutes.
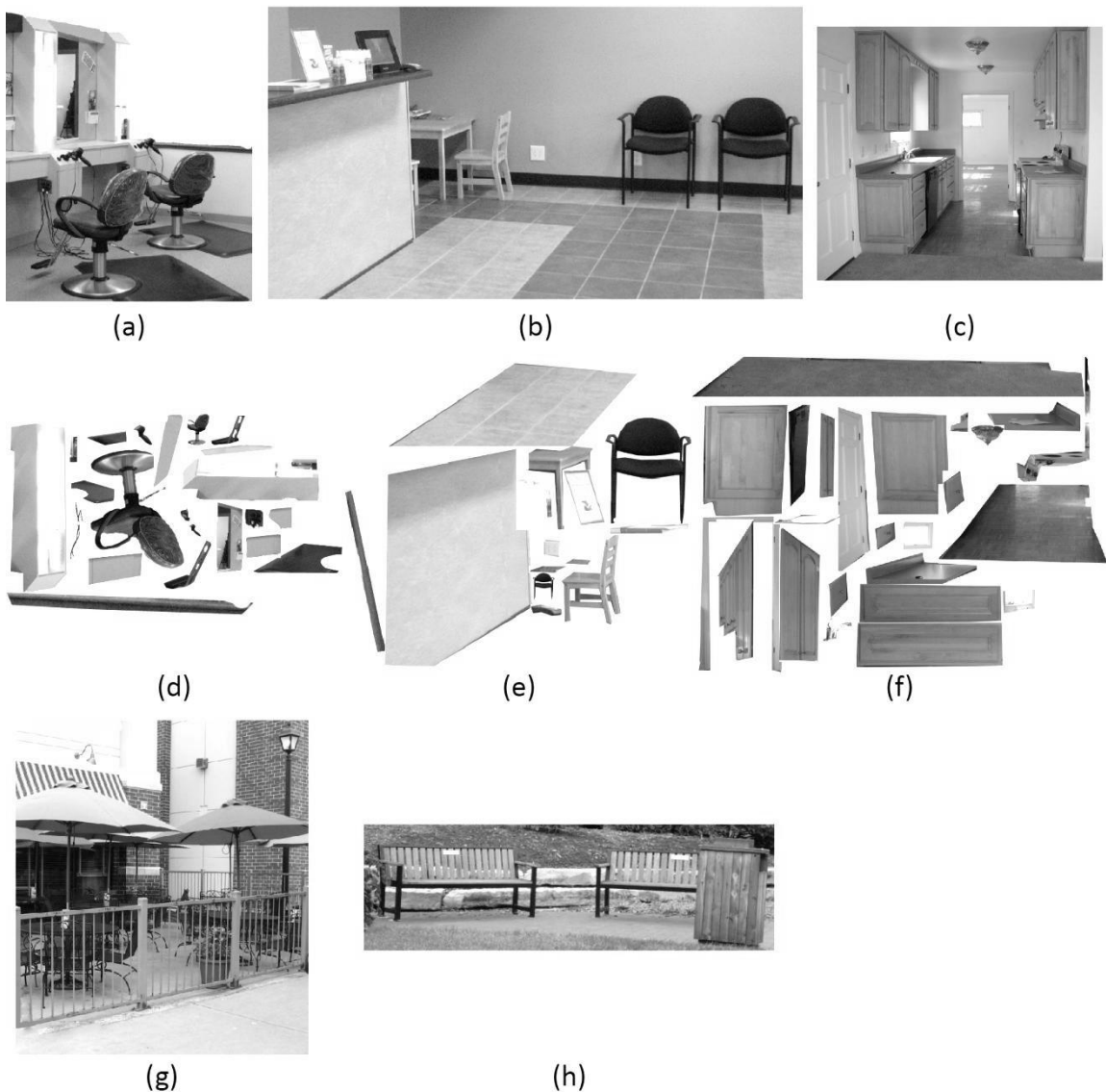
Figure 4.1 Built environments used in this study include (a) salon; (b) doctor's waiting room; (c) kitchen; (d) hair salon with altered spatial conditions; (e) doctor's waiting room with altered spatial conditions; (f) kitchen with altered spatial conditions; (g) extra image of café (h) extra image of park bench.

Upon approval from each participant, I recorded the interview sessions using a Sony digital voice recording devise. At each interview session, I asked participants to verbally respond to the same fifteen questions and include:

1.   Tell me what you see in this picture. Take your time, we have plenty of it.

2.   Tell me why you describe the contents of the picture in that way?

3a.   You seem to be familiar with what this picture shows. Are you?
3b.   ((if yes) Tell me how you have acquired familiarity with what this picture shows.) ((if no) Really? Then how were you able to describe its content in the manner that you just did?)

4.   Make believe for a moment that you now need to describe the contents of this picture to someone unfamiliar with it; please demonstrate for me how you would do that.

5.   What do you think is important for someone who is not familiar with this picture to understand about this picture?

6a.   Have you ever seen anything like what is in this picture before?
6b.   Many times or just on a few occasions?

7.   What is it about the content in this picture which you think allows you to recognize it?

8.   What would you do if you were amongst what you see?

9.   What is it about this picture that suggests you may be able to do that?

10.   Describe for me what your experience may be like once you are in the picture.

11.   Please describe for me your feelings, if any, that you may have towards what you see in this picture.

12.   What about the picture makes you feel that way?

13.   How might you encounter what you see in this picture in your daily routine?

14.   What, if anything, is missing from this picture?

15.   Is there anything else you would like to say?

I designed open-ended interview questions to permit participants the opportunity to express their thoughts and reactions to the images seen during the interview sessions. Open-ended interview questions are characterized as providing the ability for a participant to fully express their thoughts, opinions, or ideas concerning a particular question and determine the length and specificity with which they answer the questions posed to them during the interview session (Bernard, 2011). The 15 questions link directly to the research goals of the project by asking participants to voice their observations and opinions, first where I have disrupted the spatial conditions and second where the spatial conditions remain unaltered. Here are some examples of how the questions posed to each of the participants relate to my research questions:

- In this empirical assessment, I am interested in understanding how participants might rely on their prior experiences with built environments to respond to the images that I presented during our two interview sessions. Questions 1, 2, 3, 6, and 13 ask participants to reflect on their prior experience.
- I also wanted to understand the degree that an image meets or does not meet their expectations for a built environment. Questions 3, 4, 5, 6, and 14 direct participants to comment on the image as meeting or not meeting their expectations for a meaningful setting.
- Additionally, I wanted to know what sort of external information participants relied upon when evaluating the images shown during the interview sessions. Questions 1, 2, 4, 5, and 7 specifically ask participants to articulate their perceptual and cognitive processing of the information seen during the interview.
- Finally, I wanted to assess the degree that the participants felt they could have a meaningful experience or activity within the image. Questions 8, 9, 10, 11, 12, and 13 permit participants to make such observations.

Next, I discuss in detail the methods I used to analyze the narratives collected during the participant interview sessions.

Detailed Methodology for Examining Participant Conceptualizations of the Built Environment

The exercise resulted in over sixty-nine hours of participant responses and over 600 pages of transcribed narratives. I transcribed each interview session using Digital Voice Editor 3, the accompanying software to the Sony Digital Voice Recorder. The software allows the transcriber the ability to adjust the speed of the playback. I saved each transcribed narrative by participant with subheadings based on each presentation of the three environments. For example in Appendix A, Participant 6's narrative contains subheadings: *hair salon spatial conditions unaltered*, *spatial conditions removed*; *office waiting room spatial conditions unaltered*, *spatial conditions removed*; *kitchen spatial conditions unaltered*, and *kitchen spatial conditions removed*.

Because it is difficult to make generalizations from narratives alone, I employed a content analysis. Content analysis is a systematic process primarily used to extract informational-units such as words, phrases, sentences, statements or paragraphs out of verbal forms of discourse from participant responses. This is a systematic process because the extraction process is guided by a comprehensive and consistent set of rules related to the objectives of this research (Bernard, 2011). For this particular analysis, I coded all materials. I describe this process in more detail under **Step One Description of Coding Procedure,** in the following subsection of this chapter. Once I completed the coding, I performed a suite of data reduction analyses to generalize and explore the extensive information preserved in the participant narratives concerning their observations on the role of spatial conditions in their assessment of built environments.

The factor analysis employed a principal component analysis to transform the large set of observations in participant narratives of possibly correlated variables into a smaller set of values of uncorrelated variables called principal components or factors. Principal component analysis is a useful tool for exploring the structure of large datasets and is the simplest data reduction form of factor analysis (Dunteman, 1989). The principal component analysis was applied to the frequency table for each of the three environments and their two different presentations. When executed, principal component analysis reveals the internal structure of a dataset composed of a large number of variables by reducing the number of variables to a much smaller set that retain most of the information of the original dataset. In this study, the principal component analysis factors the rotated matrix so that the participant profiles were subjected to the factor analysis, in a similar fashion to Q-methodology. This step provided information on the similarities or differences among the participants' conceptualizations or viewpoints of the six different images. Additionally, I applied the analysis to categories to find commonalities or differences between themes. The reduced dataset is comprised of a set of factors that account for successively greater amounts of the variability in the original dataset. I used IBM SPSS Statistics v.20 to employ an iterative principal component analysis that extracted factors with eigenvalues greater than one. I used a factor loading cutoff value of ±0.500 to group participants, or categories, and assess the nature of the relationship between the participants, or categories.

Analysis of this rich dataset acquired from participant narratives unfolded over five interrelated steps. Step 1 utilized a coding system to guide searching participant responses for their information content. This process generalizes participant responses to

the inquiries above, but from the perspective of how those responses relate to a participant's conceptualization of environmental information observed in the image shown during the interview sessions. Step Two explored correlations between the participants in their responses. Step Three delved deeper into the correlations among participants and searched for distinct commonalties by factoring the correlation matrix constructed during Step Two. Step Four explored the correlations among the categories of the data array. Finally, in Step Five a factor analysis was performed using the correlation matrix from step four to conceptually describe the nature of participants' conceptualizations of environmental information reflected in Step Three. The remainder of the discussion provides a detailed account of this analytical procedure. Examples of partial data array and tables are provided to help visualize the methodology. The entire data array used for the study and resulting correlation tables for Steps Two through Step Five are found in Appendix B and the results of the analysis are further discussed in the following chapter, Chapter 5.

Step One Description of Coding Procedure

The coding system developed is intended to be a series of interrelated conceptual categories, which serve to generalize participants' comments regarding the two presentations of three built environments. Conceptual categories refer to the common themes that the participants referred to throughout their narratives. I used open coding because no formal theory concerning the nature of a person's conceptualization of the built environment exists in order to employ forced categories for the content analysis. Instead, I extracted the categories from my overall assessment of each participant's response to the fifteen questions posed to them during the two interview sessions.

Twenty-nine conceptual categories or themes account for the breadth of information from the ninety-six interview sessions and are listed and defined below and the following page.

Coding Definitions Used in the Content Analysis

1. AFFORDANCES EVIDENT (Does the participant claim to perceive specific affordances in the picture? If yes, a 1; if not a 0);

2. AFFORDANCES NOT EVIDENT (Does the participant explicitly express frustration and/or perceptual confusion about what is afforded or not afforded in the picture? If yes, a 1; if not a 0.);

3. TANGIBLE OR INTANGIBLE OBJECTS BY THEMSELVES   (Does the participant explicitly mention objects by themselves (i.e., unlinked, unrelated, or unconnected with other objects) in the picture? If yes, a 1; if not a 0.);

4. TANGIBLE OR INTANGIBLE OBJECTS LINKED TO ONE ANOTHER (Does the participant explicitly mention objects linked to other objects in the picture? If yes, a 1; if not a 0.);

5. CONTIGUITY MENTIONED AS PRESENT BY PARTICIPANT (Dict. Def: "the quality or state of being contiguous; proximity") (Does the participant perceive instances of contiguity and/or proximity? If yes, a 1; if not a 0);

6. ABSENCE OF INTEGRATION (Does the participant mention complete absence of integration? If yes, a 1; if not a 0);

7. ABSENCE OF STRUCTURE (Does the participant mention complete absence of integration? If yes, a 1; if not a 0);

8. WHAT TO DO THERE (Does the participant specify what to do in that picture? If yes, a 1; if not a 0);

9. WHAT NOT TO DO THERE (Does the participant specify what not to do in that picture? If yes, a 1; if not a 0);

10. HOW TO EXPERIENCE THAT PICTURE (Does the participant specify what to experience in that picture? If yes, a 1; if not a 0);

11. TYPICAL EXPERIENCE IN THAT PICTURE (Does the participant express that their experience would be typical or expected for what they see in the picture? If yes, a 1; if not a 0);

12. ATYPICAL EXPEREICNCE IN THAT PICTURE (Does the participant express that their experience would be atypical, exploratory, or unexpected for what they see in the picture? If yes, a 1; if not a 0);

13. PERSON-ENVIRONMENT-BEHAVIOR RELATIONS (Does the participant specify how P,E, and B are likely to relate in that picture? If yes, a 1; if not a 0);

14. COLLECTIVE PURPOSE OF THE THINGS IN THE PICTURE (Does the participant specify what the things in the picture collectively suggest? If yes, a 1; if not a 0);

15. SOCIAL NORMS AND/OR EXPECTATIONS (Does the participant suggest how people are socially expected to respond to the collection of things in the picture? If yes, a 1; if not a 0);

16. SOCIAL INTERACTION (Does the participant suggest how they might interact with someone? (If yes a 1; if not a 0);

17. CUES, SINGLES AND/OR PROMPTS MISSING ((Does the participant complain about the absence of meanings on how to respond to the collection of things in the picture? If yes, a 1; if not a 0);

18. HOW TO MOVE AROUND IN THE PICTURE MISSING ((Does the participant describe or suggest how to move around among the things in the picture? If yes, a 1; if not a 0);

19. ACITIVITY CUES MISSING (Does the participant complain about the absence of cues for activity and transaction? If yes, a 1; if not a 0);

20. ACTIVITY CUES PRESENT (Does the participant describe their thoughts on activity and transaction with the picture? (If yes a 1; if not a 0);

21. OVERALL CONTEXT ABSENT (Does the participant struggle to submit a belief about the social context of all of the things in the picture (If yes, a 1; if not a 0);

22. PRESENCE OF SCENE-LIKE ECOLOGY (Does the participant express a belief about the cohesion and/or coherence of the things in the picture collectively? (If yes, a 1; if not a 0);

23. FUNCTIONAL DESIGN PRESENT (Does the participant express that the picture represents something that is designed for functional use? (If yes a 1; if not a 0);

24. MENTAL SCHEMA ENVOKED (Does the participant specifically mention the use of a mental schema or template, "mental picture," during their responses? (If yes a 1; if not a 0);

25. SENSE OF SCALE MISSING (Does the participant complain that there is no sense of scale in the image? (If yes 1; if not a 0);

26. COLLECTIVE ITEM USE (Does the participant suggest their use of the objects in the picture collectively? (If yes 1; if not 0);

27. EXPECTATION OF A LARGER CONTEXT PRESENT (Does the participant express expectations about what is in the picture towards a greater environmental context? (If yes a 1; if not a 0);

28. ROUTINE ENCOUNTER OF THE IMAGE (Does the participant express that they encounter the image on a regular basis? (If yes a 1; if no a 0);

29. CONFUSION (Does the participant express confusion when assessing the image? (If yes a 1; if no a 0).

Each participant narrative was reviewed for individual words, sentences, or thoughts that expressed a particular view or opinion that the participant was trying to express. These words, phrases, or thoughts were then generalized into the 29 categories presented above. While a participant may not have mentioned the word affordance, their sentiment suggested that they perceived that the image afforded a particular activity or experience. For example, I would code the following statement as indicating three instances of an affordance in a participant's response to the unaltered hair salon:

> Probably spin around in the chair, sit down in it spin around and ask for a haircut.

The participant expresses that the image suggests to them that they could sit and spin in the chair and that the image as a whole provides the opportunity, or affords, getting their hair cut. In contrast, this statement by a participant viewing the image of the hair salon with the spatial conditions removed, I would code as indicating three instances where an affordance is not evident in the image:

> Half of it is unidentifiable stuff, shapes, looks like pictures of stuff.

The participant does not express any opinion on what the image provides, or affords, for activity, in fact, they suggest that a portion of the image is unidentifiable.

Once each participant's narrative was coded into the 29 categories, I tallied each mention of the categories for each participant's response to the six images into six frequency tables (Tables B.1–B.6). Table 4.2 contains the frequencies of statements or phrases extracted from the first ten participants who specifically make reference to themes represented by the first ten categories. Hence, categories constitute the columns in

the data array and run across the top of the array while participants appear on the left side of the data array and constitute the rows. Numbers appearing under the categories refer to the number of instances these categories appear or do not appear in participants' responses to the fifteen questions posed for that image. Each row in the data array, then, is specific to a particular participant and represents how that participant conceptualizes what they see in that particular image. In other words, the row constitutes the participant's profile for the image.

Table 4.2 Partial data array for first ten participants and frequency of mentions/non-mentions for the first ten categories.

Participant	Affordance evident	Affordance not evident	Object mentions	Objects linked to one another	Contiguity	Absence of integration	Absence of structure	What to do there	What not to do there	Experience
P1	21	0	6	22	8	0	0	9	0	4
P2	7	0	7	16	8	0	0	11	0	8
P3	11	0	20	9	5	0	0	11	0	3
P4	12	0	19	9	5	0	0	13	0	1
P5	11	0	23	4	5	0	0	6	0	1
P6	8	0	27	14	13	0	0	6	0	2
P7	11	0	16	7	4	0	0	12	1	3
P8	8	0	24	10	4	0	0	9	0	3
P9	10	0	21	10	5	0	0	7	0	2
P10	19	0	20	12	9	0	0	9	0	1

Step Two: Correlations among Participant Conceptualizations and Categorization of Environmental Information

In order for this methodology to inform on how people conceptualize built environments, attention must be drawn to the plausibility of the data array, which weighs heavily on the conceptual robustness of the coding system used to develop it. If participants demonstrate their reliance on the presence of meaningful spatial conditions for activity, then the coding system used, should generate rows in the data array which have an internal coherency based on that reliance. This simply means that the individual

categories must relate to one another, in order, for a participant's observations about spatial integrity, for example, to be reflected across a row and not solely found in independent elements of it. The interpretation of a row will be from the perspective of some categories being a part of that participant's conceptualization and some not being a part. For example, Table 4.2 above represents data from the hair salon where the spatial conditions are unaltered. Notice that the column for *affordances evident* has frequencies recorded but *affordances not evident* does not. The column for *Affordances evident* records instances a participant perceives and mentions affordances that are evident in the image. The column *affordance not evident,* then, represents instances where affordances are not evident to the participant. We would expect that in the image of the unaltered hair salon affordances evident would contain higher frequencies that affordances not evident. The integration between the concepts and the ability for a participant to mention or not mention a category, or categories, constitutes the robustness, referred to above, that is necessary for a complete conceptual understanding of that participant's conceptualization of information available to them in the image.

A correlation matrix derived from the data array is used to discover similarities or differences among participant responses. Rows in the data array correlate with one another and produce the coefficients in this table. A perfect correlation results in a value of 1, and a value of 0 suggests no correlation. Therefore, a correlation value that is closer to 1 suggests that the two participants view the image in a similar manner. A partial matrix for only the first ten participants presents the correlations between their responses for the hair salon with unaltered spatial conditions and shown in Table 4.3.

Table 4.3 Partial table illustrating correlation matrix between first ten participants.

	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
P1	1	0.778	0.684	0.708	0.504	0.595	0.675	0.572	0.656	0.771
P2	0.778	1	0.692	0.751	0.472	0.77	0.67	0.607	0.764	0.708
P3	0.684	0.692	1	0.946	0.902	0.837	0.952	0.901	0.905	0.919
P4	0.708	0.751	0.946	1	0.894	0.875	0.935	0.924	0.94	0.91
P5	0.504	0.472	0.902	0.894	1	0.808	0.863	0.929	0.871	0.828
P6	0.595	0.77	0.837	0.875	0.808	1	0.762	0.858	0.944	0.855
P7	0.675	0.67	0.952	0.935	0.863	0.762	1	0.874	0.856	0.903
P8	0.572	0.607	0.901	0.924	0.929	0.858	0.874	1	0.908	0.828
P9	0.656	0.764	0.905	0.94	0.871	0.944	0.856	0.908	1	0.88
P10	0.771	0.708	0.919	0.91	0.828	0.855	0.903	0.828	0.88	1

Interpretation of the table is demonstrated through the following example. If we find that the correlation between participant 1's response and participant 2's is .778, suggesting the two responses are quite similar. A Pearson product correlation is a measure of the standardized covariance between any two subjects. The common variance accounted for by the inter-correlation between Participant 1 and Participant 2 would be sixty percent (i.e., $.778^2$)…which is to say that sixty percent of their common variance arises because of the similar way they perceive the image. If another subject, P10, correlates highly with these two subjects, P1, and P2, this further suggests that three subjects out of the forty-eight conceptualize the information from the image in a rather similar way and may constitute a group.

Now if, upon further inspection, it is noted that another subset of subjects have a common conceptualization (i.e., their rows in the data array are highly inter-correlated) which is different from the one displayed by the three just discussed, then another kind of commonality, or group, exists in the sample. Each of these distinctive commonalities is suggestive of a separate manner in which people conceptualize information from the image. If it is found that these differences also exist between the two different

presentations of the environment, first where the spatial conditions are removed or altered and second where they remain unaltered, I argue that space through the spatial conditions of the built environment potentially influences how participants' conceptualize the built environment. The next step extracts these commonalities from the correlation matrix and defines each one of them conceptually.

Step Three: Finding Distinctive Groupings in Environmental Information Conceptualization and Categorization

The 'Ps' in Table 4.4 represent participants and the factors reflect instances of distinctive commonality underlying the correlations displayed in Table 4.3. Each factor represents a subset of participants that conceptualize information from the image similarly. Note the loadings positioned under Factor 1 in Table 4.4. This study used a cutoff of 0.500 to group contributors to a component or group. The loadings in Table 4.4 indicate that all ten participants constitute a distinctive group, or exhibit a source of commonality, in the correlation matrix; and they do so, because they apprehend information from the image similarly. The number of components in Table 4.4, represents the total number of groups or the number of ways in which people conceptualize the image. However, notice that none of the participants meet the cutoff value of 0.500, therefore, only the first factor provides a meaningful group. Chapter 5 presents in detail how to interpret the findings from the principal component analysis.

Table 4.4 Partial table illustrating component matrix for participants for the complete hair salon, environment one state one.

Participant	Factor Loading			
	1	**2**	**3**	**4**
P1	.853	.432	-0.171	-0.125
P2	.813	.353	0.093	0.242
P3	.925	-0.244	-0.022	0.137
P4	.952	-0.190	-0.056	0.173
P5	.836	-.495	0.032	-0.048
P6	.890	-0.155	0.283	0.060
P7	.900	-0.245	-0.134	-0.146
P8	.879	-.345	0.191	0.107
P9	.935	-0.214	-0.137	0.146
P10	.952	-0.105	-0.095	-0.086

The final objective in the methodology is to conceptually describe the nature of participants' conceptualization of the built environment and assess if and how participants rely on spatial conditions in that process. The final two analytical steps accomplish this task.

Step Four: Correlations among Categories

Step Four required that the original frequency table be considered, so that different correlations can now be run between the categories. When the categories are subjected to the factor analysis, two clarifications are made possible. First, we are able to assess the categories and the relationship between the various combinations of categories that participants relied on to form their conceptualizations concerning the six different interviews. Secondly, we can assess how independent or related the categories are from one another. This is a measure of how well the categories are defined and able to capture the variability in themes expressed by the participants. For example, if the categories are not well define and cannot capture the breadth of themes expressed by participants then we would expect very few factors to emerge from the principal component analysis.

However, if the categories are well defined, there may and probably should be grouping among some categories but we would expect several factors to account for the full range of variability in themes. Table 4.5, presents partial correlations for the first ten categories found in Table 4.2.

Table 4.5 Partial table illustrating correlation matrix for categories for the hair salon with spatial conditions unaltered.

	Affordance evident	Affordance no evident	Object mentions	Objects linked to one another	Contiguity	Absence of integration	What to do there	What not to do there	Experience
Affordance evident	1	-0.24	0.206	0.222	0.363	-0.24	0.419	0.225	0.082
Affordances not evident	-0.24	1	-0.14	-0.05	-0.14	0.7	-0.28	-0.07	-0.02
Object mentions	0.206	-0.14	1	0.033	0.378	-0.11	0.131	-0.04	0.082
Objects linked to one another	0.222	-0.05	0.033	1	0.599	0.016	0.144	-0.12	0.146
Contiguity	0.363	-0.14	0.378	0.599	1	-0.1	-0.01	-0.1	0.095
Absence of integration	-0.24	0.7	-0.11	0.016	-0.1	1	-0.15	-0.05	-0.07
What to do there	0.419	-0.28	0.131	0.144	-0.01	-0.15	1	0.31	0.16
What not to do there	0.225	-0.07	-0.04	-0.12	-0.1	-0.05	0.31	1	-0.09
Experience	0.082	-0.02	0.082	0.146	0.095	-0.07	0.16	-0.09	1

The correlation between any two categories in this table can also be viewed as a measure of the standardized covariance between their respective columns in Table 4.2. The correlation between *affordances evident* (C1) and *what to do in the image* (C8) is .419 and suggests that the two categories may be similar and reflect a greater dimension in how people apprehend information from the image. The common variance accounted for by the inter-correlation between *affordances evident* (C1) and *what to do in the image* (C8) is eighteen percent (i.e., .419^2)…which is to say that eighteen percent of their common variance arises because the two categories reflect similarly on the operationalization of how people conceptualize and categorize environmental information. If another content heading, *contiguity* (C5) correlates with these two categories, *affordances evident* (C1) and *what to do in the image* (C8), this further

suggests that three constructs out of the twenty-nine reflect a dimension in the conceptualization of how people respond to environmental information. From this, it follows that subsets of highly inter-correlated categories reflect the presence of a dimension of common variance in this matrix of correlations of categories.

Step Five: Finding Commonalities between Categories

The final step extracts dimensions from the correlation matrix of Table 4.5. Table 4.6 shows that, for this example, nine factors comprise the inter-correlations between all twenty-nine categories. This is meant to suggest that there are, at least, nine salient dimensions structurally encompassing themes that participants related during their evaluation of the image. Once again, if it is found that differences also exist between the two different presentations of the environment in the composition of the factors, first where the spatial conditions are removed and second where they remain unaltered, I argue that space has a potential role in how participants' conceptualize the built environment.

Table 4.6 Partial table illustrating component matrix for categories for the hair salon with spatial conditions unaltered.

Factor	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1	5.630	23.459	23.459
2	2.467	10.278	33.737
3	1.805	7.520	41.257
4	1.654	6.890	48.148
5	1.638	6.825	54.973
6	1.472	6.135	61.108
7	1.302	5.423	66.531
8	1.127	4.696	71.227
9	1.014	4.226	75.453
10	.850	3.540	78.993
11	.806	3.357	82.350
12	.698	2.908	85.258
13	.628	2.618	87.876
14	.620	2.585	90.461
15	.418	1.741	92.202
16	.394	1.641	93.843
17	.361	1.503	95.347
18	.314	1.306	96.653
19	.258	1.076	97.729
20	.203	.847	98.576
21	.109	.455	99.031
22	.095	.396	99.427
23	.089	.369	99.796
24	.049	.204	100.000

Assessing the Role of Space for Human Behavior in Ordinary Structured Environments

I performed the five-step analysis for both presentations for each of the three built environments for a total of six passes through the methodology. The information from these five steps permits us to assess the role of space in how people conceptualize and categorize environmental information.

To illustrate how this final assessment is accomplished, the factor loadings from principal component analysis for the participant profiles, Step 3, from Table 4.4 are examined further. As noted above, the first ten participants load highly on Factor 1, and constitute a distinct group, or source of commonality, in correlation matrix Table 4.3. They do so because their interpretations of the image are very similar to one another and collectively distinct from other similarities that may exist among other subsets of participants in the sample. So the next question follows: what themes are central to the

group's conceptualization, and in effect, collectively help to define this group? We turn to the factor loadings for each of the participants and explore more fully their profiles to answer this question (Table 4.7).

Table 4.7 Partial illustration on the nature of group 1 conceptualization of environmental information. This is a partial representation of the results (all 48 participants loaded > 0.500 on Factor 1).

Participant	Loadings on Factor 1	Categories Defining Factor 1					
		C1	C3	C4	C5	C8	C10
		Frequency of instances category mentioned					
P1	.853	6	29	11	16	2	0
P2	.813	6	18	4	10	3	1
P3	.925	6	36	9	7	7	1
P4	.952	16	33	13	17	6	0
P5	.836	10	39	12	10	2	1
P6	.890	12	35	13	19	3	1
P7	.900	13	31	3	1	5	2
P8	.879	8	14	5	11	1	1
P9	.935	11	16	4	4	3	2
P10	.952	6	17	5	8	1	2

What this table tells us is as follows: one conceptualization is represented in the first ten participants because the participants' loadings on Factor 1 are greater than 0.500. The primary definers for this group are participants 10 and 4 because they load the highest on Factor 1 (refer to Table 4.4) defining the participants' existence as a group. The frequencies of mentions of important categories by these subjects are shown in Table 4.7. From these frequencies, it is evident that six of the first ten categories play a role in the definition of the group. Now it is a simple matter, employing this reasoning to point out which of the categories are not parts of this group's conceptualization. Additionally, I employ other visualization methods such as scatter plots as well as consult participant narratives directly to explore the nature of the resulting group conceptualization.

By comparing each of the built environments across their two presentations, first in unaltered images and second where the spatial conditions are removed, we can directly assess the degree to which people rely on meaningful spatial conditions to conceptualize the built environment. The following chapter, Chapter 5, fully discusses the results of the analysis.

CHAPTER 5: RESULTS OF THE ANALYSIS

This chapter discusses the results of the empirical assessment described in the previous Chapter 4. The findings support the expectation that overall spatial conditions influence how people conceptualize built environments. For example, participants make explicit statements that suggest users of an environment routinely rely on spatial cues in concert with social knowledge to make behavioral decisions in structured environments. To demonstrate that they do, consider some general observations and comments and then results of the principal component analysis for the three built environments utilized in this case study.

General Observations Concerning the Role of Spatial Conditions in Participant Responses

Typical responses to the hair-salon image, where nothing has been altered, include statements like "hair-salon," "barbershop," "type," "typical of," "identity," "distinguishable," and "it's a recognizable scene." When asked, "what is it about the content in this picture, which you think allows you to recognize it?" The participants often mention something similar to this response:

> First hand exposure to it, seeing these things in real life and having visited
> a hair salon that is configured similarly. Although, different types of
> chairs, they're kind of similar styles they have pumps on them that is kind
> of unique to hair dressing chairs…just having personally visited a location
> like this.

Participant 2 observes and identifies different levels of affordance in the image. Objects have affordance, as does the scene as a whole. Participant 2 relies on those affordances in

concert with a particular spatial configuration to recognize social norms about the structured setting. They make this connection by stating:

> My understanding of what is supposed to be done in a hair dresser's salon its realistic um everything is, it's not abstract everything is to scale it seems plausible that I could sit in a chair and if in fact it is a hair dresser's salon that is why I would be there um to be to have my hair cut so it seems that it would be feasible to do that um the chairs are upright and a a it seems plausible

In contrast, a typical participant's response to the hair salon with its spatial conditions removed includes remarks like "confusion," "a lack of information," "missing context," "no order," and complain that the image is "unorganized." For example, one participant, Participant 10, demonstrates all of these remarks by suggesting that the altered hair-salon:

> looks like it needs arranging into a more meaningful formation. I think humans have a natural impulse to create meaning or create order or maybe mothers have that natural impulse or editors or some of the different roles that I play where I'm required to create meaning out of fragmented bits of you know whatever life throws up.

The response here seems personal but at the same time very typical of each participant's response with regard to missing context and meaning due to the lack of structure in the image. Participants appear to respond to the images based on their prior experience and current situations in life. Unlike participant comments during the second interview, many participants in the first session never mention the function of the environment. Most, in fact, do not refer to settings during the first interview. This suggests that the participants

do not recognize the information in the image as a built environment and shapes how they respond to questions that inquire about activities and experience within the image.

Assessing Participant Group Reliance on Spatial Conditions for Conceptualizing Built Environments: Results of the Principal Component Analysis

The results of the three built environments are presented first for the images with preserved spatial conditions and then for the images where spatial conditions are removed. Following the discussion of each of the six images, I present summary observations across each of the environments for both the unaltered images and the images where the spatial conditions were removed.

Statistical Results Obtained from the Assessment of Participant Responses to Depiction of the Unaltered Hair-Salon

Figure 5.1 Image of unaltered hair salon.

In the discussion of the results for the first image of the unaltered hair salon (Figure 5.1), I will present the procedural approach in detail. Because I repeated the same

approach for each of the six images that the participants viewed, I will only present the results in the discussion of the remaining five images. Recall from Chapter 4, the analysis requires two separate factor analyses, one to assess similarities or differences among participant profiles and one that assesses the relationship between the categories mentioned by participants.

Factor Analysis for Participant Data Array

The first factor analysis, applied to the participant profiles in a similar fashion to Q-methodology, provides an assessment of participants' subjective accounts of the image shown before them. If each participant maintains their own, unique, evaluation of the image then there would be little or no correlation amongst the participants and their resulting factor loadings would be very low (<0.500). If however, participants or a group of participants conceptualize the image in a similar fashion then there would be correlation in their evaluation and their factor loadings would be high (>0.500).

For the participant-profile factor analysis for the unaltered hair salon, four factors account for over 92% of the common variance observed between participants profile (Table 5.1). However, only three factors contain factor loadings >0.500). Factor 1 with eigenvalue of 36.013 accounts for the majority of variance (76.6%). This suggests a high level of homogeneity between participants' conceptualization of the image. All 48 participants loaded highly (>0.627) on Factor 1 (Table 5.2). The remaining two factors are comprised of very few participant profiles (n=4) and say very little towards understanding how participants as a group conceptualize the image of the unaltered hair salon. The second group consists of three participants and is marked by their low frequency mentions of objects and their greater description of objects linked to one

another (see Table Appendix B.1). Only one of these participants, P47, has a factor

loading that is higher for Factor 2 than for Factor 1, suggesting that this participant

identifies more with Factor 2 than with Factor 1. The third factor is comprised of one

participant's profile whose responses focused on object mentions and descriptions.

Appendix B contains the correlation matrix for participants.

Table 5.1 Common variance explained in participant responses to hair salon with preserved spatial conditions. The first four factors contain eigenvalues > 1, however, only three factors contain factor loadings >0.500.

Factor	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1	36.013	76.623	76.623
2	4.206	8.948	85.572
3	2.232	4.748	90.320
4	1.094	2.328	92.647
5	.750	1.596	94.243
6	.593	1.261	95.504
.	.	.	.
48	.000	.000	100.000

Table 5 2 Factor loadings for participants in their responses to hair salon with preserved spatial conditions.

Participant	Factor 1	Factor 2	Factor 3	Participant	Factor 1	Factor 2	Factor 3
P16	.974			P12	.859		
P11	.964			P47	.627	.705	
P33	.960			P44	.746	.626	
P4	.952			P41	.777	.536	
P10	.952			P43	.801		
P39	.952			P1	.853		
P9	.935			P21	.834		
P15	.934			P42	.855		
P3	.925			P24	.905		
P34	.922			P2	.813		
P28	.916			P46	.792		
P29	.913			P31	.850		
P14	.911			P36	.852		
P35	.910			P8	.879		
P27	.909			P23	.875		
P30	.908			P5	.836		
P7	.900			P37	.881		
P40	.893			P38	.910		
P6	.890			P25	.803		.519
P17	.885			P48	.838		
P22	.880			P20	.835		
P18	.880			P19	.723		
P32	.875			P45	.855		
				P13	.886		

Factor Analysis for Category Data Array

The next procedural step factors participant responses using the category frequencies. This factor analysis serves two purposes, one, to identify common themes amongst participant responses that reflect similarities or differences in their assessment of the image. The second purpose, then, is to assess how independent or related the categories are from one another. In other words, if the categories are not well defined and reflect similarly across the themes mentioned by participants, then we would expect few factors to emerge that account for the variability. If on the other hand, the categories reflect different dimensions of participant views, then, we would expect multiple factors to account for the variability in the themes mentioned by participants.

For the unaltered hair salon, none of the participants mention the categories: *absence of structure* (C7), *missing activity cues* (C19), *absence of overall context* (C21), and *missing scale information* (C25). These variables contain no variability and cannot be factored as part of the principal component analysis. Nine factors account for more than 75% of the variance in the remaining twenty-five categories (Table 5.3). Because nine factors account for the variability in the categories, it suggests that the categories, in fact, are well defined and reflect different themes in participants' assessment of the image. Only three categories mentioned by participants contain factor loadings <0.500 and are unassigned to a factor. This suggests that these categories, *object mentions* (C3), *routine encounter of the image* (C28), and *cues, signals prompts missing* (C17), do not account for variability in participant responses to the unaltered hair salon. Appendix B contains the entire correlation matrix for categories for the unaltered hair salon.

Table 5 3 Common variance explained across categories for hair salon with preserved spatial conditions.

	Initial Eigenvalues		
Factor	Total	% of Variance	Cumulative %
1	5.630	23.459	23.459
2	2.467	10.278	33.737
3	1.805	7.520	41.257
4	1.654	6.890	48.148
5	1.638	6.825	54.973
6	1.472	6.135	61.108
7	1.302	5.423	66.531
8	1.127	4.696	71.227
9	1.014	4.226	75.453
10	.850	3.540	78.993
11	.806	3.357	82.350
12	.698	2.908	85.258
13	.628	2.618	87.876
14	.620	2.585	90.461
15	.418	1.741	92.202
16	.394	1.641	93.843
17	.361	1.503	95.347
18	.314	1.306	96.653
19	.258	1.076	97.729
20	.203	.847	98.576
21	.109	.455	99.031
22	.095	.396	99.427
23	.089	.369	99.796
24	.049	.204	100.000

Participant mentions of the categories that comprise Factor 1 relate heavily on themes organized around activity, perception of what the image may afford, and social aspects of the setting (Table 5.4). Categories mentioned by participants that comprise Factor 2 also suggest that participants relied on the spatial conditions preserved in the image of the unaltered hair salon (Table 5.4). These include categories that relate to themes of organization, commonality, and structure in the image. The third factor suggests that participants rely on their experience to interpret what they see in the image (Table 5.4). Categories that comprise Factor 4 illustrate that participants relate the use of items in the image with their purpose and environmental cues that suggest what they might do in the image (Table 5.4). Factors 5 and 6 contain relatively infrequent mentions of categories that relate to a lack of information and suggest that these categories were not important consideration for participants when voicing their opinions concerning the unaltered hair salon. Factors 7, 8, and 9 contain frequencies that are well below the mean

frequency of 131 but do inform that for a few participants the design of what they were seeing in the image was functional and they could perceive how they might move about in the image and discuss with regard to a larger environmental context.

Table 5.4 Results of the factor analysis, loadings for participant responses to unaltered hair salon*.

Category	N	Percent	Factor								
			1	2	3	4	5	6	7	8	9
What not to do there	7	0.18%	.725								
What to do there	306	8.02%	.663								
Affordances evident	507	13.29%	.657								
Social norms	153	4.01%	.652								
PEB relations	126	3.30%	.601								
Social interactions	171	4.48%	.599								
contiguity	275	7.21%		.913							
Objects linked to one another	497	13.03%		.731							
Scene-like ecology	412	10.80%		.511							
Experience	79	2.07%			.763						
Mental schema invoked	14	0.37%			.719						
Typical experience	100	2.62%			.681						
Collective purpose of things	62	1.63%			.539	.632					
Collective use of items	10	0.26%				.887					
Activity cues present	253	6.63%				.534					
Atypical experience	13	0.34%					.875				
Confusion	2	0.05%					.835				
Affordances not evident	2	0.05%						.823			
Absence of integration	1	0.03%						.953			
How to move around the image	17	0.45%							.831		
Expectation of large environmental context	21	0.55%								.845	
Functional design present	60	1.57%									.880
Object mentions	607	15.91%									
Routine encounter of the image	102	2.67%									
Cues, signals prompts missing	18	0.47%									
Absence of structure	0	0.00%									
Activity cues missing	0	0.00%									
Overall context missing	0	0.00%									
Sense of scale missing	0	0.00%									
Total	**3815**	**100%**									

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 10 iterations.
* N is the frequency of mentions of each category, Percent records the percent of total mentions across all categories.

An alternative visualization of the relationship between the categories utilizes a biplot regression between Factor 1 and Factor 2 (Figure 5.2). Categories that relate more closely to one another will cluster within the biplot. Additionally, categories that inform little on how people conceptualize the image will plot near 0 and in the negative spaces on the plot. The biplot illustrates that generally, categories that relate to a coherent scene

with activity and social content interpretable by participants plot closer together than categories that relate to confusion, lack of order, and organization.
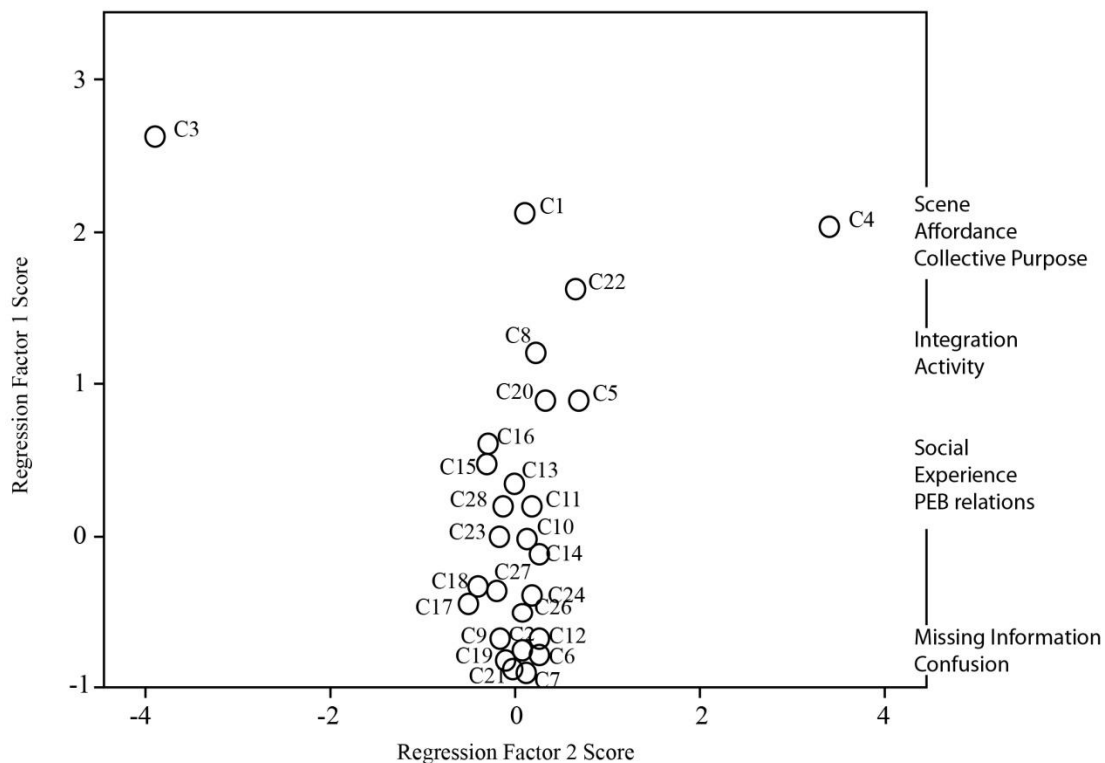
Figure 5.2 Biplot of Factor 1 and Factor 2 for participant principal component analysis illustrating clustering in categories.

Exploring Participants' Narrative Accounts

Additionally, we can explore what participants statements suggest concerning their viewpoints towards the image of the unaltered hair salon. For example, Participants 2 and 15, along with Participants 1, 3, 6, and 16, have similar profiles based on their observations on *affordances evident* (C1), *object mentioning* (C3), *linked objects* (C4), and *scene-like ecology* (C22). For example, Participant 15 observes:

> There is a pair of chairs each in front of a mirror and then there is a set of tools that are typical to a hair salon, there is a hair clipper and some scissors or a trimmer or something like that. And then the chairs themselves have the pretty…typical shape and style of a salon chair. They

have a footrest, plastic cover on the back and then there is a mat next to the chair for someone who is going to stand for a long period of time. It is just very similar, conceptually; the components are similar to any other hair salon.

Notice in the first sentence how the participant describes the chairs in relation to the mirrors and how particular features, to this participant, signal "hair salon." The participant continues to describe the chairs and integrates features that are likely to occur with them, like the mat. Participant 15 notes that the mat affords comfort while someone performs the service of cutting hair.

Participant 15 also makes observations that relate *integration* (C5), *activity cues* (C20), and perceived *activity* (C8). Participant 15 notes:

The content is pretty specific to the purpose of a hair salon. It's a particular kind of chair, that assists the hair stylist with their job so that the person is comfortable and they can move them up and down and rotate them. The mirror and then particular supplies that are there, the clippers, trimmer, and blow dryer are specific to that space.

Here Participant 15 notes the signals, prompts, and cues that are present in the image for identifying the purpose of the structured setting. They also remark on how the features of the setting permit social interaction between expected patrons and service providers.

Participants 2 and 15 provide similar responses with regard to *experience* (C10), *functional design* (C23), *routine encounter of the image* (C28), and identifying the *collective purpose of the objects* (C14). For example, when asked what their experience may be like if they were in the picture and why that may be the case, Participant 15 responds:

> It would be pleasant…..I guess since it seems to be a hair salon and a booth or a couple of booths at a hair salon, that's my experience of going to a hair salon so I assume that's the experience if I were in this space. It would be similar to what I have now.

Participant 2 also recognizes the ordinary nature of the image.

> um it just its making me think of when I have been at my hair dressers in a similar situation and that's how I usually feel when I'm there so I'm associating it with my experience when I'm at my hair dressers

Both participants provide insight on how our previous experiences in structured settings shape our ability to respond to similar, but novel situations, given enough spatial cues, prompts, and signals.

In summary, then, participants characterize the unaltered hair salon, through their observations of *affordances* (C1), *collective purpose of objects* (C14), *activity* (C8), *experience* (C10), and *social norms* (C15) and *imagined social interactions* (C16). Their reliance on *contiguity* (C5) and a presence of *scene-like ecology* (C22) illustrates the importance of meaningful spatial conditions in built environments. Participants are able to articulate person-environment-behavior transactions because they perceive, recognize and can conceptualize both the social and spatial information observed in the structured environment.

Statistical Results Obtained from the Assessment of Participant Responses to Depiction of the Hair-Salon with Spatial Conditions Removed

Figure 5.3 Image of hair salon with spatial conditions removed.

Factor Analysis for Participant Data Array

For the participant-profile factor analysis for the hair salon with spatial conditions removed (Figure 5.3), three factors account for over 92% of the common variance in participants' profiles (Table 5.5). However, only two factors have loadings that are >0.500. Factor 1 with eigenvalue of 40.845 accounts for 85% of the common variance across the participant profiles. Each of the 48 participant's factor loadings are >0.500 for Factor 1 and suggest that they strongly agree in their assessment of the image (Table 5.6). Factor 2 contained factor loadings <0.50. A single individual constitutes Factor 3 and therefore provides little information concerning group conceptualization of the image. Participant 26, however, does have a higher loading for Factor 2 than for Factor 1, which suggests that their personal profile is different from other participants in the sample. Appendix B contains the complete correlation matrix for participant profiles.

Table 5.5 Common variance explained across participant groups for hair salon with spatial conditions removed. Only the first three factors contain Eigen values >1, however, only two factors contain loadings >0.500.

Factor	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1	40.845	85.094	85.094
2	2.469	5.144	90.238
3	1.083	2.256	92.494
4	.823	1.715	94.208
5	.669	1.395	95.603
6	.470	.980	96.583
.	.	.	.
48	.000	.000	100.000

Table 5.6 Group conceptualizations for image of hair salon with spatial conditions removed.

	Factor				Factor	
Participant	1	3		Participant	1	3
P31	.992			P32	.940	
P23	.985			P41	.940	
P20	.978			P37	.934	
P27	.974			P28	.931	
P44	.971			P30	.930	
P6	.971			P5	.928	
P33	.971			P34	.923	
P35	.968			P48	.923	
P2	.968			P40	.916	
P12	.967			P43	.905	
P36	.967			P21	.903	
P11	.967			P17	.900	
P46	.967			P39	.898	
P22	.966			P7	.735	
P1	.964			P29	.888	
P42	.964			P15	.866	
P16	.963			P10	.860	
P9	.957			P13	.841	
P14	.955			P24	.891	
P4	.946			P47	.867	
P25	.943			P38	.907	
P19	.943			P45	.722	
P18	.942			P8	.918	
P3	.942			P26	.513	.785

Factor Analysis for Category Data Array

Participants did not mention *what not to do in the image* (C9), *person-environment-behavior transactions* (C13), *functional design* (C23), *collective use of the objects* (C26), and *imagined greater environmental context* (C27) and could not be factored in the category factor analysis. Again, nine factors emerge with eigenvalues greater than one and account for nearly 72% of the common variance in participant responses to the hair-salon with spatial conditions removed (Table 5.7). Factor 1 with an eigenvalue of 4.302 accounts for 17.9% of the common variance between the frequency

mentions of the categories by participants and Factor 2, eigenvalue of 2.386, accounts for an additional 9.9% of the common variance. Appendix B contains the complete correlation matrix for categories.

Table 5 7 Common variance explained across categories for hair salon with spatial conditions removed.

| | Initial Eigenvalues | | |
Factor	Total	% of Variance	Cumulative %
1	4.302	17.926	17.926
2	2.386	9.943	27.869
3	2.165	9.020	36.889
4	1.760	7.332	44.221
5	1.611	6.713	50.934
6	1.534	6.392	57.326
7	1.283	5.344	62.670
8	1.144	4.765	67.435
9	1.095	4.562	71.997
10	.941	3.919	75.916
11	.913	3.802	79.719
12	.832	3.466	83.185
13	.684	2.851	86.036
14	.664	2.768	88.804
15	.517	2.155	90.959
16	.417	1.736	92.695
17	.377	1.571	94.266
18	.339	1.414	95.680
19	.291	1.212	96.893
20	.239	.994	97.887
21	.156	.652	98.538
22	.137	.571	99.109
23	.114	.475	99.584
24	.100	.416	100.000

Participants mention categories that relate strongly to a lack of structure that define Factor 1 (Table 5.8). Additionally, participants note confusion, an inability to assess what they are viewing in the image. Participants rarely mention categories that relate to activity, social context, and experience (Table 5.8). These categories constitute Factors 2 and 3 and suggest that participants do not rely on these themes (because of their infrequent mentions) for their conceptualization of the image with the spatial conditions removed (Table 5.8). Factor 4 is comprised of infrequent mentions of a scene but frequent mentions of affordances not evident (n=216, M=103; Table 5.8). The two categories are inversely related suggesting that when participants observe that affordance is not evident in the image they are unable to identify a scene within the image. Factor 7

provides additional information about how the categories relate in participants views of the image (Table 5.8). The categories, *activities cues* (C20) and *social norms* (C15), are inversely related with the category *cues, prompts, or signals missing* (C17) (Table 5.8). Because participants more frequently mention missing information, the inverse relationship suggests that participants were not able to make judgments that relate to activity or identify social norms in the image.

Table 5.8 Results of factor analysis for hair salon with spatial conditions removed*.

Category	N	Percent	Factor								
			1	2	3	4	5	6	7	8	9
Absence of structure	316	10.87%	.824								
Overall context missing	147	5.06%	.819								
Absence of integration	252	8.67%	.804								
Confusion	126	4.34%	.559								
Routine encounter of the image	5	0.17%		.724							
Social interaction	2	0.07%		.700							
What to do there	34	1.17%		.615		.587					
Typical experience	9	0.31%		.524	.534						
Experience	35	1.20%			.755						
Objects linked to one another	27	0.93%			.605						
Collective purpose of items	55	1.89%			.573						
Scene-like ecology	15	0.52%				.805					
Affordances not evident	216	7.43%				-.589					
Integration	22	0.76%					.858				
Object mentions	1244	42.81%					.678				
Mental schema invoked	18	0.62%						.826			
Atypical experience	48	1.65%						.570			
Social norms	5	0.17%							.795		
Activity cues present	28	0.96%							.598		
Cues, prompts, signals missing	167	5.75%							-.505		
Affordances evident	102	3.51%								-.719	
How to move around	1	0.03%									.773
Activity cues missing	32	1.10%									
What not to do there	0	0%									
PEB relations	0	0%									
Functional design present	0	0%									
Collective use of the items	0	0%									
Expectation of a larger environmental context		0%									
Total	**2906**										

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 18 iterations.
* N is the frequency of mentions of each category, Percent records the percent of total mentions across all categories.

The biplot regression of Factor 1 and Factor 2 from the principal component analysis illustrates categories that relate themes concerning information is missing, confusion, or lack of structure tend to group together for the hair salon with spatial

conditions removed (Figure 5.4). The plot also illustrates that themes related to environmental knowing such as affordances evident, scene-like ecology, activity cures present are not important in participant's conceptualization of the image where the spatial conditions are removed.
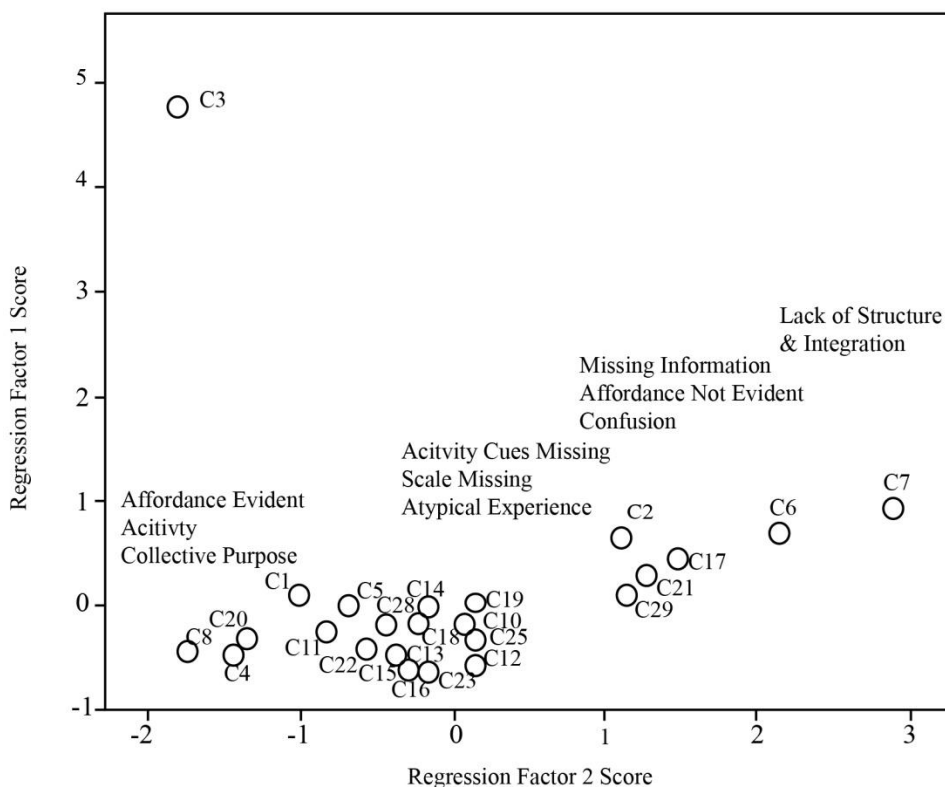
Figure 5.4 Biplot regression of Factor 1 and Factor 2 from participant principal component analysis illustrating clustering in categories.

Exploring Participants'' Narrative Accounts

Six participants, P7, P9, P10, P16, P25, and P29, correlate strongly in their responses concerning themes related to confusion and disorder in the image. Participant 10 observes that:

I don't know what the objects are, there is no context to tell me what the meaning of this is, some things are upside down, and the most identifiable

thing is clearly upside down. So there is a distinct quality of disorder in the random placements. It doesn't feel to appear to follow gravity or any other logical structure. Maybe it's in a space station.

Spatial cues, prompts, and signals are clearly missing for this participant. They complain of confusion due to the random, or meaningless, placement of objects, disorder, disregard to physical laws such as gravity and logical structure. Participant 9 elaborates on her feelings of discomfort and how this uneasiness, too, relates to missing spatial cues.

Its lack of order maybe, although, I don't mind abstract things, but its lack of identifiable pieces that you can't really quite find a part for…um...and so it's the lack of order and the…you know…the lack of being able to resolve what it is about and what to do with the various parts.

Another group of participants mentions missing information as well, in addition to a lack of structural cues. These participants relate missing contextual information in their narratives. For example, Participant 7 illustrates the connection between structural integrity and contextual information, particularly with regard to scale information:

Um...if I were in the picture I could look at the items more closely (pause) and possibly rearrange them I might feel a little more comfortable trying to identify some of the items. If I were the same size because like I said some of them look like the same thing only they're different sizes so it would depend on what size I was when I was in the midst of trying to arrange them too. Otherwise, they might be larger than me and still hard to identify. If they remained the size they are, then I think I could arrange them and maybe make some sense out of them.

To summarize participant conceptualizations of the hair salon with the spatial conditions removed, participants are searching for clues that are not present in the second

presentation of the hair salon. This invites confusion and an inability to recognize a scene for participants because the spatial conditions are no longer meaningful.

Statistical Results Obtained from the Assessment of Participant Responses to Depiction of the Unaltered Waiting Room

Figure 5.5 Image of unaltered waiting room.

Factor Analysis for Participant Data Array

For the participant-profile factor analysis for the unaltered waiting room (Figure 5.5), four factors account for nearly 94% of common variance in participants profiles for the image (Table 5.9). However, only two factors have factor loadings >0.500. Factor 1 with an eigenvalue of 33.968 accounts for 72% of the common variance in participant profiles. Again, all 48 participants have factor loadings >0.500 suggesting similar conceptualization of the image. Thirteen participant profiles comprise Factor 2 (Table 5.10). Seven of these profiles are at odds with the other six profiles. However, only one participant, in this group of thirteen, has a greater loading in Factor 2 than for Factor 1. This finding suggests that the majority of the participants forming Factor 2 identify more strongly with the entire sample from Factor 1. Appendix B contains the complete correlation matrix for participants.

Table 5.9 Common variance explained across participant groups for waiting room with preserved spatial conditions.

	Initial Eigenvalues		
Factor	Total	% of Variance	Cumulative %
1	33.968	72.273	72.273
2	7.159	15.231	87.504
3	1.579	3.359	90.862
4	1.336	2.843	93.705
5	.789	1.678	95.384
6	.586	1.246	96.630
7	.348	.741	97.371
8	.315	.669	98.040
9	.210	.446	98.486
10	.188	.400	98.886
11	.146	.310	99.196
12	.094	.200	99.395
13	.069	.147	99.542
14	.067	.143	99.685
15	.054	.116	99.801
16	.035	.074	99.875
17	.024	.052	99.927
18	.014	.029	99.956
19	.010	.021	99.977
20	.004	.008	99.986
21	.003	.007	99.993
22	.002	.005	99.998
23	.001	.002	99.999
.	.	.	.
48	.000	.000	100.000

Table 5.10 Group conceptualizations for image of waiting room with preserved spatial conditions.

	Factor				Factor	
Participant	1	2		Participant	1	2
P3	.958			P20	.835	
P48	.957			P40	.678	
P16	.951			P41	.873	
P26	.929			P47	.796	
P32	.927			P43	.837	
P29	.926			P37	.870	
P11	.923			P24	.901	
P17	.908			P35	.914	
P23	.905			P8	.892	
P7	.905			P14	.897	
P42	.900			P4	.889	
P30	.893			P18	.852	
P10	.893			P9	.904	
P15	.863			P31	.870	
P34	.833			P6	.901	
P19	.789			P27	.817	-.506
P45	.614	.575		P13	.814	-.527
P39	.760	.568		P28	.814	-.534
P33	.778	.562		P12	.789	-.534
P38	.721	.551		P25	.821	-.551
P46	.749	.550		P5	.570	-.791
P44	.765	.541		P21	.789	
P36	.822	.513		P1	.885	
				P2	.889	

Factor Analysis for Category Data Array

Categories not used in the analysis due to no variance observed across participant responses, because they did not mention these categories, include *absence of integration* (C6), *absence of structure* (C7), *missing activity cues* (C19), *overall context missing* (C21), and *sense of scale missing* (C25). Nine factors accounted for 77% of the common variance in participant responses to the image of the unaltered waiting room (Table 5.11). Factor 1 has an eigenvalue of 5.086 and accounts for 21.2% of common variance observed in participants' responses. Factor 2, with an eigenvalue of 2.625, accounts for an additional 10.9% of variance. Appendix B contains the correlation matrix for categories.

Table 5.11 Common variance explained across categories for the unaltered waiting room.

Factor	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1	4.302	17.926	17.926
2	2.386	9.943	27.869
3	2.165	9.020	36.889
4	1.760	7.332	44.221
5	1.611	6.713	50.934
6	1.534	6.392	57.326
7	1.283	5.344	62.670
8	1.144	4.765	67.435
9	1.095	4.562	71.997
10	.941	3.919	75.916
11	.913	3.802	79.719
12	.832	3.466	83.185
13	.684	2.851	86.036
14	.664	2.768	88.804
15	.517	2.155	90.959
16	.417	1.736	92.695
17	.377	1.571	94.266
18	.339	1.414	95.680
19	.291	1.212	96.893
20	.239	.994	97.887
21	.156	.652	98.538
22	.137	.571	99.109
23	.114	.475	99.584
24	.100	.416	100.000

Similar to the results for the unaltered hair salon, participant responses to the unaltered waiting room suggest that categories that relate to activity, social norms and content, as well as structure in the scene are important themes in their conceptualization

of the image. Themes such as these are reflected in the first two factors (Table 5.12). The third factor suggests that participants additionally, rely on their experience for assessing the image (Table 5.12). Factor 5 suggests that participants link spatial configuration with their interpretation of the design of the setting (Table 5.12).

Table 5.12 Results of the factor analysis for participant responses to the unaltered waiting room*.

Category	N	Percent	Factor								
			1	2	3	4	5	6	7	8	9
What to do there	226	6.24%	.817								
Affordance evident	592	16.36%	.709								
PEB relations	75	2.07%	.675								
Social interaction	144	3.98%	.545								
What not to do there	5	0.14%	.537								
Scene-like ecology	463	12.79%		.759							
Expectation of larger environmental context	75	2.07%		.735							
Mental schema invoked	28	0.77%		.814							
Experience	57	1.58%			.853						
Typical experience	53	1.46%			.895						
Atypical experience	1	0.03%				.928					
Integration	275	7.60%					.861				
Objects linked to one another	384	10.61%					.828				
Function design present	72	1.99%		.516			.538				
Activity cues present	243	6.71%						-.599			
Object mentions	644	17.80%						.686			
Confusion	2	0.06%						.738			
Collective use of items	4	0.11%							.824		
Collective purpose of items	50	1.38%							.804		
Social norms	99	2.74%								.663	
Routine encounter of the image	84	2.32%								.786	
Cues, prompts, or signals missing	8	0.22%						.517			.689
Affordances not evident	2	0.06%									.804
How to move around	33	0.91%									
Absence of integrations	0	0.00%									
Absence of structure	0	0.00%									
Activity cues not present	0	0.00%									
Overall context missing	0	0.00%									
Scale information missing	0	0.00%									
Total	**3619**	**100.00%**									

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.
a.   Rotation converged in 18 iterations.
*   N is the frequency of mentions of each category, Percent records the percent of total mentions across all categories.

The biplot regression of Factor 1 and Factor 2 from the factor analysis reveals a pattern similar to that of the unaltered hair salon (Figure 5.6). Categories that group together in this plot reflect themes related to affordance and activity and link them with structure and integration in the image.
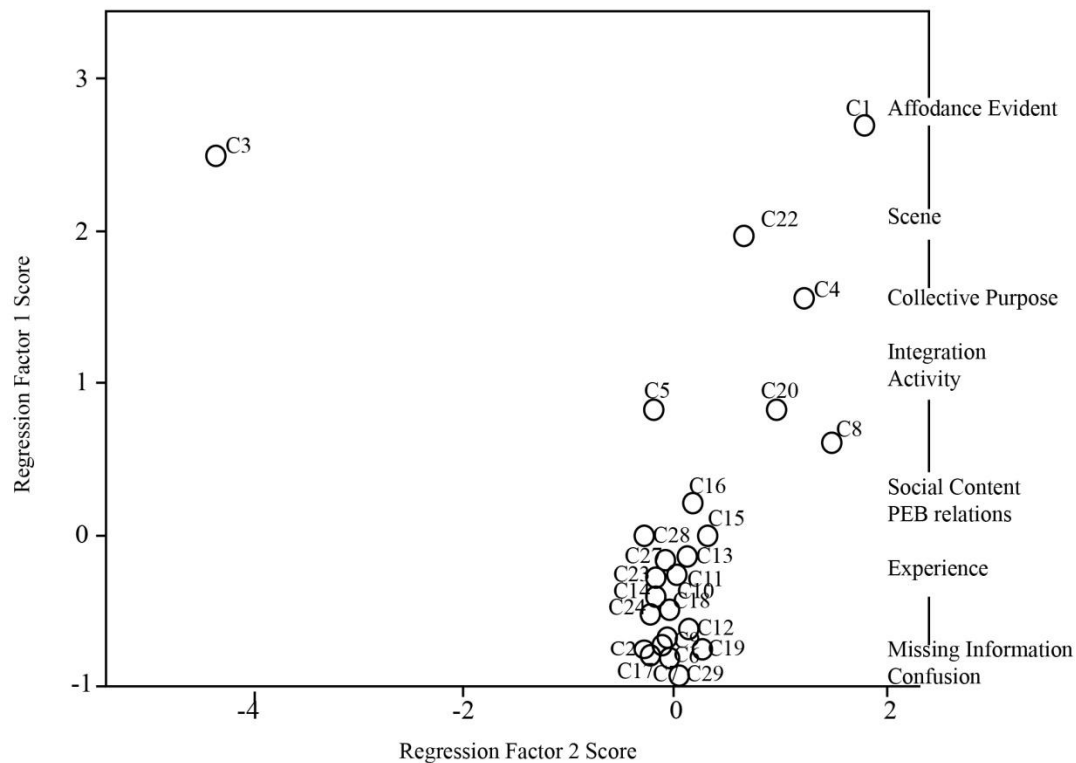
Figure 5.6 Biplot of Factor 1 and Factor 2 from participant principal component analysis illustrating clustering in categories.

Exploring Participants' Narrative Accounts

Many participants provide a laundry-list account of the objects in the image. Participant 5 responses are exemplary of this type of description.

Again not familiar with that exact picture but very similar things. I have seen black chairs everyday have one similar at work. You see flooring very similar very similar checkered patterns. See a counter top about every day at work. You see the wooden chairs and table every now and then. And then whatever else is up top whether it is a remote, I see that every day, if it's a TV, computer screen or whatever that is, I see a computer every day if its water I drink water every day.

Nevertheless, for most participants their narratives include discussions that relate *affordances evident* (C1), *linked objects* (C4), *integration* (C5), *activity* (C8), *activity cues* (C20), and *scene-like ecology* (C22). For example, Participant 10 observes:

> Looks like a waiting area, probably in a doctor's office and it has a couple of chairs for adults and kind of a work area that looks kid scaled.

Notice how the participant relates their first observation of 'looks like a waiting area' to the objects and areas within the image to form an opinion on affordances for adults and kids in the space.

Likewise, Participant 7 echoes a similar response as Participant 10 but highlights the connection between integration, activity, and presence of activity cues. Participant 7 notes:

> It looks like it might possibly be a…an office maybe for…um...an eye doctor. But I see a small table and chairs with looks like maybe books on it for children and I see regular kind of chairs that look like chairs that might be in a waiting room of some sort. The counter on the left is what made me think it's a place for an eye doctor because of the brochure on the left with the glasses and it looks like glass cleaning solution and maybe um…contact lens cleaning solution. And it looks like a remote control on the right but for what I'm not sure. I don't know if that is a TV screen of what type of screen on the right hand side and also it looks like there some brochures on the left side of the counter top. And um...yeah that's why I think it's an eye place either for eye testing or I don't see glasses but possibly could be a place to buy glasses too.

Participant 7 pays particular attention to the information provided by objects in the image through their spatial arrangement and proximity to one another and their placement within scene.

Finally, participants often relate what they see in the image to where they encounter the setting in their daily routine. Participant 18 describes:

> One would encounter this picture in their daily routine a) if they worked in this setting or environment they would obviously be there every day; or if you had some sort of appointment in this facility or building regardless of what it might be you would have an experience there.

Much like the first built environment of the hair salon, participants respond to this image by referring to spatial cues, prompts, signals and relate them to social information based on their priory experiences to form expectations about social norms and imagined social interactions in the structure setting presented in the image.

Statistical Results Obtained from the Assessment of Participant Responses to Depiction of the Waiting Room with Spatial Conditions Removed

Figure 5.7 Image of waiting room with spatial conditions removed.

Factor Analysis for Participant Data Array

In the participant-profile factor analysis for the waiting room with spatial conditions removed (Figure 5.7), two factors account for over 95% of the common variance observed in participant profiles (Table 5.13). However, only Factor 1 has factor loadings >0.500 and accounts for more than 93% of the common variance among participants' responses to the image of the waiting room with spatial conditions removed. All participants record factor loadings >0.500 for this factor (Table 5.14). Appendix B contains the complete correlation matrix.

Table 5.13 Common variance explained across participant groups for waiting room with spatial conditions removed. The first two factors have Eigen values >1 but only Factor 1 has factor loadings >0.500.

Factor	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1	44.752	93.233	93.233
2	1.160	2.417	95.650
3	.725	1.511	97.161
4	.296	.617	97.779
5	.244	.509	98.288
.	.	.	.
.	.	.	.
48	.000	.000	100.000

Table 5.14 Group conceptualizations for image of waiting room with spatial conditions removed.

Participant	Factor 1	Participant	Factor 1
P15	.995	P1	.979
P20	.994	P31	.978
P28	.992	P9	.978
P30	.992	P11	.977
P48	.991	P3	.976
P42	.990	P43	.976
P32	.989	P8	.975
P47	.987	P26	.975
P12	.986	P6	.968
P27	.986	P36	.967
P44	.985	P5	.962
P13	.985	P25	.960
P14	.985	P17	.955
P34	.984	P33	.955
P19	.983	P2	.946
P37	.983	P29	.946
P10	.982	P35	.946
P41	.982	P24	.934
P45	.982	P7	.930
P39	.981	P16	.874
P4	.981	P21	.864
P23	.981	P46	.867
P18	.980	P40	.900
P22	.980	P38	.878

Factor Analysis for Category Data Array

Twenty-five categories of the twenty-nine met requirements for inclusion in the principal component analysis for the categories. Categories not included in the analysis include *what not to do in the image* (C9), *person-environment-behavior transactions* (C13), *functional design* (C23), and *collective use of objects* (C26). Ten factors account for 78% of the variability observed in participants' responses (Table 5.15). Factor 1 has an eigenvalue of 3.910 and accounts for 15.6% of common variance between participant responses to the image of the waiting room with removed spatial conditions. Factor 2 has an eigenvalue of 3.558 and accounts for 14.2% of the common variance. Appendix B contains the complete correlation matrix for categories.

Table 5.15 Common variance explained across categories for waiting room with spatial conditions removed.

Factor	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1	3.910	15.640	15.640
2	3.558	14.231	29.871
3	2.292	9.168	39.039
4	1.947	7.789	46.829
5	1.776	7.103	53.932
6	1.511	6.046	59.978
7	1.318	5.270	65.248
8	1.180	4.718	69.966
9	1.033	4.132	74.098
10	1.007	4.028	78.126
11	.873	3.491	81.617
12	.771	3.084	84.700
13	.689	2.755	87.456
14	.586	2.345	89.801
15	.530	2.120	91.921
16	.425	1.698	93.619
17	.341	1.364	94.983
18	.331	1.326	96.309
19	.247	.988	97.297
20	.236	.944	98.241
21	.159	.635	98.876
22	.100	.400	99.276
23	.073	.291	99.567
24	.061	.244	99.811
25	.047	.189	100.000

Two factors emerge of near equal value in explaining variability among the categories. Categories for Factor 1, with loadings > 0.500, include *typical experience*

(C11), *social interaction* (C16), and *scene-like ecology* (C22) (Table 5.16). While, Factor 2 includes *absence of integration* (C6), *absence of structure*, *overall context missing* (C21), and *mental schema invoked* (C24) (Table 5.16). Participant 38 provides an example, relating categories that define Factor 1, when they are asked to describe what they see in the image to someone who is unfamiliar with the picture. They state:

> I would say it's a waiting room and you see a couple of chairs there that would give you a chance to sit down and maybe a couple of magazines to read. um..until you wait for your appointment till you are called into the doctor's office. The colors in the room are very neutral to be soothing to whoever is waiting and not creating any anxious thoughts.

Whereas Participant 15 illustrates typical responses that fall into Factor 2:

> So it's a collage of pictures placed on a white background arranged not really in any particular order. the cutout pictures in the collage are everyday items like chairs table, papers, electrical outlet and they are varying sizes and are randomly placed on the white background.

Table 5.16 Results of the factor analysis for participant responses to waiting room with spatial conditions removed*.

Category	N	percent	Factor								
			1	2	3	4	5	6	7	8	9
Typical experience	8	0.30%	.902								
Scene-like ecology	14	0.53%	.860								
Social interaction	5	0.19%	.770								
Overall context missing	70	2.63%		.606							
Absence of structure	162	6.10%		.901							
Absence of integration	173	6.51%		.867							
Mental schema invoke	3	0.11%		.508							
Affordances evident	103	3.88%			.772						
Routine encounter of image	2	0.08%			.899						
Cues, prompts, or signals missing	157	5.91%				.784					
Affordances not evident	177	6.66%				.751					
Activity cues missing	20	0.75%				.732					
Activity cues present	5	0.19%					.835				
What to do there	49	1.84%					.744				
Atypical experience	5	0.19%						.827			
How to move around	4	0.15%						.563			
Integration	6	0.23%							.603		
Objects linked to one another	22	0.83%							.814		
Confusion	59	2.22%							.500		
Social norms	3	0.11%								.893	
Expectation of larger environmental context	5	0.19%									.920
Object mentions	1497	56.34%									.254
Experience	17	0.64%									
Collective purpose of items	51	1.92%									
Scale information missing	40	1.51%									
What not to do there	0	0.00%									
PEB relations	0	0.00%									
Functional design present	0	0.00%									
Collective use of the items	0	0.00%									
Total	**2657**	**100%**									

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 9 iterations.

* N is the frequency of mentions of each category, Percent records the percent of total mentions across all categories.

The biplot regression of Factor 1 and Factor 2 from the principal component analysis reveals a pattern similar to the hair salon with spatial conditions removed suggesting that overall participants perceive a lack of organization as well as missing information and express confusion concerning the image (Figure 5.8). For example, consider Participant 25's statement:

> Again its cutout objects that look like there's actually a wall or something that could resemble a wall, or a ceiling, or a floor, part of a desk, there's two chairs or three chairs um…then various surfaces and picture of a remote. And then a few pieces of paper or cutouts of paper or documents.
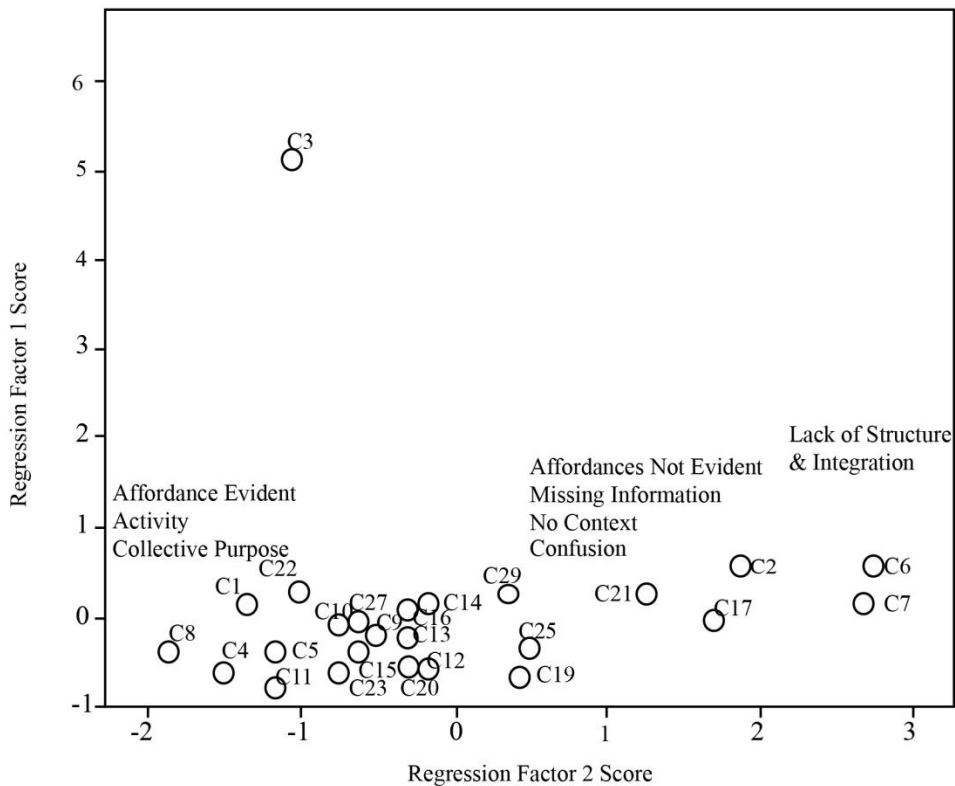
Figure 5.8 Biplot regression of Factor 1 and Factor 2 from participant principal component analysis illustrating clustering in categories.

Exploring Participants' Narrative Accounts

Participant 17 elaborates on themes related to lack of information and inability to

perceive and understand what the image affords. They state:

> I still think there's a few things missing in terms of context, what the black
> line may stand for, if the gray line that's standing up is part of a file
> cabinet or if we are really talking about a ceiling. And where the rest of
> the desk is and what the posters are. I'm still a little uncertain as to what
> the rest of the story is. And I don't know what the blue thing is laying on
> the floor. So there is a story there that I'm still not completely sure of what
> those items are there.

Participant 16 suggests that information related to scale and integration is missing

in the image:

The important thing is, that if the picture has any importance (laughs), is that there are chairs and what would be important for somebody to understand about this picture...is that you've got um…furniture and walls and...but there's no scale except for the chair and the table. The chair and the table are scaled together but the two black chairs are not. And the other things are just...I recognize these as walls and floors but I don't know why I do. I just think that's what they look like to me. And these chairs are not they are either close to you and further away in a reordered photograph or they are…just they have no relationship to each other but they are exactly the same. I don't know.

You can see how the participants are grasping for meaning in the image. They are trying to form relationships between the items that are not apparent. They recognize missing spatial cues particularly with regard to scale.

However, note how Participant 4 observes and recognizes affordances from the image:

well I'm pretty sure that I could sit in that chair because I recognize it as a chair and I've sat in chairs like that before. So I know that I could do that. The poster that has words on it I'm not sure what language they are but I would assume I could read it or if it was in a different language I might be able to look at the picture and kind of figure out maybe what it is about. My experience with remotes tells me it has buttons that operate TV or some other type of apparatus. So I think it's probably connected to something. And so I could do that.

Participant 4's responses focus affordance on individual items. Participant 18 however, observes and recognizes affordances differently:

It's hard to make out what the pictures themselves...again I'm just…again jumping to conclusions here. To me in the business that I've had the opportunity to work in that's what I would find there and that's what I'm drawing my conclusions from. Looks like pretty nice tile floor, nice wall, nice desk, decent chair, light switches. I can't make out if that is some sort of award or degree or some art work. Those are certain things that would be in someone's office. I think you would either being giving some sort of professional advice to someone in some form or another or receiving it. information gathering. Service oriented I guess

The comments shared by Participant 18 exemplify the variables that constitute Factor 1 for the categories. Their recognition of affordance does not relate spatial cues but rather the collective purpose presented in the image.

Participants do not respond to this image as they do in the state one presentation, where *affordances* (C1), *activity* (C8), *social norms* (C15), and *interactions* (C16) are clearly apparent across all participants; nor, as a group, do they respond as they did with the deconstructed hair salon where their narratives focused on confusion, disorder, lack of structure or logic at the exclusion of other themes. Participants express confusion to the image as a whole. However, they are able to relate to the common nature of the objects present in the picture and recognize the ability to relate such objects either to multiple structure settings or simply by object affordance without consideration of environmental context, just as Participant 4 recognizes a chair and that the chair affords sitting.

Statistical Results Obtained from the Assessment of Participant Responses to Depiction of the Unaltered Kitchen

Figure 5.9 Image of the unaltered kitchen.

Factor Analysis for Participant Data Array

Five factors account for 93% of the common variance in participants' responses to the unaltered image of a kitchen (Figure 5.9; Table 5.17). However, only two factors have loadings >0.500. Factor 1 has an eigenvalue of 32.637 and accounts for nearly 68% of the common variance between the participant responses. Each of the 48 participants have factor loadings >0.500 (Table 5.18). This finding suggests that the participants view the image similarly. Thirteen participants comprise Factor 2. Six of these participants have positive factor loadings and the remaining seven have negative factor loadings, which suggest that their opinions about the image are very different from the group of six. However, all thirteen participants load higher in Factor 1, suggesting that they identify more with the entire group than they do as a subset. Appendix B contains the correlation matrix for participants.

Table 5.17 Common variance explained across participant groups for unaltered kitchen. The first five factors have Eigen values >1, but only the first two factors have loadings that are >0.500.

Factor	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1	32.637	67.993	67.993
2	7.019	14.622	82.616
3	2.445	5.093	87.709
4	1.573	3.277	90.986
5	1.058	2.204	93.189
6	.934	1.945	95.135
7	.731	1.522	96.657
8	.354	.737	97.395
9	.300	.624	98.019
10	.283	.590	98.609
.	.	.	.
48	.000	.000	100.000

Table 5.18 Group conceptualizations for image of unaltered kitchen.

Participant	Factor 1	2	Participant	Factor 1	2
P14	.964		P40	.768	
P4	.955		P33	.840	
P29	.920		P38	.763	
P27	.919		P37	.803	
P26	.910		P24	.807	
P34	.908		P6	.917	
P16	.906		P28	.901	
P31	.906		P1	.874	
P2	.894		P13	.808	
P32	.890		P7	.736	-.523
P20	.879		P18	.813	-.514
P39	.856		P25	.815	-.520
P43	.748	.572	P11	.829	-.526
P42	.621	.534	P3	.804	-.532
P48	.786	.529	P12	.738	-.548
P47	.818	.516	P5	.794	-.554
P45	.657	.515	P30	.858	
P41	.672	.593	P19	.827	
P21	.769		P9	.830	
P22	.790		P17	.695	
P46	.517		P15	.866	
P36	.776		P23	.850	
P35	.792		P8	.889	
P44	.810		P10	.869	

Factor Analysis for Category Data Array

Participants did not mention the following variables in their responses to the unaltered kitchen: *affordance not evident* (C2), *absence of integration* (C6), *absence of structure* (C7), *activity cues missing* (C19), *overall context missing* (C21), *sense of scale missing* (C25), and *confusion* (C29). Eight factors emerge with eigenvalues greater than 1 and account of 69% of the variability observed in category frequency mentions by participants (Table 5.19). Factor 1 with an eigenvalue of 3.482 accounts for 15.8% of the

common variance observed between category frequencies. Factor 2 has an eigenvalue of 2.542 and Factor 3 has an eigenvalue of 2.146 and together account for an additional 21.3% of common variance. Appendix B contains the complete category correlation matrix.

Table 5.19 Common variance explained across categories for unaltered kitchen.

Factor	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1	3.482	15.826	15.826
2	2.542	11.554	27.380
3	2.146	9.753	37.133
4	1.942	8.826	45.958
5	1.470	6.682	52.641
6	1.327	6.030	58.671
7	1.244	5.652	64.323
8	1.092	4.962	69.285
9	.876	3.983	73.268
10	.857	3.898	77.165
11	.799	3.633	80.798
12	.764	3.472	84.270
13	.668	3.035	87.305
14	.577	2.621	89.926
15	.453	2.061	91.987
16	.402	1.829	93.816
17	.385	1.748	95.564
18	.332	1.511	97.075
19	.252	1.148	98.223
20	.184	.836	99.058
21	.133	.603	99.661
22	.075	.339	100.000

Factor 1 contains two categories that relate objects and spatial integration (Table 5.20). Participants demonstrate a relationship between themes that relate PEB relations with environmental expectations and scene structure illustrated in the factor loadings present in Factor 3. For the unaltered kitchen participants suggest that there is a relationship between activity and social interaction as illustrated by Factor 4.

Table 5.20 Results of the factor analysis for participant responses to the unaltered kitchen*.

Category	N	Percent	Factor							
			1	2	3	4	5	6	7	8
Integration	433	11.51%	.905							
Objects linked to one another	407	10.82%	.855							
Routine encounter of the image	105	2.79%		.715						
Activity cues present	258	6.86%		-.575						
How to move around	64	1.70%			.667					
Scene-like ecology	515	13.69%			.536					
Expectation of larger environmental context	136	3.62%			.744					
PEB relations	67	1.78%			.601	.520				
What to do there	167	4.44%				.814				
Social interaction	37	0.98%				.711				
Typical experience	39	1.04%					.593			
Experience	56	1.49%					.819			
Functional design	92	2.45%					-.542			
Social norms	116	3.08%						.821		
Cues, prompts, or signals missing	4	0.11%						.806		
Object mentions	681	18.11%							.518	
Atypical experience	1	0.03%							.797	
Mental schema invoked	26	0.69%							.648	
Affordances evident	459	12.20%								.782
Collective purpose of items	78	2.07%								
Collective use of items	18	0.48%								
Confusion	0	0%								
Affordances not evident	0	0%								
Absence of integration	0	0%								
Activity cues not present	0	0%								
Scale information missing	0	0%								
Absence of structure	0	0%								
Overall context missing	0	0%								
What not to do there	2	0%								
Total	**3759**	**100%**								

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.

a.   Rotation converged in 14 iterations.

*   N is the frequency of mentions of each category, Percent records the percent of total mentions across all categories.

The biplot regression of Factor 1 and Factor 2 from the principal component analysis illustrates a similar pattern of category clustering to that of the first two unaltered environments (Figure 5.10). The plot illustrates that participants relate themes concerning spatial structure with activity, environmental recognition, and social expectations in their responses to the unaltered kitchen.
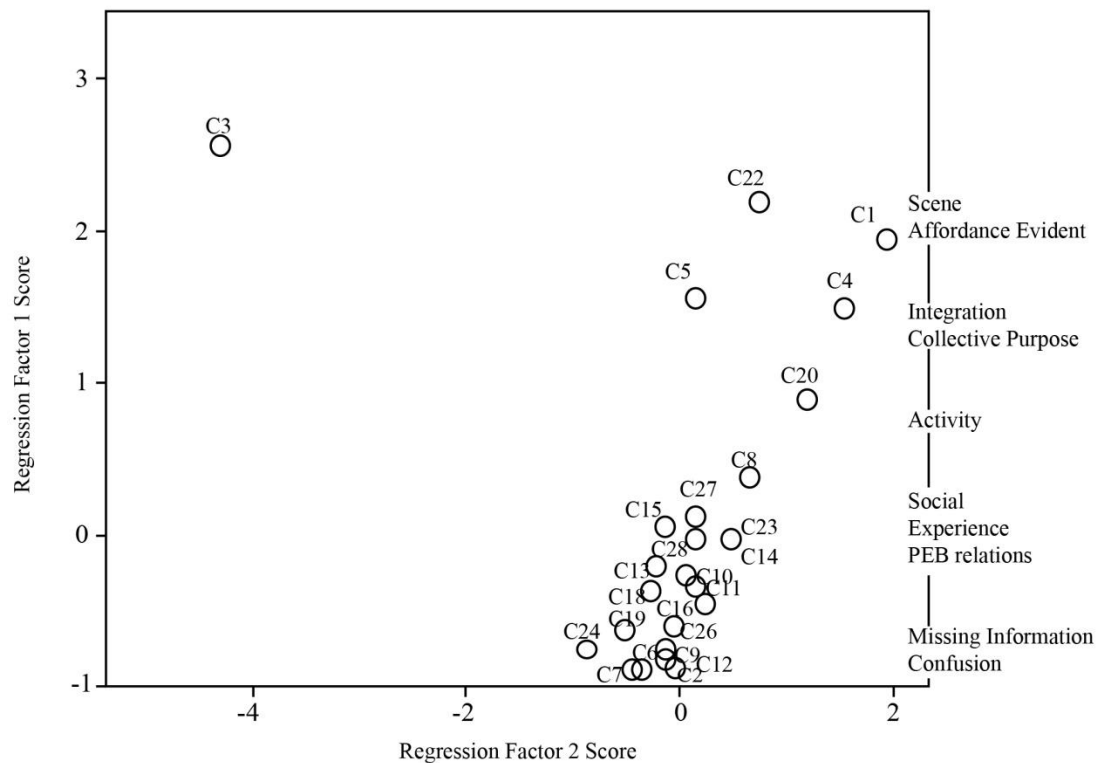
Figure 5.10 Biplot regression of Factor1 and Factor 2 from participant principal component analysis illustrating clustering in categories.

Exploring Participants' Narrative Accounts

One theme that emerges from participant responses relates objects to one another.

For example, Participant 35 notes:

> Well I see that there is a piece of paper sitting on the counter top so I would probably go and see what that says. Maybe it is something about the house itself. It kind of looks like the dishwasher is open a little bit and I feel compelled to go and shut it. If I were in this space, I would probably wonder around through the kitchen and into that room beyond and see what is out there and see what else is in the house. It seems like the way that the picture is shot its inviting you to go through the picture to see what else is beyond that doorway into the next room.

You can see how Participant 35 describes how they can imagine their movement through the image relies on cues from the whole scene rather than any one particular item.

The majority of participant responses relate their expectations for a kitchen based on their prior experience and the social norms for such a setting. For example, Participant 20 provides a typical response:

It's pretty standard American kitchen with a stove and dishwasher and a sink. It is a galley kitchen with a narrow walkway down the center. It looks like a smaller kitchen in an apartment or small house, a retro house. It is just a place for you to keep your food, make food. No real place to sit and eat. I think there is a microwave, so it's got all your kitchen appliance for a standard American kitchen and places for you to store your food and make food and wash dishes and stuff like that.

Here Participant 20 conveys how others should respond to the image based on the social norms and expectations of the typical American home. Participant 38 illustrates how they imagine social interactions and the signals that prompt such imagining:

I would probably walk through and I would want to see what the rest of it looks like. Because it looks like the house is empty and it looks like its rentable or up for sale because of the keys on the counter nothing on the counter tops. There's no pictures on the walls. It looks like the dining room or the adjoining room is empty. No curtains.

They elaborate when asked what their experience would be like if they were in the picture and suggest that:

It would probably be one of cautious reservation in some ways. If I was looking for a home I would be looking for details trying to take in all my surroundings. If I were a guest and it was somebody's home I would feel differently than if I was looking at it for a home or a rental property.

Again, like the first two unaltered settings, participants respond to this image based on their prior experience, the expectations of a kitchen and are able to do so because the image portrays the spatial conditions of the setting in a meaningful manner.

Statistical Results Obtained from the Assessment of Participant Responses to Depiction of the Kitchen with Spatial Conditions Removed
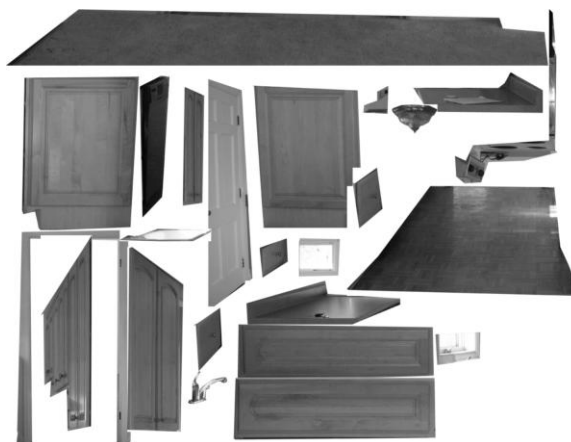
Figure 5.11 Image of kitchen with spatial conditions removed.

Factor Analysis for Participant Data Array

Nine factors account for nearly 93% of the common variance in participants' responses to the image of the kitchen where spatial conditions are removed (Figure 5.11; Table 5.21). However, only five factors have loadings >0.500. Participant responses to this image produce the most varied participant profiles of the six analyses. Factor 1 with eigenvalue of 24.483 accounts for 51% of the common variance in participants' responses. Participant's 39 loads highest on Factor 1 with a value of .923 (Table 5.22). In contrast to all other images, several participants' profiles (n = 9) do not meet the 0.500 cutoff for inclusion in Factor 1. Participant 1 loads highest on and is the sole participant with factor loading >0.500 for Factor 7. Participants' 19, 24, 38, 43, 45, and 47 load

highest on Factor 2. Participant 4 loads highest on Factor 4 and Participant 8 comprises

Factor 5. Appendix B contains the complete correlation matrix for participants.

Table 5.21 Common variance explained across participant groups for kitchen with spatial conditions removed. The first nine factors have Eigen values >1, but only five factors have loadings that are >0.500.

Factor	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1	24.483	51.007	51.007
2	5.909	12.310	63.317
3	3.342	6.963	70.279
4	2.880	5.999	76.278
5	2.222	4.630	80.908
6	1.687	3.515	84.423
7	1.583	3.299	87.722
8	1.371	2.857	90.579
9	1.128	2.351	92.930
10	.811	1.689	94.618
11	.656	1.366	95.984
12	.482	1.005	96.989
13	.368	.768	97.757
14	.258	.537	98.293
15	.209	.434	98.728
16	.170	.353	99.081
17	.113	.235	99.316
18	.099	.206	99.522
19	.073	.153	99.674
20	.047	.098	99.772
21	.045	.094	99.866
22	.023	.049	99.915
23	.019	.041	99.955
24	.015	.031	99.986
25	.006	.012	99.998
.	.	.	.
48	.000	.000	100.000

Table 5.22 Group conceptualizations for image of kitchen with spatial conditions removed.

Participant	Factor 1	2	4	5	7	Participant	Factor 1	2	4	5	7
P39	.923					P15	.693				
P30	.909					P14	.673				
P9	.896					P34	.658				
P32	.888					P22	.634				
P33	.887					P5	.594				
P29	.886					P13	.699				
P18	.872					P20	.741				
P26	.863					P42	.654				
P11	.861					P23	.599	.554			
P6	.859					P21	.715				
P25	.859					P28	.896				
P10	.852					P3	.795				
P31	.848					P2	.693				
P41	.839					P7	.745	-.503			
P36	.828					P4	.500		.666		
P35	.819					P47		.506			
P16	.799					P43		.568			
P46	.764					P19		.585	.556		
P40	.728					P45		.783			
P44	.725					P24		.818			
P12	.725					P38		.833			
P27	.725					P8				.534	
P48	.719					P1					.725
P17	.716										

Factor Analysis for Category Data Array

Participants did not mention *what not to do in the image* (C9) and *person-environment-behavior transactions* (C13). Ten factors account for nearly 78% of the common variance in the category mentions by participants (Table 5.23). Factor 1 has eigenvalue of 4.791 and accounts for 17.7% of common variance across categories. Factor 2 has an eigenvalue of 3.078 and accounts for an additional 11.4% of common variance. Appendix B contains the complete category correlation matrix.

Table 5.23 Common variance explained across categories for kitchen with spatial conditions removed.

	Initial Eigenvalues		
Factor	Total	% of Variance	Cumulative %
1	4.791	17.743	17.743
2	3.078	11.399	29.142
3	2.328	8.620	37.762
4	2.245	8.314	46.077
5	1.870	6.926	53.002
6	1.626	6.022	59.024
7	1.583	5.865	64.889
8	1.334	4.940	69.829
9	1.153	4.271	74.100
10	1.049	3.884	77.984
11	.933	3.455	81.439
12	.812	3.008	84.447
13	.636	2.354	86.801
14	.609	2.257	89.057
15	.563	2.084	91.142
16	.481	1.780	92.922
17	.385	1.424	94.346
18	.352	1.305	95.651
19	.251	.929	96.579
20	.222	.821	97.400
21	.208	.772	98.172
22	.137	.509	98.681
23	.116	.430	99.111
24	.098	.363	99.473
25	.075	.277	99.750
26	.043	.159	99.909
27	.025	.091	100.000

Participant responses to the kitchen with spatial conditions removed illustrate that similar themes group together. For example, Factor 1 is comprised of categories that relate confusion with a lack of information available in the image (Table 5.24). Factor 2 illustrates that participants link the design of a setting with their expectations for a setting. This factor, however, contains relatively infrequent mentions of the three categories that comprise the factor (Table 5.24). The grouping of the two categories for Factor 3 suggests that participants relate an absence of structure with absence of integration in the image and that these categories were frequently mentioned by participants (Table 5.24).

Table 5.24 Results of the factor analysis for participant responses to kitchen with spatial conditions removed*.

Category	N	Percent	1	2	3	4	5	6	7	8	9	10
											Factor	
Confusion	34	1.22%	.878									
Cues, prompts, or signals missing	131	4.70%	.809									
Contiguity	25	0.90%	.782									
Affordances not evident	103	3.70%	.701									
Atypical experience	7	0.25%	.689									.514
Object mentions	1413	50.70%	.564									
Functional design	1	0.04%		.923								
Expectation of greater environmental context	15	0.54%		.878								
Scene-like ecology	26	0.93%		.951								
Absence of structure	210	7.54%			.881							
Absences of integration	213	7.64%			.853							
Activity cues present	34	1.22%				.755						
Objects linked to one another	73	2.62%				.764						
Routine encounter of the image	11	0.39%				.522	.539					
Typical experience	13	0.47%					.809					
Experience	26	0.93%					.725					
Collective use of items	3	0.11%						.812				
Social interaction	3	0.11%						.854				
What to do there	47	1.69%							.578			
How to move around	6	0.22%							.857			
Activity cues missing	12	0.43%							.647			
Collective purpose of items	162	5.81%				.566				.576		
Mental schema invoked	8	0.29%								.878		
Affordance evident	122	4.38%									.798	
Social norms	17	0.61%										.862
Overall context missing	60	2.15%										
Scale information missing	12	0.43%										
What not to do there	0	0.00%										
PEB relations	0	0.00%										
Total	**2787**	**100.00%**										

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization
a.   Rotation converged in 7 iterations.
*   N is the frequency of mentions of each category, Percent records the percent of total mentions across all categories.

The biplot regression of Factor 1 and Factor 2 from the principal component analysis illustrates a very different cluster pattern for the categories for the kitchen with spatial conditions removed than compared with all other images (Figure 5.12). Similar categories cluster together; however, two distinct clusters emerge. On the left side of the plot categories that relate to a lack of spatial and contextual information, cluster together. Compare this to the group on the right side of the plot where categories that relate to activity, affordance, and collectiveness of the items cluster.
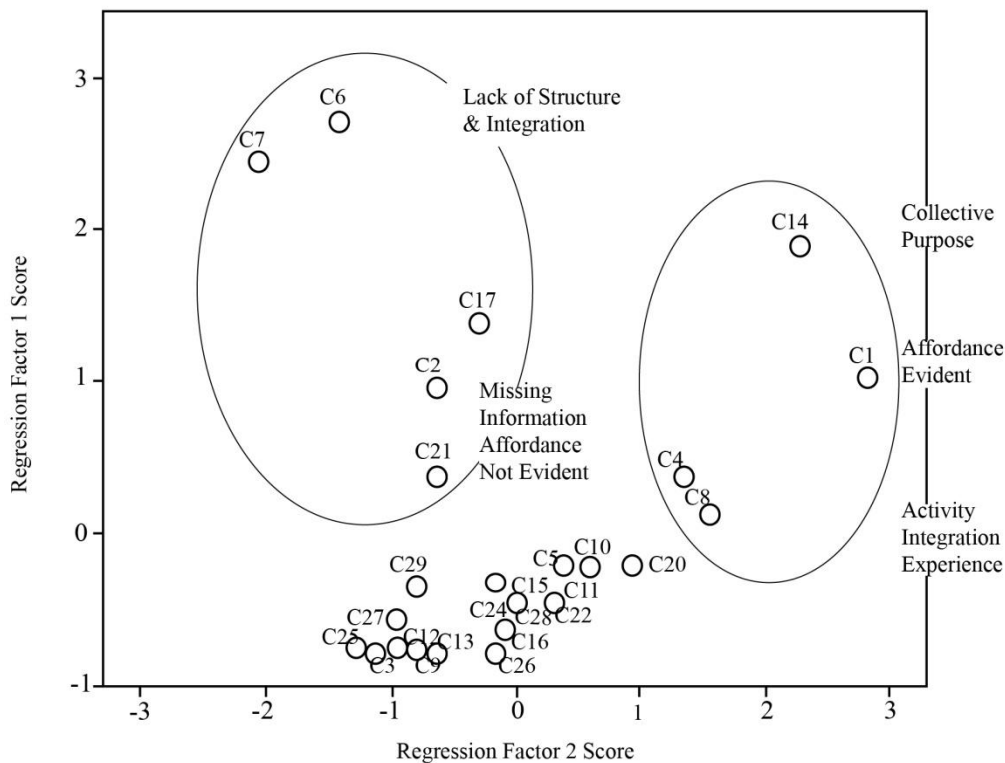
Figure 5.12 Biplot of Factor 1 and Factor 2 from participant principal component analysis illustrating clustering in categories.

Exploring Participants' Narrative Accounts

Participant narratives may provide insight on why the patterns observed in the biplot emerge. Participants often observe instances of integration of objects and information in the image but also express instances of confusion, atypical experience. For example, consider how Participant 1 provides a concise example where inferences of a kitchen are acknowledge from the beginning of the interview and shape their responses throughout the remainder of the interview:

> Well it is very straight a lot of doors and file cabinets and mean door cabinets. Um…a…counter. I mean what strikes me is the first thing that I see is that door the white door um and then stove upside there a lamp like typical of a kitchen. I recognize a faucet a window in there so yeah I would say it is a kitchen but this kitchen is um it seems very typical of a

1980s house. Because of the faucet, the side of the doors, it seems very 1980–1990.

Contrary, Participant 12 observes some uncertainty in the image. They suggest:

Well again they are pretty even though they are pieces and parts and little bit abstracted. They are a little bit more whole than some of the other ones. As well as the association, I mean all of the objects looks like something that you could rearrange and make a kitchen setting out of.

It was common for participants to compare the three deconstructed images to one another throughout the interview session, just as Participant 12 does in their statement above. Participants view the kitchen with spatial conditions removed last and suggest it was more recognizable than the other two altered built environment images, particularly compared with the first image of the hair salon with spatial conditions removed. The cluster may reflect the common nature of the elements in the image and the daily encounter of the objects; but the removal of the spatial conditions invites confusion and uncertainty for some participants. For example, Participant 12 concludes the interview by observing:

There is the cupboards that imply that there might be food there but you can't necessarily say that they are you know if you are in a kitchen environment. Usually there is a table that you end up eating around. Um...the rest of the stove is missing. There is a floor but it is not in a way to support any of the other items. There is a faucet but not a sink. Um...again…it's…implies a kitchen but its absent any people or anyone who would be using those items.

However, most participants expressed confusion more concretely. For example, Participant 5 demonstrates when asked what, if anything, is missing from the picture:

Again just the whole view. You know you just see bits and pieces which is kind of frustrating. Um…missing would be just fill in the blanks where everything appears to be missing. You know sizes, size things so you could see better. Flip things around so you are seeing them eye-to-eye at normal level instead of upside down or to the side. You know have a straight on view.

Many participants acknowledged that they commonly interact with the items presented in the image and that they inferred how and where these items might occur within their ordinary settings. For example, after describing the picture, Participant 38 notes:

I have grown up where I have and was raised in an environment with these things typical in our home and continue where I live. It is pretty typical.

Participant 45 also relates the connection between the items in the image and their purpose. When asked what they would do and what about the picture suggests that they could perform such activity, Participant 45 responds:

I would cook some food and then wash my dishes afterwards…Um...cause there is a stove, there is a dishwasher and I know from daily experience that I cook things on a stove and then wash my dishes in a dishwasher.

It is apparent that for many participants certain objects have strong activity implications such as a stove or dishwasher regardless of the configuration of the spatial conditions.

Summary of Results for Removal of Space from Structured Settings

Unaltered Images

Participant responses to the unaltered images are overwhelmingly characterized by their ability to perceive *affordances* (C1), *activity cues present* (C20), *contiguity* (C5),

objects linked to one another (C4), the *collective purpose of objects* (C14), *ability to imagine social interaction* (C16), *articulate person-environment-behavior transactions* (C13), *ability to imagine movement within the image* (C18), *call to mind mental schema* (C24), and the observance of *scene-like ecology* (C22).

Space's significance obviously plays a major role in the structuring of those settings; this is by necessity because our world is spatial. But, by that same necessity, it is also social. That is why settings for activity enactment are referred to as structured environments. And that is also why, we *conceptually* refer to the two sides or perspectives of a structured environment as its arena facet and/or its context facet. They are not something that evolve as a result of biological and/or physical laws; they are, instead, *intentionally structured* in order that people may make use of them for their everyday functioning.

Participants respond to the three environments slightly differently. For example, a difference exists between how participants respond to the hair salon and the waiting room with that of their response to the kitchen with regard to mental schema. For the hair salon and the office waiting room, mental schema clusters with other variables that relate to scene ecology, whereas in participant responses to the kitchen mental schema relates with person-environment-behavior relations. This may suggest that participants conceptualize built environments differently with regard to public and private spaces.

Images with Spatial Conditions Removed

Participant responses to the images with spatial conditions removed are characterized by their reliance on mentioning of objects, imagine that it would by an atypical experience, observance of the absence of integration, structure, cues, prompts, or

signals, activity cues, and sense of scale, as well as a lack of an overall context for the image, and confusion.

Inextricability, between the spatial and social dimensions of structured environments, refers to a type of systematic joining and/or entwining of two or more dimensions (e.g., as in spatial conditions with social content) for the purpose of developing or creating a particular condition like a structured environment. For a specific built environment, like a hair salon, the condition emerges because of the specific entwining selected. If the spatial facet, for example, is disengaged from their systematic entwining with the social facet, then by definition, the condition, in effect, is destroyed. This is because their joining is a necessary and sufficient reason to reach that condition, namely, the structured environment. If the structured environment cannot be logically sustained and/or maintained when disengaging the two facets from one another, then the entwining relation is considered an inextricable one for the preservation of that condition.

While this case study used a limited sample of 48 participants, interesting results emerge. The results from the exercise are extremely suggestive that the property of inextricability must hold in order for people to recognize and respond to structured environments. The research methodology presented in Chapter 4 and the results of that study presented throughout this chapter provide a platform that person-environment-behavior researchers can build to expand our understanding in the nature of social-spatial core relationship in the built environment. In the following and final chapter for the dissertation, Chapter 6, I explore the implications of this empirical assessment for environmental design in particular and more broadly for person-environment-behavior research.

CHAPTER 6: SUMMARY STATEMENTS ON THE SPATIAL-SOCIAL RELATIONSHIP IN STRUCTURED ENVIRONMENTS

A structured environment's distinction is realized through a mutual inextricable interdependence of its spatial and social facets. A complex connection of this nature implies that the absence of one of either of the two facets eliminates the instance of structured setting. This research illustrates why that inextricable intertwinement must be the case in the representation of any environment not only because of the nature of social information but also because of the need for transacting with structured settings for facilitating the transfer of social meaning. The contention in this discussion is that this type of reasoning not only relates to how a construct like an environment achieves an identity through the design process but also how an environment is apprehended or known by users.

The following discussion is distilled from a series of papers co-authored by Amedeo and Cannon and presented for audiences at the American Association of Geographers (2008), Environmental Design Research Association (2009, 2010, 2011, 2012), and the University of California-Berkeley, College of Environmental Design's conference on Re-examining Behavioral and Cultural Research in Environmental Design "*THE DEATH OF SOCIAL FACTORS AND LIFE*" (2012). Amedeo and Cannon continue to work on this material; I summarize their collective work in this chapter and provide concluding thoughts on the work presented throughout this dissertation.

The research presented in this dissertation examined some structural implications that result from integrating social content with spatial conditions when considering built environments. The case study illustrates that spatial conditions must be interwoven with

social content to become everyday built environments. Consider how environmental design might accomplish this entwining.

Implications of Research for Environmental Design

We can examine structured environments from the perspective of those who transact with them or from how designers' have provided for such functioning. For effective environmental design, neither focus is independent of the other. Designers in the process of developing surroundings must be mindful of activity and experience needs of those who might use them; while those who might use them must be cognizant of planning strategies employed by designers to facilitate activity. This is evident in the manner that participants from the case study routinely relied on the spatial conditions in forming their conceptualization of the unaltered images. The common denominator for designers and users must be shared social contexts. The shared knowledge between the two groups coupled with spatial conditions enables responses for apprehending the central purpose of a structured environment and assist in exemplifying an environment's categorical distinctiveness.

Design does not occur in an instance; rather it is a process where the overall meaning of a structured setting typically evolves from the way a variety of sub-relationships coheres and ultimately suggests a structured environment. Hence, in effective designs, this overriding relationship always needs to be made as evident as possible to users. Participants from the case study regularly complained when the design, or lack of design, did not meet their expectations for a structured setting. The primary function of an environment's core-defining relationship, then, is to be the overriding,

inextricable relationship, which makes evident and facilitates inference about the distinctive nature of an environment in terms of what it affords the user in its design.

Utility of Core Spatial-Social Relationship for Environmental Knowing

The inextricability of a built environment's overriding social-spatial core relationship is its most critical structural feature. This is mainly because this overriding core relationship, itself, is the reflection of the coherency jointly and collectively implied by all the social-spatial connections employed in the design of that built surrounding. In that sense, then, it is the fundamental relationship, which defines the distinctiveness of the built environment in question. To 'point' or make reference to a particular environment, then, is equivalent to suggesting its primary or overriding core social-spatial relationship. Participants for each of the unaltered images consistently formed a single group conceptualization of the image. It is argued here that to 'interfere,' 'ignore' or 'misrepresent' this relationship is to, in effect, impede credible reasoning about themes crucial for rationalizing the environmental design process. This is most evident from the case study when participants were unable to identify and recognize a scene.

The case study illustrates that a structured setting cannot be inferred by participants when the relationship between the spatial and social facets is disrupted. Neither facet alone accounts for the importance of the structured environment in behavior. Knowledge about the relevance of either facet to the distinctiveness of the environment, itself, is certainly necessary for effectively transacting with that setting; but the sufficient condition for fully apprehending that built surrounding's nature is to understand that the interrelationships between the spatial conditions and the social context are non-separable. Recall how participants routinely complained of frustration or

confusion due to missing information from the images where the spatial conditions were removed. This is because establishing inextricable relationships between the facets is the principal way to design a built environment for displaying external information to users' behavior that it affords both structurally and socially.

Hence, it might be said that a convenient 'rule of thumb' is that, in general, environments are designed to provide information externally about what is or is not afforded by them and that users process that information through experientially-driven schemata reflecting what should be afforded for the behavior they have in mind. External environmental information, in effect, displays, cues, alerts, stimulates and prompts, while users internal processing concurrently searches for and rationalizes that information with experience-driven integrations about it. Those integrations are the user's environmental schemata. For example, participants from the case study often mentioned how an unaltered image was a typical representation of setting of that type. If people were unable to recognize the correspondence between the setting and their expectations, integration of internal and external information sources would be superfluous and useless in the particular instance of the designer's intention and user's purpose resulting in confusion. In fact, this is just what the case study illuminated through participants evaluations of images with spatial conditions removed.

Given this perspective on environmental designing and, particularly, its implications concerning the use of social-spatial structural schemes for exemplifying an environment's distinctiveness, an expectation of conceptual correspondence between an environment's external information display about what behavior it affords and a user's schema concerning affordances that are necessary to enable intended activity, a number

of interrelated questions can be entertained and, were initiated through this research. The primary one is as follows: Is it, then, at least plausible to assert that, to effectively engage in activity or intentionally function in an environment, users must be able to "construe" its distinctiveness as would be inherent in its core relationship reflecting the logical homogeneity of the coherence underlying its integrations of social things with spatial conditions? What this claims is that a user must be able to infer, in a conjectural sense, whether the distinctiveness of an environment's organization affords the enactment of activities the user intends to engage in. This perceptual processing of external information for its meaning is typically biased by a user's goals, values, purposes, preferences, dispositions, life experiences, and the like. And, yet, there are acceptable, appropriate, and socially expected ways of conducting or functioning in the environments of a social system and those ways are made evident in the distinctive schemas employed to design different environments. Hence, there is a need for at least indicative information of a "permitting sort" that is critical for a user's attempt to estimate the appropriateness of certain activity conducted in particular environments.

Implications for Person-Environment-Behavior Research

Separating the spatial facet from its social context, as has been simulated in the case study presented in this dissertation obviously cannot be executed in actual world circumstances. If it were possible, its effect would be like reversing the design process by disentangling, step-by-step, the accumulated variety of relations all the way back to the initial inspiration first entertained for such a built setting. In that reverse process it should be noticed, all the sub-relations connecting space with social things would gradually collapse, one after another, until grounds for recognizing or detecting an overriding

social-spatial core relationship were no longer available. In effect, the environment would then be gone.

Although it has much usefulness for studying differences, particularly cognitive, in responses to its structured and unstructured states, in this discussion the decomposition exercise is viewed as a metaphor whose logical outcome strongly suggests that crucial implications are likely to materialize when ineffective designing of any kind is employed in the development of a built environment. Crucial implications refer to key or decisive effects that relate closely to the knowledge needs of the designing process itself. Ineffective, then, refers to the idea that not all transformations of social things into spatial expressions produce desired or expected environmental outcomes with respect to a user's expectation of environmental affordances. Ineffective design may suggest the presence of such design problems as inadequate structural logic, excesses from experimental indulgence, poor understanding of translating the language of social into the language of space, weak understanding of social-cultural norm framework regarding activity, and the like.

When a design is ineffective, it usually means that its sub-relations are not likely to infer a consistent and overwhelming communality necessary to strongly suggest the overriding core defining relationship reflecting the distinctive nature of the environment in question. In effect, this suggest a weakening of the structural property of that relationship. Hence, because the simulated decomposition, as illustrated, proceeds decisively in only two of its states, structured and unstructured, it effectively suggests the threat to an environment's distinction when the inextricability property of its most critical

overriding social-spatial core relationship is mal-formed or irrationally linked to permit, in effect, its disentanglement .

Hence, from the perspective of environment knowing, it is clear that facilitating environmental apprehension, requires, at least, that the information of built environments be susceptible to acquisition by users and be in a form to facilitate transaction with a setting. Since activity enactment always requires movement and meaning, the principal information facets of an environment are likely to be spatial and social. Through the design process, structured settings are made stable, sensible, and especially coherent for knowing by relating the facets inextricably. If this were not so, then knowledge formed could conceivably vary with each separate instance of transacting with it, environmental schemata would have to undergo continuous changes and would not be generalizable. This would leave a user in a state of uncertainty about appropriateness of behavior. Behavior would be problematic and may vary from one instance of transacting with an environment to another.

Conclusions and Future Directions

The research completed for this dissertation assessed one component of the social-spatial core relationship. I explored the implications of spatial conditions for behavior and the environmental knowing process through the case study. It should be recognized that the social content and context of a situation are just as important in the definition of built environments as the spatial conditions and that neither component alone, the social or the spatial, .make an environment. The essence of the built environment is the interrelationships and connects that are formed from relating the social content with spatial conditions. Future efforts could direct attention to exploring more

fully the implications of social content for behavior and its explicit manifestation as spatial forms by expanding on the following themes:

- What is the nature of social content in built environments?
- What are the mechanisms that people employ to assess and understand social information in the built environment? How might this relate to their assessment of environmental affordance?
- How do people react when they find themselves in novel situations where social content or the context of the situation is unknown? Does their experience prepare them for navigating such situations?

Additionally, studies in environmental design could further elaborate on the issues raised about the environmental design process and congruency in environmental design and users' expectations of the built environment by evaluating:

- Conceptualizing the design process and resulting built environments
- User satisfaction in built environments and post occupancy evaluations (POE)
- How does environmental design relate to environmental affordance?

Recall once again, how Ittelson summarizes Person-Environment-Behavior relations:

Man is never encountered independent of the situation through which he acts, nor is the environment ever encountered independent of the encountering individual. It is meaningless to speak of either as existing apart from the situation in which it is encountered. The word 'transaction' has been used to label such a situation, for the word carries a double implication: one, all parts of the situation enter into it as active participants; and two, these parts owe their very existence as encountered in a situation to such active participation—they do not appear as already existing entities which merely interact with each other without affecting their own identity. (1973, p.18)

The notions brought forth in this quotation by Ittelson guided the research examined and explored through the case study in this dissertation. Participants regularly expressed their reliance on the spatial conditions of the images to form their evaluation of the built environments in the study. Participants suggested that the environmental knowing process encompasses more than recognizing spatial cues. They illustrated through their narratives that people connect the social context and identify social content from the built environment through the very manner in which it is expressed spatially. They identified the essence of the built environment.

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APPENDIX A EXAMPLE PARTICIPANT TRANSCRIPTS

Participant 6

Hair Salon with Spatial Conditions Removed

1.   Tell me what you see in this picture. Take your time, we have plenty of it.
So we are in a salon and there are two chairs and there are like shiny black mats to the
right of each chair and you can see the little station to the right of each chair. If a person
sat in them they would be facing to left and that's where the two little stations are and are
connected and sit in front of those chairs. You can tell it's a salon because there are little
hair dryer and curling iron type things in little cubbies there and I think you can see
mirror, yeah there are mirrors and lights.

2.   Tell me why you describe the contents of the picture in that way?
Well at an immediate glance you see a lot of the different subjects at the same time and
your brain says oh it's a salon. And part of that is the kind of chairs, the plastic on the
back of the chairs, the sterilness of the room that you see part of and of course the hair
dryers and stuff it just immediately makes you say oh it's a salon. And then it's beyond
that there's enough going on in the picture that then you feel like well a salon is a pretty
dynamic thing. What are are the things that you see in a salon that allow you to describe
it relative to any other salon you've seen. Then I just kind of systemically went through
and described the main things that you see in the picture, specifically what might tell you
that it's a salon.

3a.   You seem to be familiar with what this picture shows. Are you?
Yes

3b.   ((if yes) Tell me how you have acquired familiarity with what this picture shows.)
((if no) Really? Then how were you able to describe its content in the manner that you
just did?)
Just going to beauty salons and barber shops my whole life either with someone else or to
get my own hair cut.

4.   Make believe for a moment that you now need to describe the contents of this
picture to someone unfamiliar with it; please demonstrate for me how you would do that.
Yeah I would say it's a photo of probably like a corner of a salon that you can't tell how
big the salon is. And there are two salon chairs and two whole like stations where
cosmetologist would work. And you know pretty..Not super colorful with these black
shinny pads on the gray floor and then black and silver chairs and then gray and white
walls. And then some pretty primitive kind of almost European or sterile architecture of

the booths the stations. And these long thin florescent lights kind of lining the stations with pretty big mirrors. And then the little cubbies with the accoutrements things you need to plug in to do hair like a hair dryer and curling iron.

5.   What do you think is important for someone who is not familiar with this picture to understand about this picture?
Just to let them know that it's a photo of part of the inside of a salon and that there are a couple of stations in the salon that include you know the chairs and stuff and enough that you are looking at the snap shot of some corner of the salon.

6a.   Have you ever seen anything like what is in this picture before?
Oh sure.

6b.   Many times or just a few occations?
Many times

7.   What is it about the content in this picture which you think allows you to recognize it?
Oh well it's certainly the sum of the parts but there are certain things..Well no..Like if I only saw a hair dryer I wouldn't necessarily say that I was in a salon but that would be one of the choices. Those chairs though are pretty distinctive the fact that they are kind of industrial looking and they have the plastic on the back. They kind of have that look that um..They definitely are salon kind of chairs. But it's more a combination of things like the hair dryer and the chairs, how they are arranged and how they are facing and that they are at these little stations with the mirrors.

8.   What would you do if you were amongst what you see?
I would be hoping that someone would be doing my hair.

9.   What is it about this picture that suggests you may be able to do that?
Well it's a salon and the chairs are empty.

10.   Describe for me what your experience may be like once you are in the picture.
Kind of like the restaurant I could just be sitting in that chair just waiting for something and I would be somewhat comfortable um..Hopefully there would be a magazine and the experience would be different if there was someone there who was going to have a conversation with me or maybe actually approach me and they were the person who was going to give me a haircut. And I think it would be a good experience unless they gave me a bad haircut.

11.   Please describe for me your feelings, if any, that you may have towards what you see in this picture.

It doesn't look like the nicest salon in the world but it's just a picture of part of a salon so it kind of reminds me too of 'oh when was the last time I was in a salon and maybe I need to go to the salon' but um..It's not the most inspiring design that I've seen.

12.   What about the picture makes you feel that way?
The colors and it's kind of innocuous. It's pretty sterile and the like the plastic on the back of the chairs and stuff it looks pretty low budget.

13.   How might you encounter what you see in this picture in your daily routine?
Well I would have to be in a salon everyday which I am not. So the only way that I would encounter it in my daily routine is to change my daily routine and go to a salon every day. There is a little barber shop on campus that's similar yet different than that. But I only go to a salon maybe once a month. So it's just not part of my daily routine.

14.   What, if anything, is missing from this picture?
Well again I would say that nothing is necessarily missing I would say that it's complete the way that it is for what it is. Again it's an empty chair thing where well this is a picture of a salon with nobody in it but it's some place where chairs are for people and you're inclined to think oh well if there were people in it it might make it seem more complete. But in my mind that would just be a different picture of people in the chairs in the salon. Kind of like this is the salon when it's closed or the salon when it's not busy.

15.   Is there anything else you would like to say?
No I probably need a haircut.

Hair Salon with Spatial Conditions Removed

1.   Tell me what you see in this picture. Take your time, we have plenty of it.
 (laughs) okay well..because there are some many different things and they are sort of scattered, I'm going to systematically kind of go around from left to right. so this far left hand rectangular thing that is oriented vertically looks like a window that is popping out a little bit like a bay window. and this here the next thing over looks kind of like a can of spray paint or a can of shaving cream kind of thing maybe with the cap off and the cap underneath the can. and then it gets a little bit more challenging (laughs) there is this upside down trapezoidal thing that could be anything it could be a piece of wood a piece of mental um..but I guess it looks like an object I guess it could also be an opening you know like um..a door way into some place dark. this next object is kind of odd looking, again it looks kind of like a dark piece of metal um..but it doesn't look like its complete it looks like it belongs to something else. um..i would like to go to something easy so I'm going to jump down to that near whole upside down kind of you know it's like an old barber's stool or old chair of some sort that's got plastic on it, fabric, it's got a funny little belt across the front and it look like it has one of those little things that you press with

your foot to make it rise and fall. a..then there's these other objects, I almost want to avoid them because I don't know how to describe them, but we will go to this next one it almost looks like a doubly terminated crystal that's got a bite out of it but again it looks like something flattish with angular edges and then that roundish thing cut out of it like a fender of a car or something. could be wood could be metal its shiny on the corners there. it could almost be like a counter top. um..this string thing looks like string. but a..or like dried up seaweed or something like that. uh..below the chair is something square metallic maybe it's got a little pattern on it, it could be part of a washer or dryer or something. um..there's this brown kind of bronze thing running along the base that looks like a base board. but something not quite right about that. it also could be upside down and then that's got a notch out of it over here on the right like a lot of these things do. they are like almost a certain shape and then they have a notch out of them. and um..this thing above that looks like a..almost like a squeegee a thing that you use to clean windows. also kind of looks like a bent piece of metal that has holes in it for screws. up from that there's this one little dark curvy thing that looks like a handle with some kind of handle curvy thing that comes off the top of it that looks the same as that larger one that's up over to the left that's above the upside down chair. whatever that is. the thing above that looks like a piece..like a purse with a handle or an apron that's been taken off and left on the floor something like that, something kind of cloth that has strings or a handle. um..interesting okay..this next thing is horizontal almost looks like a light table at first like an old fashion light table that we don't use anymore but it looks like this object here that has been rotated to the right and turn so you are seeing the other side of it. and then associated with that is again this can of spray paint or shaving cream whatever that is and its turn laterally on that. um..oh funny I don't know..above that looks like a separate object which again looks like I don't know another piece of metal but it looks similar to that window frame kind of thing, same colors and reflections and such. above that is another one of these squeegee things that you can't see all of um..that looks like it is oriented a little bit differently kind of turned inward away from me. here is the chair again upright and smaller and the little belt thing is cut off and its missing the little petal so we are seeing the other side of it. then there's this yellow rounded thing, its rounded and square and again has a little notch out of it, could be metal could be wood, um..hard to say but it looks pretty flat like it doesn't have a deep 3rd dimension. this here to the right of the squeegee thing looks like a doorway it's a wall with an opening and then within that is another doorway that leads to a different room that has some random stuff in it and then there's some signs or poster or a paper towel holder or something on there and there almost looks like a toilet paper role. and then there's a couple more..the last four things are pretty pretty weird looking. one..see no I'm trying to associate them with something else in the picture because they are harder to describe. this one is not unlike this other one that I said looked like part of an appliance but the corners are cut off and its smaller again still looks very sheet like it doesn't have a 3rd dimension. and then one

above it with the same kind of coloring..both of them look like they kind of curve in at the top could be pieces of metal. that thing to the left is really odd um..looks like two rectangular things that have almost like light outlets that are next to one another and are offset just a little bit. it's really just an odd shape that I don't really recognize as anything easy to describe. it's got those funny little things coming out of it. and then this last piece is not unlike this one over here where it looks relatively flat angled inward into the page and it's got again this arc cutout and this little notch and it almost looks metallic like its reflecting light.

2.   Tell me why you describe the contents of the picture in that way?
um..kind of like what I said at the beginning there are some many different things on there that when you look at it they are arranged pretty randomly and you immediately recognize some shapes like the chair jumps out at you and that other thing looks like a window and then there are other shapes that you don't immediately recognize and I think that your brain tells you right away that there are things that will be hard for you to describe and so the arrangement of items made me want to go kind of systematically around and not lose my place cause I didn't want to miss anything cause it's kind of unpredictable. um..so I thought I was going to go all the way around but then there were more um..objects and it was easier for me to jump to the next one especially if it was easy to describe. like I got to the middle here and I was like ooh that yellow thing is going to be hard for me to describe but I can jump down and say oh that's an upside down chair. and of course um..generally when you describe something the physically attributes are shape, color, composition and maybe orientation and all of these things do definitely have..you know they are all oriented differently and obliquely and some definitely something to mention.

3a.   You seem to be familiar with what this picture shows. Are you?
um..the ones that I feel confident I can identify I am somewhat familiar with. like I don't know that I've ever seen a chair that is exactly like that chair cause it's got a funny strap or it almost looks like a bike tire around it. but I am familiar with types of chairs like that. and then um..of course the other chair is recognizable that looks like a can of paint although maybe something is missing and its cut you know I don't know if some of these things are..I do get the impression that I'm seeing partial images of some things and so I can't say for sure um..that I'm 100% confident of what I see in the picture of what they really are but the chair I feel good about, the what looks like a can of paint or shaving cream, something that looks like a baseboard but has something cut out of it or like a running board of a car I feel pretty good about like the wall and doorway. and this sure looks like a you know a split light window frame of some sort. the rest of them are a little bit more esoteric because I feel like I'm only seeing parts of the whole.

*3b.   ((if yes) Tell me how you have acquired familiarity with what this picture shows.)
((if no) Really? Then how were you able to describe its content in the manner that you just did?)*
um..everyday life I guess, just making observations, coming across a chair in a beauty salon or some other place where you would see an adjustable chair like that, um..and of course windows are everywhere just seeing architecture, cans of paint, again just something that you use around the house or shaving cream that you see in the bathroom. um..of course most of its just daily life, observations that you don't even know that you are making for the most part.

4.   Make believe for a moment that you now need to describe the contents of this picture to someone unfamiliar with it; please demonstrate for me how you would do that.
okay, okay um..well sure. I don't what to take too much time but I would say there are about 20 items I would guess of all different shapes and sizes that are randomly oriented on a landscaped shaped page and some are metallic looking some items are flat browns and yellows um..some look like partial photographs of things. but there are like 1234567 about 8 of them that looks like partial photos of appliances or car fenders or something. um..and there are repeats of at least 4 items. there are something that looks like a window box that takes up a good part of the left hand side of the page that's repeated, smaller and changed in orientation. um..there's a little what looks like a spray paint can that's rotated and shown on that item that windowy item. there's something that looks like bent metal or a squeegee that's repeated not in its entirety and then there's a big upside down chair that takes up a sixth or an eighth of the picture. that's also repeated right side up and typically the things that are repeated are at least in a slightly different orientation.

5.   What do you think is important for someone who is not familiar with this picture to understand about this picture?
that it looks like a collage of inanimate objects that are unrelated for the most part and in part you can't tell what they are.

6a.   Have you ever seen anything like what is in this picture before?
um..you know it makes me think of the collages that you did in high school and stuff like that..the more I look at it it just looks like random things you find in the garage (laughs) and it also makes me think of collages. but I would say that I haven't seen anything quite like it but a lot of collages have that general essence to it visually.

6b.   Many times or just a few occasions?
um..well a few meaning three then I would say many, more than 3

7.   What is it about the content in this picture which you think allows you to recognize it?

again I struggle with the parts vs the whole but there are certainly a handful of familiar objects at least to my eye. that allow me to make some sense out of it and allow me to say well oh there are two different sized chairs and there are 2 different sized window boxes and I see a wall and a doorway. so there are those few items that look like they are almost all there or enough is there that I feel pretty confident that I recognize it unless it's something kind of tricky but based on what I see. and then the other things..and then the can..but the other things I can't make much sense out of it.

8.   *What would you do if you were amongst what you see?*
I would clean it up. I would leave. it all looks cold and angular and it's in disarray, there's is nothing relaxing or neat about it so if I were amongst all those things I put like with like and straighten it up and..but it looks cold and angular it doesn't look like anything that I would want to be around.

9.   *What is it about this picture that suggests you may be able to do that?*
because they are all..well..they all look like real 3 dimensional objects that could be moved..and changed their orientation and you are tempted to change their orientation, many of them anyway because they are upside down or sideways so and their random distribution. so the fact that they are objects and their random distributed makes you want to take all the objects and put them in a less random order.

10.   *Describe for me what your experience may be like once you are in the picture.*
um..you know I guess it would depend on what my motivation was. it's not something..it's not..I would look forward to it. it's not a..somewhere where I feel like I would want to spend time because I would have to work very hard to make it into an environment that I would be comfortable in and then I probably still wouldn't be comfortable in it. I need a plant or some carpeting or something.

11.   *Please describe for me your feelings, if any, that you may have towards what you see in this picture.*
um..you know just not a lot of warmth it's kind of like looking into somebody else's messy garage and glad that it's not your mess. but you know it's not relaxing its busy and chaotic.

12.   *What about the picture makes you feel that way?*
the arrangement of the objects and the overall arrangement of the objects and the orientation of the objects with respect to one another. things being upside down that I know should be right side up in a normal world and the fact that a lot of the objects are angular or kind of non-sensible in that they might be somewhat geometrically uniform and then there is a notch out of it. or like..and then you have trouble trying to fit it into anything that makes sense. and then of course there is that one black fuzzy rondohedrial thing that I have no idea what that is.

13.   How might you encounter what you see in this picture in your daily routine?
well..um..just like how I'm familiar with some of the things just daily life. um..you might encounter split light window, I don't think we have anymore at our house, um..you see chairs like that if you go into a salon or maybe certain rooms at the university. if I went out into the shed I would see cans of spray paint. um..you know so I think that I could encounter some of these things, not the exact thing, and of course it's hard to say the things that I don't recognize I'm not sure how I would encounter them because I don't know what they are.

14.   What, if anything, is missing from this picture?
well if it's a collage then nothing is missing right. so it depends on how you look at it. if you look at it as a piece of art then nothing is missing. if you look at it as um..somebody else's garage full of junk then order is missing. if you looked as each individual object..then some of the objects appear incomplete number 1 and number 2 those things that you even recognize tend to not stand alone. they would be part of something else. like a chair would be in a room or amongst other chairs or a window would be in a house not just kind of floating in space. and all these, most of these other things, of course the wall and the doorway would be connected to the rest of the house so it's part of something else. it strikes me that a lot of these things are parts of something else. so if this were a really utilitarian you know a question about how do we complete the things that are here. a lot of them seem like parts of something else.

15.   Is there anything else you would like to say?
no.

Waiting Room with Preserved Spatial Conditions

1.   Tell me what you see in this picture. Take your time, we have plenty of it.
Oh yes it's kind of like the last one that its part of the inside of a room that has a corner. there are also two chairs that are black that are against one wall and then to the left there's a long counter top and then there's a little table and chair that's not totally in full view, actually two chairs that are not totally in full view, of like um...that are kids sized. And then tile. Again pretty dull colors like tan and gray and so it has a slightly industrial look and it's clearly like um..A waiting room oh and there's a picture of eye glasses on the counter. So it's probably like the optometrist office but you get the impression that it's a waiting room for some kind of doctor's office.

2.   Tell me why you describe the contents of the picture in that way?
Well I kind of went around, it's everything that's in it that's big. and you know at first I just wanted to give the big picture that 'oh we are looking at the inside of a room' because that's more of a big picture thing and then by describing some of the other big objects in it and the color of those it gives you the sense of what kind of room you might be in.

3a.   You seem to be familiar with what this picture shows. Are you?
Yes

3b.   ((if yes) Tell me how you have acquired familiarity with what this picture shows.)
((if no) Really? Then how were you able to describe its content in the manner that you
just did?)
Going to lots of waiting rooms. It just clearly looks like a doctor's office.

4.   Make believe for a moment that you now need to describe the contents of this
picture to someone unfamiliar with it; please demonstrate for me how you would do that.
Yeah I would say it's a photograph of the inside of some kind of waiting room in a
doctor's office of a relatively new office. And that it's very simple and has tile floors and
a counter top and it looks relatively new and it's nice because there is a little place for
kids to hang out with table and chairs and it looks like there is stuff for them to do on the
table. And then there are a couple of black metal chairs, hopefully they are not the only
two chairs in the waiting room.

5.   What do you think is important for someone who is not familiar with this picture
to understand about this picture?
Um..Well again it depends on how you define important. If someone hasn't seen this
picture and they need to understand it I would say it is a picture of the corner of some
kind of waiting room. And that it's got chairs, and tables, and counter tops that you might
imagine in a standard waiting room.

6a.   Have you ever seen anything like what is in this picture before?
Yes

6b.   Many times or just a few occasions?
Many times all different kinds of doctor's offices pediatrician offices.

7.   What is it about the content in this picture which you think allows you to
recognize it?
Um..Well again if I saw anything by itself out of context with everything else it would
probably I wouldn't be able to say 'oh yeah we are in a doctor's office' so it's probably
like the combination of the tile, the counter top, and the big chairs. oh and I was saying
that if I think about any individual item in there but it's a combination of things, it's the
tile on the floor and the counter top and it's the kind of counter top it is. Kind of the
arrangement of the chairs and the fact that there is nothing else in the picture that it's just
tile and a really bland wall you get the sense that it's a waiting room.

8.   What would you do if you were amongst what you see?

well it depends on what I could be leaving I could be coming but if I were in the room and I needed to wait for a while I would probably sit in one of those black chairs if my son was with me he and I might both sit in the little chairs at the table and do an activity. Or another possibility is walking up to the counter top to communicate with the person that would be there to let me know when my..Check in to go check in with the person who tells you when your appointment is.

9.   *What is it about this picture that suggests you may be able to do that?*
If the office is open and we just happen not to see any people that's what you do in a place like this if you have an appointment. You just walk in and you either go to the counter or you take a seat. And there are seats there and there is the counter top there to do those things.

10.   *Describe for me what your experience may be like once you are in the picture.*
I don't think it's a place that I would want to spend a lot of time it's very sterile and usually waiting grooms..It's not tons of fun to wait but if I had something to read it would be fine. But it's probably not the warmest, it doesn't have the best atmosphere I assume. So I would probably want to spend as little time in here as possible.

11.   *Please describe for me your feelings, if any, that you may have towards what you see in this picture.*
it is just familiar and it make me think of all the times I've gone to the pedestrian and you know it's just really familiar and it makes you think all the times you go to the doctor and it kind of makes you think of family cause often it's because I've taken Zane in for something. so in one way its oh it's a waiting room and in another way it's sort of like number 2 I'm glad I'm not in waiting room right now but it also gives a sense of family because often times you go..Either I go with Joel or Zane to have someone taken care of. So in a long term it's sort of a positive thing.

12.   *What about the picture makes you feel that way?*
Um..Because I recognize it as a waiting room and then I have those connections with a waiting room those emotional ties to a waiting room.

13.   *How might you encounter what you see in this picture in your daily routine?*
You know I just wouldn't. We go into some kind of doctor's office probably once a month or once every other month. But it does have some sort of industrial sort of institutional look to it. So there are probably similar settings in many of the buildings on campus. But not as many things for little kids I would say.

14.   *What, if anything, is missing from this picture?*
Well I think like all the other ones nothing is necessarily missing depending on what the photographer was trying to capture. But um..Again these are things that humans typically

occupy and so it would change the picture a lot if there were people in the picture but I don't think there is anything missing from the picture.

15.   Is there anything else you would like to say?
No

Waiting Room with Spatial Conditions Removed

1.   Tell me what you see in this picture. Take your time, we have plenty of it.
more chairs (laughs), more chairs and furniture and most things unlike the last one, immediately seem more recognizable. so the top picture looks like an oblique photo or partial photo of a either a tile floor or a linoleum floor. um..and then you're looking at it obliquely. you are going clockwise, that dark dark item looks like a groovy kind of mod looking chair that you are looking straight on so if someone were going to sit in it they would sit and face you. looks like the orientation and kind of funny its touching whatever that it is. it's kind of book shaped and its going into the page and it's kind of shiny, it almost looks like a photo album or something, it makes the chair is touching it, so it makes the chair look like it's at an angle. and then almost touching that book down below is another chair facing off to the left obliquely into the page and then that actually points to another chair that is a repeat of that black chair and a that looks pretty similar but I can't tell which way it is facing. I think that the orientation is a little bit different on that little black chair. below that looks like a remote control or a squished box of Kleenex, tissue, but I think it's a remote control at an angle, that is almost touching what looks like a sheet of, again what almost looks like marmoleum or something, that's got a funny cutout shape. and then off to the left there looks like a piece of wood that is leaning up against the wall or something. and then I missed some little things in the middle that were just, so I think I'll do another, so that's a circle around the outer items that kind of connect to one another. so now I'll do these ones that are within that kind of framed by those larger items. so there's part of a table not unlike the one we are working on. and then almost leaning up against that looks like some kind of advertisement or like a like a like a stiff cardboard thing, you know it has a small picture and some writing on it so it could be a piece of art or an announcement of some sort. and then below that looks like a sheet like dark grey thing that could be anything it could be a piece of paper. um..and then there is something kind of similar to that that's larger that has a slightly different orientation and more color to it and above that looks like a double outlet where you plug stuff into and it looks like it was part bigger photograph that was cutout. and then there's two more things, one is this blue up and down rectangular thing that I just can't quite tell what that is. it almost looks like it is something tabular on end projected into the page. it's hard to say. and then just to the left of that looks like a drawing of a pair of glasses with something underneath it, it almost looks like sunglasses without the the lens.

2.   Tell me why you describe the contents of the picture in that way?

well most of the things seem familiar and the arrangement of the objects generally there is a flow of larger items on the outside or larger items in contact with smaller items that kind of bring your eye around so that I could kind of keep track of what I was describing with the knowledge that there were sort of this middle set of objects that were kind of enclosed by those other ones so that I knew I would miss any if I went around the outside. and on the inside I did sort of a clockwise thing as well. partially just so that I could keep track and partially the way that the objects are connected to one another it allows you if you want to go clockwise.

3a.   You seem to be familiar with what this picture shows. Are you?
most things I can at least describe in some cases I feel very confident like the table I only see part of it it looks like it's a picture and part of it was cutout. um..so yeah I am familiar with at least..even if I'm not right about it being linoleum or tile I can at least say that texture looks like that. but maybe it's the close-up of a piece of fabric or something. I feel like the picture of the glasses definitely looks more like a drawing cause the lines aren't so sharp. I feel good about all the chairs and the outlets. um.. you know some of the other things like the flat things going into the page there is not a lot of detail so it's hard to say if they are just funny cutout pieces of dark paper or what. this looks like more of a complete object here, this looks more like a book. but these two down here could be 2 dimensional for all I know and it's just the way they are cut out. and who knows that's probably part of something else but at first glance it looks like a piece of wood. that really does look like the side of a remote control.

3b.   ((if yes) Tell me how you have acquired familiarity with what this picture shows.) ((if no) Really? Then how were you able to describe its content in the manner that you just did?)
um..kind of like the last one this are mostly things you would see just growing up and being in a house. different kinds of chairs, tables, pictures, drawings um..outlets, a remote control if that's what that really is and the textures of the other things, even if they are only partial representations of what they are they make you think of wood or marmoleum or linoleum or tile. so again it all kind of comes back to the home.

4.   Make believe for a moment that you now need to describe the contents of this picture to someone unfamiliar with it; please demonstrate for me how you would do that.
I would say well this is a picture again it looks like a collage of randomly oriented objects or partial objects of different sizes. um..and most of the objects are or seem to be parts of things from a domestic dwelling. and anything from a drawing to a double outlet switch, to different kinds of chairs, a table, maybe some artwork books.

5.   What do you think is important for someone who is not familiar with this picture to understand about this picture?

that's touch cause what is important, importance is so subjective. um..well if there is an importance in understanding what the picture is about I would describe it somewhat like I just did in that I would say um..you haven't seen this picture but it's probably nothing you've seen before and it's a collages of parts and wholes of domestic shapes sometimes repeated um..on a stark white background. if you don't need to see it you're probably not missing much. kind of like the last one it depends on really what you mean by important, you know and so I guess that would be it would also depend..on the person you were describing it to. you know if I were describing it to my husband versus if I were describing it to my mom. I would probably describe it differently.

6a.   Have you ever seen anything like what is in this picture before?
not all together and arranged like this but certainly I've seen chairs that look like that. definitely the wooden chair and table I've seen things that looks very similar to that. and the double outlet um..and that thing that looks like the drawing of glasses and piece of artwork and the textures are somewhat familiar.

6b.   Many times or just a few occations?
oh many

7.   What is it about the content in this picture which you think allows you to recognize it?
cause they are what they are. they are literal shapes or parts of literal shapes and there is enough of it that you can recognize what it is. color helps with like the sunglasses. color and the level of detail help and level of contrast.

8.   What would you do if you were amongst what you see?
boy um..i would just clean it up its just a mess. there is still a enough chaotic and random distribution. of course what do you do with a partial table. you know so that's just non sensible it's sort of that stuff in someone else's garage. and I would tend to sort it which might tell you something about my personality. you know putting all the chairs together, and putting all the flat items together, and getting the pieces of flooring or linoleum out of the way. and if that is the remote, you know we are always looking for the remote so put it back where it belongs.

9.   What is it about this picture that suggests you may be able to do that?
um..because a lot of the objects look tangible. many of them are whole so they look like something you could pick up and arrange. you know there is the table that you can either pretend or assume that the whole table is there, maybe it is part of a table and I will just move it to the side cause I'm not sure that we are going to be able to use it.

10.   Describe for me what your experience may be like once you are in the picture.

again um..if that..if that's all I had to work with again it's not somewhere I would want to be because it suggests that I would have to work arrange it so that I could relax. it's just too chaotic the way it is. I wouldn't be able to go to sleep. I would have to sort all that stuff.

11.   Please describe for me your feelings, if any, that you may have towards what you see in this picture.
well you know it's all homey stuff, it's a bunch of random domestic things, so in that way it's sort of warm. you can recognize most things but again its nothing I really want to have anything to do with cause as a collage or a piece of art I don't appreciate it and if I were amongst all those things I wouldn't necessarily appreciate it either. I definitely wouldn't. but like that larger black chair I would be like hey that might look kind of cool in my office. so maybe I would want to move it elsewhere.

12.   What about the picture makes you feel that way?
um..um..the real objects, the black chair, I like the black chair, but the arrangement of the objects again..just has that a bunch of stuff piled up in the garage that's been forgotten and needs to go to the thrift shop or something.

13.   How might you encounter what you see in this picture in your daily routine?
oh..well you know the two largest objects look like flooring or wall something to do with surfaces in a home so boing into the kitchen or going in the bathroom and a lot of that other furniture you might see in a bedroom or a living room. most of these things you would see in a home um..all of these things you would see in a home. if that drawing happened to be in somebody's house for example.

14.   What, if anything, is missing from this picture?
there is certainly only part of a table there. this looks like it's part of something else so you could say whatever its part of is missing. and these two larger objects look like they are just cutouts of much more larger objects like an expanse of floor or an entire wall of an entire counter top. and there is order..the order is missing. purely from an architectural perspective you would want the chairs together and the pictures and the art work on the wall and the flat things together, and the outlet down below, and the flooring maybe underneath the chairs and whatever that is, you know I don't know what you would do with that. there are definitely things that are recognizable objects that are incomplete.

15.   Is there anything else you would like to say?
no.

Kitchen with Preserved Spatial Conditions

1.   Tell me what you see in this picture. Take your time, we have plenty of it.

Yes um..So it looks like a okay it's a picture of a kitchen in a house that is vacant. So there's not any visible furniture in it but there is an oven in the kitchen. It's a long narrow room with lots of cabinets and counter tops and it's somewhat symmetrical. But it's a long thin room that is perpendicular to your view so it looks long and narrow. You could walk through it through an open doorway into a whole other room that has a window that sunlight is coming in and that's what gives you the sense that 'oh you're in a pretty big spacious house that's not occupied.'

2.   Tell me why you describe the contents of the picture in that way?
Well immediately you say it's a kitchen because you see cabinets, and the oven, and the faucet and I think that's all you need to say that's probably a kitchen and the dishwasher. the kitchen being part of a bigger you know a whole house is the connection of the open door way behind the kitchen that goes into another room and then there's another door way on the left that gives you the sense that continues to either a closet or a front door or something. um.and the sense that it's vacant is that there's not furniture and there's no people and there's nothing on the counter tops except a piece of paper and a key and so it really has that look that there's no people living there.

3a.   You seem to be familiar with what this picture shows. Are you?
Yes

3b.   ((if yes) Tell me how you have acquired familiarity with what this picture shows.) ((if no) Really? Then how were you able to describe its content in the manner that you just did?)
Everyday life. ever since I was a little kid right we just associate kitchens with certain items because you could have a counter top in a workshop or a bathroom, you could have a faucet in a bathroom or washroom, but the stove and dishwasher kind of give it away and the stove and the style of the cabinetry kind of give it away.

4.   Make believe for a moment that you now need to describe the contents of this picture to someone unfamiliar with it; please demonstrate for me how you would do that.
Yeah I would say it's a picture of a kind of a long thin room that's the kitchen of a house. And it's got cabinets along both walls that are mirroring one another and there are up above cabinets and then there are lower cabinets and drawers with counter tops. Um..There's a sink on the left that is center between its cabinets and there is a window which is nice I always like having a window where I'm doing dishes. And then um..Across form the sink on the right hand side is the stove probably symmetrically placed and there's a dishwasher to the left of the sink on the left hand side of the photo. I don' t know if I said that but the sink and the window are on the left side of the photo and the stove is on the right hand side of the photo.

5.   What do you think is important for someone who is not familiar with this picture to understand about this picture?
It's a photo of the kitchen part of a house with the idea that it's not a photo of just the kitchen and that it includes..It extends..The house extends away from you in the away direction to another room and it gets lot of light nice light. It kind of looks like a photo that you would see on a house information sheet to show what the maybe kitchen dining area looks like that's vacant. It's not occupied.

6a.   Have you ever seen anything like what is in this picture before?
Yes many times

7.   What is it about the content in this picture which you think allows you to recognize it?
Um..the content there's a lot of different levels immediately when you see walls, and cabinets, and lights and windows you are like oh I'm inside a house and then when you see that its specifically the stove, the dishwasher, the sink, faucet and the cabinets and probably in that order you say oh I'm looking at a kitchen.

8.   What would you do if you were amongst what you see?
I don't know it looks like a pretty nice house. it depends on what my role is if I were walking through it to buy it I would be looking out the window and turning on the faucet on and off and walking into that next room because that's kind of intriguing like ooh what room does this connect to.. If it were my home then maybe I would be going into the kitchen to use to wash my hands or to start preparing a meal um..Or I might be in there um..You know just walking through if someone else is looking at it to buy it. I don't know why else I..the only two reasons I would be in that house is to look at it to maybe buy it or maybe I already live there or someone else lives there but it doesn't look like anyone is living there right now.

9.   What is it about this picture that suggests you may be able to do that?
Well it's just a nice looking inside of a house and as long as somebody let me in I could certainly do those things. it's such a standard thing and it's so familiar and it's like of course I could go in and use the sink and of course I could go into that next room.

10.   Describe for me what your experience may be like once you are in the picture.
I think it I would be pretty good because that house gets some nice light and the floors are really pretty they are parquet tiled floors and so the um..It's a very appealing setting it looks like a house with a nice atmosphere it's relatively new and its really clean and taste wise I like the cabinets and I like the counter tops. I think it would be a very nice experience it looks like a very nice place it looks some place you would like to spend time.

11.   Please describe for me your feelings, if any, that you may have towards what you see in this picture.

I think it looks nice if I had a friend who should me that picture and they were thinking about buying the house I would say oh it sure has a nice kitchen and it looks like it has a dining area just off it so I think it would be positive very positive.

13.   How might you encounter what you see in this picture in your daily routine?

Um..Well of course I have a kitchen in my house and so as far as encountering a kitchen we encounter our kitchens many times in a single day. On an average day. As far as encountering a vacant kitchen or en empty house that would not be common at all. So those are sort of the two possibilities. So as far as walking through a house that doesn't have any furniture in it that would not be very common.

14.   What, if anything, is missing from this picture?

Again it just depends on what the motive of the photographer was like why did you take the picture. If you were taking the picture to take a picture of this part of this house then nothing is missing. Again though it is something that humans occupy so you might think well that next room should have future in it and it should have a dining table and there should be things on the counter and there should be someone standing in front of the sink so it depends on the motive of the person taking the photo was. So again in my mind nothing is missing from the picture.

15.   Is there anything else you would like to say?

No it looks like a really nice place it gets nice light.

Kitchen with Spatial Conditions Removed

1.   Tell me what you see in this picture. Take your time, we have plenty of it.

lots of wood. mostly um..what look like cabinet doors, kitchen cabinets maybe bathroom cabinets, vanity kind of thing. all kitcheny bathroomy things mostly kitchen. this one thing looks like an actual bamboo floor which I highly approve of. this looks like part of a window bathroom window um..not unlike the one in your bathroom. this is like a big stainless steel sink, cabinet doors on their sides, but and this reminds me of..it could be like a stove hood but also could be an odd cutout of maybe some flooring or a piece of metal. and what looks like a right side up counter top and an upside down electrical stove, light fixtures, part of a washer dryer, but its funny cause all these objects are closely related enough, again that's like a top of a part of a sink, that's a doorway, obliquely oriented doors, that looks like the front of a dishwasher, these are the fronts of drawers, again that's a piece of window, faucet, another front doorway and another door in the middle.

2.   Tell me why you describe the contents of the picture in that way?

but what is funny about it and what is easier about it than the other two pictures is that they are all so almost everything..if not everything is recognizable and are closely enough related that I don't feel like I have to go through and tell you what ever individual item is. I feel like there are enough things that are basically the same type of thing or related and you would find together in the same room that I don't feel like I have to go through and tell you what every individual thing is in any particular order. like that's oh a bunch of cabinet doors and drawers that you might find in a kitchen or bathroom and be happy with that because I think people could picture that pretty easy.

3a.   You seem to be familiar with what this picture shows. Are you?
yes

3b.   ((if yes) Tell me how you have acquired familiarity with what this picture shows.) ((if no) Really? Then how were you able to describe its content in the manner that you just did?)
daily life and spending time in bathrooms and kitchens.

4.   Make believe for a moment that you now need to describe the contents of this picture to someone unfamiliar with it; please demonstrate for me how you would do that.
so again it's another landscape image on white that looks sort of like a collage but it looks more like almost something you would see in a catalog. different cabinet doors that you might find in bathroom or kitchen some of them are oriented the way they should be and others are shown sort of obliquely or on their sides. and then there's other items in the picture as well that you would find in kitchens and bathrooms..I forgot what you call them you know the main light in the room that's mounted on the ceiling. and pictures of parts of different appliances, counter tops, sinks, windows, drawers, faucets.

5.   What do you think is important for someone who is not familiar with this picture to understand about this picture?
well that it's an image that is a collage of different items that you would find in a kitchen with an emphasis on doors and cabinets.

6a.   Have you ever seen anything like what is in this picture before?
oh absolutely

6b.   Many times or just on a few occasions?
many times

7.   What is it about the content in this picture which you think allows you to recognize it?
um..i guess what is shown all the little images that are placed within this little image are whole enough or clear enough to show parts or whole pieces..parts or whole items that I

've seen throughout my life. so you can look at them with confidence and say oh yeah that's most of a white door. or oh those look like cabinet doors, or wow that's entire ceiling light, I recognize that. so there are um..there enough of individual images that are clear that even though the whole thing isn't shown they are everyday objects that you would see in a kitchen or bathroom or washroom that you feel confidence in what you see.

8.   *What would you do if you were amongst what you see?*
I'm not as inclined to think about arranging them um..if I were amongst what I saw..definitely more aesthetic. it's a hard question because if I were amongst those things would they be in the same orientations? and if they weren't and I was just standing on that bamboo floor I would just be in heaven because I love the way that it feels on my feet but um..you know there is part of me that's saying..I don't know I think I would have more of a sense of being in the kitchen or the bathroom. or maybe I would just look out that window or be inclined to use the sink as oppose to trying to achieve order.

9.   *What is it about this picture that suggests you may be able to do that?*
because the doorway looks like a doorway and the cupboards look like cupboards. and almost everything there is..looks like something you could just walk up to and use. even though there are only partial images of some of them you know what they are. um..and a..

10.   *Describe for me what your experience may be like once you are in the picture.*
well..if things were you know it's a hard question because it's hard to imagine being amongst all those things but I keep getting drawn back to the bamboo floor or the windows and if I were only dealing with those things that are familiar and aesthetic like oh there's a window and there's sunlight coming in that would be really good experience for me. if I had to stand in that sink to look out that window that would be odd. or if there really was an upside down stove that would probably freak me out. but it's easier to imagine yourself having an experience with different parts, different things and parts of the picture like standing on the bamboo floor or opening a wooden cabinet or using a stainless steel sink or looking out a sunlit window.

11.   *Please describe for me your feelings, if any, that you may have towards what you see in this picture.*
well you know it's kind of like when you are looking through a catalog and you see an image of a pretty room that's got nice floors and so I look at that bamboo floor and I think oh that's beautiful and I look at those wood cabinets and I like the light fixture. and all these things are really utilitarian kinds of things that I could total relate to and am happy that I have in my life. and so..so you know it's kind of how you feel when you flip through a home magazine more than oh my gosh I have to arrange all these things.

12.   *What about the picture makes you feel that way?*

what the objects are and what they are made of.

13.   How might you encounter what you see in this picture in your daily routine?
well I don't have any bamboo floors but I do have wood floors in my kitchen. you know spending time in bathrooms and kitchens just everyday life or other peoples bathrooms and kitchens and washrooms.

14.   What, if anything, is missing from this picture?
well as a collage nothing is missing. but if you really thought all of these things truly exist then you know there is a window that is only shown partially so the rest of that window is missing, um..and there's parts of the cabinets that are missing and of course the fronts of doors that belong to the rest of the cabinet and the floor doesn't look complete the stove is off, the rest of the stove is missing, there's lots of partially you know things that to be complete and real need to have their wholeness needs to be acquired.

15.   Is there anything else you would like to say?
I like this one better than the other two.

Participant 22

<u>**Hair Salon with Preserved Spatial Conditions**</u>
1.   Tell me what you see in this picture. Take your time, we have plenty of it.
I see a hair salon or beauty parlor and the elements and equipment that generally goes
along with that type of occupation.

2.   Tell me why you describe the contents of the picture in that way?
Um..Because of the type of elements that are there, the orientation, the type of chair is
very to me seems very specific to that type of occupation. the..Orientation of the chairs to
the mirrors to the booths to the um..Abundance of equipment and duplication of
equipment.

3a.   You seem to be familiar with what this picture shows. Are you?
Yes

3b.   ((if yes) Tell me how you have acquired familiarity with what this picture shows.)
((if no) Really? Then how were you able to describe its content in the manner that you
just did?)
From a combination of going to some place like this to get my own hair cut to my sister
works in this type of environment to where I go to the grocery store and where I park my
car in the same general situation I pass behind an establishment of this kind.

4.   Make believe for a moment that you now need to describe the contents of this
picture to someone unfamiliar with it; please demonstrate for me how you would do that.
It is a place where um..Someone would go to get their hair cut or hair done. It's a
multiple multiple people can have these things done at the same time. Because there is a
sense of individual stalls or corrals and there's multiple equipment. I'm going to leave it
at that.

5.   What do you think is important for someone who is not familiar with this picture
to understand about this picture?
That this place of business um..Seems to be a clean place of establishment to have your
hair done. It seems to be designed for the client the people that work there to have the
tools that they need at their disposal and provide comfort for these people who work
um..That generally work on their feet.

6a.   Have you ever seen anything like what is in this picture before?
Yes

6b.   Many times or just on a few occasions?
Many times.

7.   What is it about the content in this picture which you think allows you to recognize it?
The style of chairs, the orientation of the equipment and the chairs and this corral are very in kind of a standard orientation for a business like this.

8.   What would you do if you were amongst what you see?
I would most likely be getting my hair cut and groomed.

9.   What is it about this picture that suggests you may be able to do that?
Again the style of chair, the types of equipment, the design of the corral, the mirror, those kinds of things.

10.   Describe for me what your experience may be like once you are in the picture.
A combination of relaxed and anticipation. Waiting for my hair to be cut and will it be done right.

11.   Please describe for me your feelings, if any, that you may have towards what you see in this picture.
I don't have any strong feelings.

12.   What about the picture makes you feel that way?
It's something about the picture itself. There is nothing out of place. It's not a place that I need to go to on a regular basis it's just there.

13.   How might you encounter what you see in this picture in your daily routine?
Generally as I said I would pass something like this if I was going to the grocery store. I would see this kind of thing.

14.   What, if anything, is missing from this picture?
The actual tools for cutting hair. I see half the tools that I would expect to see there which is maybe not a bad thing. No this is not missing the reason why I said this is clean is because it looks very clean. Even though I see no hair there I know it's this type of establishment.

15.   Is there anything else you would like to say?
No

Hair Salon with Spatial Conditions Removed
1.   Tell me what you see in this picture. Take your time, we have plenty of it.
I see some chairs (pause) a..I guess now I can see a light fixture. I'm not sure what the metal things are that have slots in them. um..seems like a door or a window. one of them. that's about all that I can particularly make out that I can actually tell you what they are.

2.   Tell me why you describe the contents of the picture in that way?
um..well I guess because I see pieces. I don't see anything that looks like a whole. I see pieces of things. um..I am not recognizing specific elements of what they are if they are pieces of something or if they are entities of themselves. whole pieces like the chair or the light fixture things like that. so um..I described it based on pieces of things and not anything as a whole.

3a.   You seem to be familiar with what this picture shows. Are you?
um..pieces of it not all of it

*3b.   ((if yes) Tell me how you have acquired familiarity with what this picture shows.)
((if no) Really? Then how were you able to describe its content in the manner that you just did?)*
experiences of seeing the things in other settings and being able to understand what they are. investigating I guess certain things looking at things and trying to figure out what they are. I guess the one thing that maybe it pertains to the other question too but because of the chair being the most obvious thing but not being in the way I would normally expect to see the chair then that immediately made me start looking at the other pieces in not necessarily in the context of how I would see them. so trying to look..that's why I almost think the picture that looks like a window or something like that is another thing that looks upside down or they are not in there in what I would normally expect their natural environment or be placed or view them.

4.   Make believe for a moment that you now need to describe the contents of this picture to someone unfamiliar with it; please demonstrate for me how you would do that.
would say there are pieces of various items. just various things that have been extracted from their normal way you would view them and are placed randomly in a collage or a display of different images. again they are not necessarily placed on to view them as you would normally expect them to be seen or in their normal environments even though they are individual elements. and there is potentially not only individual objects that do have some understanding of what they are but there's potentially pieces of things pieces of the image that are placed on this image.

5.   What do you think is important for someone who is not familiar with this picture to understand about this picture?
that I guess that it would be that things are not necessarily orientated or in the..things are not necessarily in the context of what you would expect to see them. so you have to look at things in different ways to investigate what they are.

6a.   Have you ever seen anything like what is in this picture before?
yes

6b.   Many times or just on a few occasions?
um..many times.

7.   What is it about the content in this picture which you think allows you to recognize it?
that there is enough of the um..any one particular object that I was able to determine what it is there's enough of that image for me to be able to understand what it is. there are pieces of things on this image there's not enough of that for me to interpret what that actually is.

8.   What would you do if you were amongst what you see?
I don't know, I'll just say this off the top of my head, I feel like I would be getting a haircut.

9.   What is it about this picture that suggests you may be able to do that?
um..the style of the chairs to me reminds me of a barber shop or a salon or something like that. um..the lighting (pause) that's about the extent of what I think I could do and why I know that I could do that.

10.   Describe for me what your experience may be like once you are in the picture.
 (pause) relaxed um..a..I don't know. relaxed taking care of business that needs to be done on a regular basis. I'm at a loss.

11.   Please describe for me your feelings, if any, that you may have towards what you see in this picture.
I don't think I have any particular feelings about it.

12.   What about the picture makes you feel that way?
I guess because its random. to me there are a few items that are related but its random and I don't necessarily feel any connectivity to it. it's just pieces.

13.   How might you encounter what you see in this picture in your daily routine?
well there's lights so I would see things like that. potentially, the doorway or window thing, my first impression is there is some sort of colander or something there so keeping time. um..although the chair is not the type of chair that I would sit in but it would be something that I sit in a chair as part of my occupation doing work at a computer screen.

14.   What, if anything, is missing from this picture?
 (pause) I don't feel that there is anything missing from the picture because I don't total feel like everything is connected. so because if everything is not connected I can't visualize what would be needed to connect things together.

15.   Is there anything else you would like to say?

no

Waiting Room with Preserved Spatial Conditions

*1.	Tell me what you see in this picture. Take your time, we have plenty of it.*
I see what appears to be a waiting room or a reception area. Um..Yeah. I mean I see specific objects but yeah I see chairs and a counter, I see small chairs for a children's area.

*2.	Tell me why you describe the contents of the picture in that way?*
Mostly because the counter the counter seems like it would be something that someone would go up to and be asking for information or doing something. Where the chairs the variety of sizes of chairs give me the sense that there's not a knowledge of what or who might be in the space at any one time. Or it's not set for a specific group of people. And then some of the display items on the counter give me a sense that there is some sort of business or interaction or some sort of communication going.

*3a.	You seem to be familiar with what this picture shows. Are you?*
Familiar in that I've seen spaces like this before I have not seen this exact space before.

*3b.	((if yes) Tell me how you have acquired familiarity with what this picture shows.)
((if no) Really? Then how were you able to describe its content in the manner that you just did?)*
Between any kind of doctor's visit or um..Any kind of..Not so much retail..Yeah maybe retail too. Um..Spaces that I've occupied before in my lifetime.

*4.	Make believe for a moment that you now need to describe the contents of this picture to someone unfamiliar with it; please demonstrate for me how you would do that.*
I see a room with a elevated..a counter that is not for seating but for interacting across..I may actually see some kind of television or computer monitor that may allow some sort of self-service acts to potentially occur. And then I see two areas allow people to be seated..a..When they are in this space and not interacting at the counter. One is more smaller chairs that appear to be more for children..Child level interactive area. And then I see two more standard sized chairs where a middle age child to an adult could be seated at.

*5.	What do you think is important for someone who is not familiar with this picture to understand about this picture?*
I would say that the space is designed for potential family. a family a..a..Use by multiple aged group of people or a family because there is not just one size of chair. It definitely has a feeling that there is a knowledge or an anticipation of what age of people would be using and interacting with this space.

6a.   Have you ever seen anything like what is in this picture before?
Yes I have

6b.   Many times or just on a few occasions?
Many times.

7.   What is it about the content in this picture which you think allows you to recognize it?
The type of chairs, the size of chairs, the height of the counter, um..

8.   What would you do if you were amongst what you see?
I'd either be interacting with someone at the counter, I would be..If that is a computer monitor I may be looking up information for myself, or I would be waiting for something. Waiting for something to happen or waiting for someone.

9.   What is it about this picture that suggests you may be able to do that?
The counter..If it was a home like situation I wouldn't expect to see the things I see on the counter. A counter that high would be maybe something like in a home situation would be a bar or something like that. It wouldn't have the items on it that I necessarily see there. And then the fact that the different sizes of chairs doesn't necessarily give you a sense that it couldn't be in a home but the fact that they are there gives that sense. The other thing is I don't know this has also been..The fact that it's a tile floor in this situation kind of also makes me think it's some kind of waiting area. I don't know why.

10.   Describe for me what your experience may be like once you are in the picture.
Some of it would be anticipation in waiting and some of it could be um..What the word would be..The fact that I'm getting something done. Getting that communication. Whether its setup as a time period for another meeting or getting information about the visit the doctor's visit. Anticipation, waiting, and getting something accomplished I can't find the word that I'm looking for that but..

11.   Please describe for me your feelings, if any, that you may have towards what you see in this picture.
I don't have any real feelings just anticipation.

12.   What about the picture makes you feel that way?
From the..In the picture..Well..I don't know if it's necessarily in the picture but the fact that I've settled on that this is some sort of waiting room or doctor's office or a reception area makes me think that I'm there for something and I'm waiting and I don't know..I'm not active..Whatever I'm going to do..Why I came to this place I'm not actively doing something at that point in time. I know that I am either waiting for someone or I'm going to go do something.

13.   How might you encounter what you see in this picture in your daily routine?
Um..If I were going to a doctor's visit or something like that. Um..I would have to say that because of the place where I work I don't necessarily have the breadth of the age that I would expect from people who would use this type of environment.

14.   What, if anything, is missing from this picture?
Um..As I've looked at the picture more I've determined it's an eye doctor's office and there's light missing from this picture. I would think that there is some sort of reading light provided for the adult chairs.

15.   Is there anything else you would like to say?
No.

Waiting Room with Spatial Conditions Removed
1.   Tell me what you see in this picture. Take your time, we have plenty of it.
I see chairs tables floor potentially a wall or ceiling um..pamphlets book maybe a pen or something along the side.

2.   Tell me why you describe the contents of the picture in that way?
um..cause again there are I described it as individual elements because they are individual elements they are not actually connected to one another. they may have a relationship to each other but between the white spaces and what's there is not a direct connection.

3a.   You seem to be familiar with what this picture shows. Are you?
yep more of the pieces in this one yes

3b.   ((if yes) Tell me how you have acquired familiarity with what this picture shows.)
((if no) Really? Then how were you able to describe its content in the manner that you just did?)
once again being using the objects that exist or something like that. being around those particular kinds of things.

4.   Make believe for a moment that you now need to describe the contents of this picture to someone unfamiliar with it; please demonstrate for me how you would do that.
I would again describe it as individual elements or parts of elements that um..are placed on a picture on a canvas..I was going to say but I think several of at least one of the items seems to be duplicated so there is more than one there. depending on if I make an assumption about what certain objects are I would say all of the objects seem to be in their at least in the proper orientation of how they might be used.

5.   What do you think is important for someone who is not familiar with this picture to understand about this picture?

that again it's not a complete picture it's not organized its random things placed on a page. they are in an orientation of how we might expect them to be.

6a.   Have you ever seen anything like what is in this picture before?
yes

6b.   Many times or just on a few occasions?
many times

7.   What is it about the content in this picture which you think allows you to recognize it?
um..I think that most of the elements have enough of them, there is enough visual of them for me to understand what they particularly are. they are in again being in the proper orientation it's easier to understand. um..

8.   What would you do if you were amongst what you see?
I would could be sitting and reading some of the items, I could be working at a table, um..providing power to something that I'm working with like laptop or something like that.

9.   What is it about this picture that suggests you may be able to do that?
the fact that they are there. it's just the facts that they are there. that they are correctly orientated. I don't know.

10.   Describe for me what your experience may be like once you are in the picture.
um..active being a..more organized.um..maybe somewhat informed depending on what the written material is.

11.   Please describe for me your feelings, if any, that you may have towards what you see in this picture.
 (long pause) I guess I could say that maybe..there are two different styles of chairs so I could be doing two different things. I could be relaxing at some point and I could be actively working at another.

12.   What about the picture makes you feel that way?
I think the style of the chairs. the elements that are presented, the table, the chairs, the electrical socket. um..the pamphlet. I guess it gives me a feeling of actively working or gaining knowledge.

13.   How might you encounter what you see in this picture in your daily routine?
I would see them on a fairly regular basis through my work and my leisure because things like that would be in my home or

*14.	What, if anything, is missing from this picture?*
um..some of the elements are incomplete and I still down don't know what they are. so I would..things to finish off..things so I would understand more what they are. um..yeah I would say there are pieces missing and the fact that there still not necessarily organized in a fashion to know what this actually is. but they are at least within the context of how I would expect to see those particular items.

*15.	Is there anything else you would like to say?*
no

Kitchen with Preserved Spatial Conditions
*1.	Tell me what you see in this picture. Take your time, we have plenty of it.*
I see a kitchen of a an unoccupied house.

*2.	Tell me why you describe the contents of the picture in that way?*
Um..Well I see usual appliances and items that you would see in a kitchen, the stove, a sink, a dishwasher. But I said it was unoccupied because there is little if anything visible on the counter tops, um..On the walls, in the room that is past..Of the kitchen there appears to be nothing in there also.

*3a.	 You seem to be familiar with what this picture shows. Are you?*
Yes

*3b.	((if yes) Tell me how you have acquired familiarity with what this picture shows.) ((if no) Really? Then how were you able to describe its content in the manner that you just did?)*
It's a room that I have in my own house so it's something I occupy every day.

*4.	Make believe for a moment that you now need to describe the contents of this picture to someone unfamiliar with it; please demonstrate for me how you would do that.*
Um..It's a pass through kitchen that is you can walk through it from different directions. It's not an actual room to itself. It is unoccupied..It is in some unoccupied state because there does not appear to be anything in the room other than the typical standard features of a kitchen such as the stove, the sink, the cabinetry.

*5.	What do you think is important for someone who is not familiar with this picture to understand about this picture?*
It..The fact that it's an unoccupied house or apartment I think is one thing. Um..I'm not good with the dates of type of cabinetry and from what I can see of the appliances I can't tell if it is something relatively new or at least in the last 15 or 20 years.

*8.	What would you do if you were amongst what you see?*

In the state of it now I would be looking I feel like I would be looking at the house as to whether or not I would be purchasing it. It does not give me the sense that I would be working in it. Because of the state of people not being there. So I would get a sense of I would be observing or looking at the house from the stand point of a sale or renting.

9.   What is it about this picture that suggests you may be able to do that?
The fact that the walls are bare. The counters are bare. Maybe even..From having seeing..It doesn't look like the actual heating elements are in the stove. Um..The floors are bare. Um..So it feels unoccupied. Maybe even the set of keys on the counter leads me to believe that I'm with a realtor or someone who is looking at the house.

10.   Describe for me what your experience may be like once you are in the picture.
Inquisitive, inspecting, determining if it meets the needs of what the type of family or my own tastes and styles if it would meet those needs.

11.   Please describe for me your feelings, if any, that you may have towards what you see in this picture.
Vacant, um..And curious.

12.   What about the picture makes you feel that way?
The lack of things, elements in the space that makes me feel that it is occupied, currently occupied, or that it is actually working. The stove without the heating elements if that is actually what I am not seeing. Um..Does it actually work.

13.   How might you encounter what you see in this picture in your daily routine?
In my daily routine I wouldn't necessarily see this. In my daily routine..It would have to be something that I was purposely looking at a house, considering moving or something like that so daily it's not something I would see.

14.   What, if anything, is missing from this picture?
If it was not a vacant house everything that comes from..Making a space feel occupied. Yeah. If I'm..Truly believe that this is a vacant space then nothing is missing. If it's just this vacant then it feels like everything is missing that makes it feel occupied.

15.   Is there anything else you would like to say?
No.

Kitchen with Spatial Conditions Removed
1.   Tell me what you see in this picture. Take your time, we have plenty of it.
I see see pieces of again pieces of rooms of a room elements of what could be a kitchen or a laundry room or maybe even a lab. but this time there appear to be elements that are oriented in a fashion that are not the way that you would normally expect them to be oriented. lots of doors, lots of drawers too.

2.   Tell me why you describe the contents of the picture in that way?
again this time there's white spaces with elements it's not necessarily a whole image. there are the images are not oriented in the way that you normally expect to see them. but there are particular pieces of the image that are more familiar. but most of these pieces most of the pieces in the image are complete enough for you to understand what they are.

3a.   You seem to be familiar with what this picture shows. Are you?
a..yes again its more from the stand point..well this time I understand more of what the individual elements are. um..not necessarily how they are all connected.

3b.   ((if yes) Tell me how you have acquired familiarity with what this picture shows.)
((if no) Really? Then how were you able to describe its content in the manner that you just did?)
I think being around particular elements in either a house or a work place. I know more because I've been around them.

4.   Make believe for a moment that you now need to describe the contents of this picture to someone unfamiliar with it; please demonstrate for me how you would do that.
um..again describe to the person that these are pieces of an image not necessarily a whole. they don't all necessarily need to fit together to form to be in a particular space or all are totally related. this one there are more complete pieces that are there but some of them are not orientated in the way that you usually expect them.

5.   What do you think is important for someone who is not familiar with this picture to understand about this picture?
well one of the things is that there are certain pieces of the image that are hard to tell their orientation. um..but there's enough detail in the individual images for you to understand or grasp what that image piece is.

6a.   Have you ever seen anything like what is in this picture before?
yes

6b.   Many times or just on a few occasions?
many times

7.   What is it about the content in this picture which you think allows you to recognize it?
I think seeing the most of the images you can see an aspect of them in their entirety so that allows you to understand or make an assumption of what those particular are.

8.   What would you do if you were amongst what you see?

(pause)..I think I would be cooking. um..although the sink..the faucet..I'm kind of torn the faucet appears to be one style but the sinks appear to be another style. so I'm not exactly sure what I would be doing but again it would be something active um..and the fact that there is all these doors implies that there must be some sort of storage involved in the picture.

9.   What is it about this picture that suggests you may be able to do that?
I think all the doors, usually imply storage of something or passage way. some of them are a particular door. and one looks like an oven and the faucet kind of looks like a kitchen or a lab.

10.   Describe for me what your experience may be like once you are in the picture.
active but from a slightly different stand point. with all the doors it usually means there is something on the other side and so it would be inquisitive to see what is on the other side.

11.   Please describe for me your feelings, if any, that you may have towards what you see in this picture.
curiosity, what is behind the doors.

12.   What about the picture makes you feel that way?
the fact that there are all these doors that are closed. none of the doors are in a state, doors or drawers, are in a state of being opened. um..

13.   How might you encounter what you see in this picture in your daily routine?
Well…being in a kitchen or in a lab. I guess I have a sense I would be working or doing something in there.

14.   What, if anything, is missing from this picture?
because again there are pieces of a whole. there seems to be things that are missing to be able to complete being a room or a..something like that. so there seems to be pieces missing to be able to completely understand how if we need to know how they are all related.

15.   Is there anything else you would like to say?
No

APPENDIX B DATA TABLES

Table B.1 frequency table for hair salon with preserved spatial conditions.

Participant	Affordance evident	Affordance not evident	Object mentions	Objects linked to one another	Contiguity	Absence of integration	Absence of structure	What to do there	What not to do there	Experience	Typical experience	Atypical experience	PEB relations	Collective purpose of items	Social norms	Social interaction	Cues, prompts, signals	How to move around	Activity cues missing	Activity cues present	Overall context missing	Scene-like ecology	Functional design	Mental schema invoked	Scale information missing	Collective use of items	Expectation of greater environmental context	Routine encounter of image	Confusion	total
P1	21	0	6	22	8	0	0	9	0	4	5	0	6	2	5	4	1	1	0	10	0	9	1	0	0	1	2	3	0	120
P2	7	0	7	16	8	0	0	11	0	8	6	0	3	5	4	4	0	1	0	5	0	17	3	1	0	0	0	3	0	109
P3	11	0	20	9	5	0	0	11	0	3	4	0	8	2	4	8	0	0	0	6	0	9	1	1	0	0	2	4	0	108
P4	12	0	19	9	5	0	0	13	0	1	2	0	4	2	5	3	0	0	0	6	0	12	3	0	0	0	0	2	0	98
P5	11	0	23	4	5	0	0	6	0	1	1	0	5	2	4	3	1	1	0	5	0	6	5	1	0	1	1	4	0	90
P6	8	0	27	14	13	0	0	6	0	2	3	0	2	5	6	7	0	1	0	11	0	23	3	1	0	1	0	2	0	135
P7	11	0	16	7	4	0	0	12	1	3	4	1	3	1	4	7	0	2	0	3	0	6	1	0	0	1	0	3	0	90
P8	8	0	24	10	4	0	0	9	0	3	0	2	2	3	5	2	1	0	0	6	0	7	3	0	0	0	2	1	0	92
P9	10	0	21	10	5	0	0	7	0	2	4	0	2	4	3	2	0	0	0	6	0	15	0	1	0	0	0	4	0	96
P10	19	0	20	12	9	0	0	9	0	1	1	2	5	2	4	12	0	1	0	6	0	14	0	0	0	0	1	1	0	119
P11	13	0	13	13	7	0	0	10	0	1	2	0	3	4	7	2	0	0	0	8	0	9	2	0	0	1	0	1	0	96
P12	8	0	17	6	3	0	0	4	0	3	3	0	4	6	4	2	0	0	0	8	0	13	0	0	0	4	0	1	0	86
P13	24	0	20	17	18	0	0	5	0	1	1	0	3	1	3	1	0	0	0	5	0	6	0	0	0	0	1	1	0	107
P14	5	0	21	11	7	0	0	6	0	1	2	0	3	0	2	3	0	0	0	6	0	10	0	0	0	0	0	2	0	79
P15	15	0	17	19	16	0	0	5	0	3	5	0	3	5	5	8	1	1	0	9	0	13	0	1	0	0	0	5	0	131
P16	16	0	19	16	5	0	0	7	2	1	5	0	4	1	8	7	0	0	0	8	0	14	1	0	0	0	0	5	0	119
P17	15	0	6	10	3	0	0	4	0	2	3	0	3	0	2	1	1	0	0	5	0	11	2	0	0	0	1	3	0	72
P18	10	0	8	9	5	0	0	9	0	1	0	0	1	1	3	2	0	0	0	12	0	6	3	0	0	1	0	2	0	73
P19	20	0	7	2	4	0	0	15	2	1	1	0	4	0	4	7	0	0	0	9	0	5	2	1	0	0	0	1	0	85
P20	19	0	6	8	2	0	0	6	0	1	1	1	3	2	5	3	1	0	0	4	0	9	3	0	0	0	1	2	0	77
P21	9	0	8	19	13	0	0	4	0	1	2	0	1	2	1	5	2	0	0	6	0	7	1	0	0	0	0	2	0	83
P22	6	0	4	7	3	0	0	4	0	1	1	0	1	0	3	2	0	0	0	6	0	5	4	0	0	0	0	1	0	48
P23	6	0	20	7	6	0	0	7	0	1	1	0	3	0	2	6	0	0	0	2	0	7	3	0	0	0	0	2	0	73
P24	9	0	4	10	4	0	0	7	0	1	2	0	2	1	2	3	0	0	0	3	0	8	1	1	0	0	0	1	0	59
P25	3	0	27	15	10	0	0	2	0	1	0	1	1	0	2	0	1	0	0	3	0	9	2	0	0	0	0	1	1	79
P26																														
P27	10	0	16	6	3	0	0	4	0	3	3	2	0	0	1	0	0	0	0	5	0	10	0	1	0	0	0	2	0	66
P28	13	0	28	17	12	0	0	6	0	1	1	0	2	1	5	2	1	0	0	6	0	7	2	0	0	0	0	2	0	106
P29	15	0	14	5	6	0	0	8	1	1	3	0	4	0	5	3	0	0	0	4	0	10	4	0	0	0	0	6	0	89
P30	12	0	11	4	5	0	0	10	0	1	2	0	1	0	2	4	1	0	0	5	0	6	0	0	0	0	0	3	0	67
P31	9	0	7	13	10	0	0	2	0	3	1	0	5	2	3	7	0	1	0	4	0	8	4	0	0	0	0	2	0	81
P32	7	1	8	7	3	0	0	1	0	2	2	3	0	1	2	0	3	0	0	4	0	6	0	0	0	0	0	0	1	51
P33	16	0	14	9	10	0	0	6	0	1	2	0	2	0	3	4	0	0	0	7	0	9	0	0	0	0	0	2	0	85
P34	9	0	12	7	3	0	0	3	0	1	1	0	3	1	4	4	0	1	0	6	0	4	0	2	0	0	1	4	0	66
P35	17	0	13	5	8	0	0	5	0	1	1	0	3	2	2	4	0	0	0	4	0	12	1	0	0	0	1	1	0	80
P36	15	0	13	3	1	0	0	4	0	4	3	0	2	2	3	4	0	0	0	3	0	8	1	2	0	0	0	1	0	69
P37	10	0	17	4	6	0	0	4	0	2	2	0	3	0	4	7	0	0	0	3	0	6	0	0	0	0	1	2	0	71
P38	9	0	16	7	1	0	0	5	0	2	5	0	2	0	3	5	0	0	0	4	0	6	1	0	0	0	1	1	0	68
P39	16	0	17	15	2	0	0	8	0	1	3	0	3	0	2	3	0	1	0	3	0	8	0	0	0	0	0	1	0	83
P40	5	0	4	4	2	0	0	6	0	0	0	0	1	0	1	1	0	0	0	4	0	6	0	0	0	0	0	2	0	36
P41	13	0	5	27	4	0	0	14	0	1	2	0	4	0	2	3	2	4	0	5	0	10	1	1	0	0	0	5	0	103
P42	6	0	7	16	6	0	0	2	0	1	1	0	2	1	1	2	0	0	0	5	0	7	0	0	0	0	0	3	0	60
P43	6	0	1	8	1	0	0	5	0	1	2	0	2	0	2	3	0	0	0	3	0	5	0	0	0	0	0	2	0	41
P44	10	0	2	25	12	0	0	6	0	1	2	0	2	0	4	3	0	0	0	7	0	10	1	0	0	0	0	1	0	86
P45	4	0	11	4	0	0	0	7	0	1	3	0	1	0	2	2	0	0	0	5	0	4	0	0	0	0	0	1	0	45
P46	5	0	4	9	2	0	0	6	0	1	0	1	2	0	3	4	0	1	0	2	0	10	0	0	0	0	5	1	0	56
P47	2	0	0	9	3	0	0	3	1	1	1	0	2	0	1	1	0	1	0	2	0	4	1	0	0	0	1	3	0	36
P48	2	1	7	11	3	1	0	3	0	1	1	0	1	1	1	1	2	0	0	4	0	6	0	0	0	0	0	0	0	46

Table B.2 frequency table for hair salon with spatial conditions removed.

Participant	Affordance evident	Affordance no evident	Object mentions	Objects linked to	Contiguity	Absence of integration	Absence of structure	What to do there	What not to do there	Experience	Typical experience	Atypical experience	PEB relations	Collective purpose of	Social norms	Social interaction	Cues, prompts,	How to move	Activity cues	Activity cues	Overall context	Scene-like ecology	Functional design	Mental schema	Scale informatio	Collective use of	Expectation n of greater	Routine encounter	Confusion	total
P1	0	0	46	0	0	8	6	1	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	65
P2	2	2	29	1	0	9	12	1	0	0	0	2	0	1	0	0	3	0	0	0	5	0	0	1	0	0	0	0	6	74
P3	3	0	34	1	1	3	7	4	0	0	0	0	0	1	0	0	3	0	0	0	3	7	0	1	0	0	0	0	3	71
P4	3	0	41	1	1	7	2	6	0	1	0	1	0	0	0	0	4	0	0	0	4	0	0	3	0	0	0	0	3	77
P5	0	9	45	0	0	3	0	2	0	0	0	0	0	0	0	0	1	0	2	0	1	0	0	1	1	0	0	2	12	79
P6	0	0	88	1	3	17	20	2	0	1	0	2	0	1	0	0	3	0	1	0	11	1	0	0	0	0	0	0	11	162
P7	0	0	22	0	0	7	10	0	0	0	0	0	0	0	0	0	1	0	0	0	6	0	0	0	7	0	0	0	21	74
P8	0	2	32	2	1	2	1	0	0	1	0	5	0	2	0	0	0	1	0	0	4	0	0	0	0	0	0	0	0	53
P9	0	6	39	0	0	9	20	0	0	1	0	2	0	0	0	0	1	0	3	0	7	0	0	0	1	0	0	0	5	94
P10	0	7	24	0	0	12	20	0	0	1	0	2	0	0	0	0	2	0	3	0	10	0	0	0	4	0	0	0	4	89
P11	3	6	35	0	0	3	2	0	0	0	0	0	0	0	0	0	8	0	1	0	2	0	0	0	1	0	0	0	1	62
P12	3	1	30	0	0	5	2	0	0	1	0	1	0	0	0	0	4	0	1	0	3	0	0	0	0	0	0	0	1	52
P13	1	5	8	0	0	5	5	0	0	1	0	1	0	0	0	0	4	0	0	0	4	0	0	0	0	0	0	0	3	37
P14	1	10	41	0	0	3	1	0	0	1	0	1	0	1	0	0	10	0	1	0	3	0	0	0	0	0	0	0	7	80
P15	0	4	9	0	0	3	4	0	0	1	1	0	0	4	0	0	5	0	1	0	3	0	0	1	0	0	0	0	2	38
P16	5	9	27	0	0	7	12	0	0	1	0	1	0	0	0	0	8	0	4	1	6	0	0	0	1	0	0	0	4	86
P17	0	6	10	0	0	4	3	0	0	1	0	3	0	0	0	0	3	1	1	0	1	0	0	0	0	0	0	0	2	35
P18	1	6	15	0	0	6	2	0	0	0	0	0	0	0	0	1	2	0	2	0	2	0	0	0	0	0	0	0	4	41
P19	2	1	28	0	1	2	2	0	0	1	0	1	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	41
P20	0	8	23	0	0	7	5	2	0	1	0	1	0	1	0	0	2	0	0	0	4	0	0	0	0	0	0	0	2	56
P21	1	5	13	0	0	6	4	0	0	1	0	3	0	0	0	0	6	0	0	0	3	0	0	0	2	0	0	0	5	49
P22	0	2	14	0	0	3	4	1	0	1	1	0	0	1	0	0	5	0	0	1	3	0	0	1	0	0	0	0	1	38
P23	0	4	20	0	0	2	3	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0	0	0	0	0	0	0	1	33
P24	6	0	20	0	0	1	0	1	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	31
P25	0	4	32	0	0	15	13	0	0	1	0	2	0	0	1	0	7	0	1	0	4	0	0	2	7	0	0	0	3	92
P26	16	2	16	0	0	11	11	0	0	1	0	2	0	0	0	0	6	0	0	0	3	0	0	0	0	0	0	0	0	68
P27	2	1	31	1	1	4	10	1	0	1	0	1	0	3	0	0	4	0	0	0	3	0	0	0	0	0	0	0	0	63
P28	3	3	34	3	0	16	19	0	0	1	0	1	0	2	0	0	10	0	1	0	3	0	0	0	0	0	0	0	3	99
P29	1	6	21	0	0	7	11	0	0	0	0	0	0	5	0	0	12	0	2	0	6	0	0	0	2	0	0	0	8	81
P30	1	3	10	0	0	5	4	0	0	0	0	1	0	0	0	0	4	0	1	0	1	0	0	0	1	0	0	0	3	34
P31	0	5	26	0	0	4	7	0	0	1	0	1	0	2	0	0	3	0	1	0	2	0	0	0	0	0	0	0	1	53
P32	0	3	8	0	0	4	2	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	0	0	1	0	0	0	0	21
P33	3	11	36	0	0	11	6	0	0	1	0	1	0	5	0	0	2	0	1	0	1	0	0	1	2	0	0	0	1	82
P34	0	10	30	0	1	1	2	0	0	1	0	2	0	0	0	0	1	0	0	0	6	0	0	1	7	0	0	0	1	63
P35	2	4	19	1	0	3	5	1	0	1	1	0	0	5	0	0	4	0	0	1	4	0	0	0	0	0	0	0	1	52
P36	2	6	21	0	1	9	5	1	0	1	0	2	0	2	0	0	4	0	0	2	2	0	0	0	0	0	0	0	0	58
P37	1	5	25	0	0	2	3	0	0	0	0	0	0	0	2	0	0	0	0	0	6	0	0	0	0	0	0	0	0	44
P38	3	5	23	3	2	0	0	1	0	1	1	0	0	2	0	0	1	0	0	3	0	0	0	0	0	0	0	2	1	48
P39	5	8	21	1	1	4	14	0	0	1	0	1	0	4	0	0	1	0	0	4	2	2	0	0	1	0	0	0	0	70
P40	0	1	12	0	0	4	8	0	0	1	0	1	0	2	0	0	3	0	0	0	3	0	0	0	0	0	0	0	1	36
P41	2	6	22	0	1	4	14	0	0	1	0	2	0	0	0	0	5	0	0	2	3	1	0	0	0	0	0	0	2	65
P42	2	14	54	0	8	2	13	0	0	1	0	2	0	2	0	0	3	0	0	1	5	0	0	1	0	0	0	0	0	108
P43	1	6	11	0	0	2	5	0	0	1	0	1	0	0	0	0	1	0	1	0	5	1	0	1	0	0	0	0	1	37
P44	0	3	37	3	0	3	8	0	0	1	0	1	0	4	0	0	3	0	0	0	2	0	0	0	0	0	0	0	0	65
P45	4	1	11	2	0	0	1	7	0	1	2	0	0	2	0	1	0	0	0	2	0	0	0	0	0	0	0	1	1	36
P46	0	7	20	0	0	4	4	0	0	0	0	0	0	0	0	0	6	0	1	0	5	0	0	0	0	0	0	0	1	48
P47	2	3	15	4	0	1	1	3	0	1	2	0	0	2	0	0	2	0	0	4	2	3	0	0	2	0	0	0	0	45
P48	6	6	16	3	0	2	3	0	0	1	0	1	0	2	0	0	3	0	1	0	2	0	0	0	1	0	0	0	0	47

Table B.3 frequency table for waiting room with preserved spatial conditions.

Participant	Affordance evident	Affordance no evident	Object mentions	Objects linked to one	Contiguity	Absence of integration	Absence of structure	What to do there	What not to do there	Experience	Typical experience	Atypical experience	PEB relations	Collective purpose of	Social norms	Social interaction	Cues, prompts,	How to move around	Activity cues missing	Activity cues present	Overall context	Scene-like ecology	Functional design	Mental schema	Scale information	Collective use of items	Expectation of greater	Routine encounter of	Confusion	total
P1	27	0	20	6	0	0	0	16	0	3	4	0	1	2	2	11	0	0	0	8	0	21	0	2	0	0	5	1	0	129
P2	10	0	21	11	10	0	0	5	0	1	1	0	2	1	1	5	0	2	0	10	0	27	2	1	0	0	3	2	0	115
P3	10	0	15	9	5	0	0	5	0	1	1	0	3	0	0	5	0	0	0	5	0	10	1	2	0	0	2	0	0	74
P4	21	0	37	10	7	0	0	14	1	2	1	0	3	2	2	4	0	0	0	3	0	14	1	1	0	1	1	1	0	126
P5	2	0	38	4	4	0	0	1	0	0	0	0	0	0	1	0	2	0	0	0	0	3	1	1	0	0	0	2	2	61
P6	12	0	25	9	6	0	0	2	0	2	2	0	3	4	1	5	0	2	0	5	0	14	2	2	0	1	3	3	0	103
P7	12	0	17	7	10	0	0	1	0	2	2	0	2	6	2	6	0	1	0	11	0	12	4	2	0	1	4	4	0	106
P8	16	0	22	5	6	0	0	1	0	2	0	1	2	1	2	6	0	7	0	8	0	13	4	2	0	0	2	0	0	100
P9	8	0	20	7	5	0	0	3	0	1	0	0	1	1	2	2	0	0	0	5	0	13	1	1	0	1	1	1	0	73
P10	17	0	22	9	10	0	0	0	0	1	1	0	0	0	0	2	0	1	0	3	0	24	5	4	0	0	4	2	0	105
P11	10	0	15	8	6	0	0	7	0	0	0	0	5	2	2	3	0	4	0	4	0	11	4	0	0	0	5	4	0	90
P12	8	0	24	2	1	0	0	2	0	1	2	0	2	3	3	3	0	1	0	4	0	11	0	0	0	0	0	2	0	69
P13	11	0	29	8	11	0	0	3	0	1	1	0	2	1	1	2	0	0	0	3	0	5	0	0	0	0	0	1	0	79
P14	6	0	15	8	8	0	0	2	0	2	2	0	2	1	4	3	0	0	0	4	0	8	1	0	0	0	2	2	0	70
P15	8	0	10	11	15	0	0	5	1	2	1	0	2	2	2	3	0	0	0	7	0	12	4	1	0	0	3	2	0	91
P16	13	0	10	7	6	0	0	7	1	0	0	0	4	2	5	5	0	1	0	9	0	12	2	0	0	0	3	3	0	90
P17	10	0	5	4	5	0	0	1	0	1	1	0	1	2	2	1	1	0	0	6	0	9	1	1	0	1	2	1	0	54
P18	3	1	9	5	3	0	0	1	0	1	1	0	0	0	2	1	2	0	0	3	0	5	2	1	0	0	2	1	0	43
P19	8	0	4	3	1	0	0	2	0	1	1	0	2	0	1	7	0	0	0	6	0	4	0	0	0	0	1	1	0	42
P20	10	0	3	6	5	0	0	9	0	0	0	0	1	3	4	2	0	1	0	6	0	9	2	1	0	0	2	2	0	66
P21	10	0	27	12	15	0	0	2	0	1	1	0	0	2	0	0	0	0	0	1	0	5	3	1	0	0	0	2	0	82
P22																														
P23	10	0	6	10	3	0	0	6	0	2	1	0	3	0	2	5	0	1	0	6	0	6	1	0	0	0	1	3	0	66
P24	11	0	4	7	3	0	0	5	0	1	1	0	1	3	2	0	0	0	0	5	0	7	0	0	0	0	1	2	0	53
P25	11	0	32	7	5	0	0	2	0	2	2	0	0	1	4	1	0	0	0	4	0	11	2	1	0	0	2	1	0	88
P26	34	0	36	10	11	0	0	5	2	1	1	0	3	1	1	9	1	3	0	4	0	22	1	2	0	0	2	2	0	151
P27	13	0	26	8	5	0	0	1	0	1	2	0	1	0	0	0	0	1	0	2	0	4	1	0	0	0	2	1	0	68
P28	14	0	43	16	15	0	0	3	0	2	3	0	1	1	1	4	0	0	0	4	0	9	2	0	0	0	3	2	0	123
P29	20	0	18	8	7	0	0	1	0	1	2	0	1	0	5	2	0	0	0	2	0	11	2	0	0	0	5	3	0	88
P30	13	0	14	2	2	0	0	3	0	1	1	0	1	1	2	3	0	0	0	1	0	7	0	0	0	0	0	1	0	52
P31	10	0	21	7	12	0	0	3	0	2	0	0	1	2	4	5	0	1	0	7	0	6	1	0	0	0	2	1	0	85
P32	8	0	12	5	1	0	0	3	0	1	1	0	2	0	1	3	0	1	0	7	0	7	2	1	0	0	2	1	0	58
P33	28	0	1	18	7	0	0	16	0	2	2	0	5	1	2	3	2	1	0	6	0	14	1	0	0	0	2	1	0	112
P34	20	0	7	3	1	0	0	5	0	1	1	0	2	0	1	1	0	0	0	9	0	7	2	0	0	0	0	2	0	62
P35	15	0	5	10	7	0	0	4	0	1	1	0	1	0	2	1	0	0	0	4	0	11	0	0	0	0	0	2	0	64
P36	14	0	2	7	2	0	0	9	0	1	1	0	2	0	2	4	0	0	0	5	0	9	0	0	0	0	1	1	0	60
P37	14	0	5	14	11	0	0	7	0	1	0	0	1	0	6	3	0	0	0	6	0	10	2	0	0	0	2	3	0	85
P38	11	0	0	4	1	0	0	6	0	1	1	0	1	0	5	4	0	0	0	2	0	9	1	0	0	0	0	2	0	48
P39	18	0	0	18	8	0	0	9	0	1	1	0	1	0	3	3	0	1	0	8	0	8	3	0	0	0	0	1	0	83
P40	5	0	0	3	3	0	0	2	0	1	1	0	2	0	3	2	0	0	0	4	0	10	3	1	0	0	1	1	0	42
P41	17	0	5	16	7	0	0	10	0	1	1	0	2	2	3	2	0	0	0	10	0	11	1	0	0	0	0	1	0	89
P42	9	1	6	10	6	0	0	2	0	2	3	0	1	1	1	2	0	0	0	7	0	8	2	0	0	0	0	4	0	65
P43	12	0	3	8	4	0	0	4	0	2	2	0	1	0	2	3	0	2	0	4	0	4	0	0	0	0	1	4	0	56
P44	22	0	1	16	7	0	0	10	0	1	1	0	1	0	4	2	0	2	0	5	0	7	4	0	0	0	1	2	0	86
P45	6	0	0	8	3	0	0	8	0	1	1	0	1	0	1	4	0	0	0	8	0	2	0	0	0	0	0	2	0	45
P46	11	0	0	6	0	0	0	7	0	0	0	0	1	0	2	1	0	0	0	4	0	12	0	0	0	0	1	2	0	47
P47	5	0	1	5	4	0	0	2	0	1	1	0	0	2	0	0	0	0	0	4	0	4	0	0	0	0	1	1	0	31
P48	9	0	8	7	1	0	0	4	0	1	0	0	1	0	1	1	0	0	0	4	0	5	1	0	0	0	0	1	0	44

Table B.4 frequency table for waiting room with spatial conditions removed.

Participant	Affordance evident	Affordance no evident	Object mentions	Objects linked to one another	Contiguity	Absence of integration	Absence of structure	What to do there	What not to do there	Experience	Typical experience	Atypical experience	PEB relations	Collective purpose of items	Social norms	Social interaction	Cues, prompts, signals missing	How to move around	Activity cues missing	Activity cues present	Overall context missing	Scene-like ecology	Functional design	Mental schema invoked	Scale information missing	Collective use of items	Expectation of greater	Routine encounter of image	Confusion	total
P1	1	0	44	0	0	8	6	1	0	0	0	0	0	1	0	0	2	0	1	0	3	1	0	0	0	0	5	0	0	73
P2	3	2	41	1	0	9	14	2	0	1	0	0	0	1	0	0	2	0	1	1	1	0	0	1	0	0	0	0	10	90
P3	1	0	31	1	0	5	7	1	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	49
P4	11	3	56	1	1	6	1	5	0	2	0	0	0	0	0	0	6	0	1	0	3	0	0	1	0	0	0	1	3	101
P5	1	0	39	0	0	0	0	1	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	8	54
P6	0	9	48	0	0	10	16	0	0	0	0	0	0	0	0	0	5	0	0	0	2	0	0	0	0	1	0	0	2	93
P7	2	9	25	0	0	5	1	0	0	0	0	0	0	0	0	0	9	0	0	0	0	0	0	0	0	2	0	0	5	58
P8	6	5	34	2	0	1	2	0	0	2	2	0	0	1	0	1	5	1	0	0	2	4	0	0	0	0	0	0	0	68
P9	1	1	26	1	1	3	6	2	0	1	1	0	0	0	0	0	1	0	0	0	2	0	0	0	3	0	0	0	2	51
P10	3	3	37	1	0	6	8	3	0	1	2	0	0	0	0	3	3	0	0	1	5	2	0	0	1	0	0	0	0	79
P11	8	4	41	0	0	2	1	0	0	0	0	0	0	0	0	0	8	0	3	0	1	0	0	0	1	0	0	0	0	69
P12	2	2	40	0	0	1	1	0	0	0	0	0	0	4	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	53
P13	2	6	51	2	0	1	0	1	0	0	0	0	0	0	1	0	8	0	0	0	0	0	0	0	0	0	0	0	1	73
P14	0	5	42	0	0	1	0	0	0	0	0	0	0	3	0	0	2	0	1	0	0	0	0	0	1	0	0	0	0	55
P15	4	3	34	0	0	5	3	0	0	0	0	0	0	0	0	0	3	0	0	0	2	0	0	0	1	0	0	0	0	55
P16	2	6	19	1	0	4	6	1	0	0	0	0	0	3	0	0	10	0	4	0	6	0	0	0	3	0	0	0	3	68
P17	0	6	18	0	0	1	1	0	0	1	0	2	0	0	0	0	1	0	0	0	3	0	0	0	0	0	0	0	0	33
P18	0	2	35	0	0	1	0	4	0	1	0	0	0	2	0	1	4	0	1	1	1	0	0	0	0	0	0	0	1	54
P19	4	0	30	0	0	3	4	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	42
P20	1	3	31	0	1	3	4	1	0	0	0	0	0	2	0	0	1	0	0	0	1	0	0	0	2	0	0	0	0	50
P21	1	14	22	0	0	8	2	0	0	0	0	0	0	0	0	0	7	0	3	0	1	0	0	0	3	0	0	0	1	62
P22	4	5	20	0	0	2	2	2	0	0	0	0	0	0	0	0	2	0	0	0	1	0	0	0	0	0	0	0	1	39
P23	1	2	30	0	0	0	0	2	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	36
P24	8	1	22	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	33
P25	0	4	38	0	0	11	11	0	0	0	0	0	0	1	1	0	7	0	0	0	5	0	0	0	1	4	0	0	4	87
P26	0	3	28	1	1	1	4	0	0	0	1	0	0	0	0	0	6	1	0	0	2	0	0	0	3	0	0	0	4	55
P27	4	1	38	4	1	2	5	0	0	0	0	0	0	2	0	0	3	0	0	0	2	0	0	0	0	0	0	0	2	64
P28	6	2	51	0	0	5	4	2	0	1	1	0	0	3	0	0	6	0	0	0	2	2	0	0	3	0	0	1	1	90
P29	5	2	22	0	0	5	7	0	0	0	0	0	0	3	0	0	6	0	0	0	0	0	0	0	3	0	0	0	1	54
P30	4	7	36	0	0	6	5	0	0	1	0	1	0	0	0	0	4	1	1	0	3	0	0	0	2	0	0	0	3	74
P31	4	11	43	4	0	4	2	3	0	0	0	0	0	2	0	0	5	0	1	0	0	0	0	0	2	0	0	0	6	87
P32	2	1	24	0	0	4	3	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	36
P33	0	10	27	0	0	5	5	0	0	0	0	0	0	1	0	0	7	0	0	0	2	0	0	0	0	0	0	0	0	57
P34	1	1	26	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	2	0	0	0	0	34
P35	2	9	22	1	0	5	3	1	0	0	0	0	0	3	0	0	6	0	0	0	1	0	0	0	0	0	0	0	0	53
P36	1	2	15	0	0	4	1	0	0	0	0	0	0	3	0	0	1	0	2	0	1	0	0	0	0	0	0	0	0	30
P37	1	3	36	0	0	0	0	2	0	0	0	0	0	2	1	0	2	1	0	0	0	0	0	0	0	0	0	0	0	48
P38	1	0	8	2	0	0	0	3	0	1	0	0	0	1	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	19
P39	1	3	22	0	0	6	5	1	0	0	0	0	0	0	0	0	2	0	0	0	2	0	0	0	1	0	0	0	1	44
P40	0	1	13	0	0	4	7	0	0	0	0	0	0	2	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	31
P41	1	3	37	0	1	2	0	3	0	2	1	0	0	2	0	0	2	0	0	1	0	2	0	0	0	0	0	0	0	57
P42	0	9	52	0	0	2	3	0	0	0	0	0	0	0	0	0	3	0	0	0	2	0	0	0	0	0	0	0	0	71
P43	0	3	18	0	0	3	4	0	0	0	0	0	0	2	0	0	3	0	0	0	3	0	0	0	2	0	0	0	0	38
P44	1	3	36	0	0	0	2	1	0	1	0	0	0	3	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	49
P45	1	1	21	0	0	1	0	2	0	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	29
P46	0	1	18	0	0	12	5	0	0	0	0	0	0	2	0	0	2	0	0	0	1	2	0	0	0	0	0	0	0	43
P47	0	3	27	0	0	2	0	1	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	35
P48	2	3	23	0	0	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	34

Table B.5 frequency table for kitchen with preserved spatial conditions.

Participant	Affordance evident	Affordance no evident	Object mentions	Objects linked to one another	Contiguity	Absence of integration	Absence of structure	What to do there	What not to do there	Experience	Typical experience	Atypical experience	PEB relations	Collective purpose of items	Social norms	Social interaction	Cues, prompts, signals missing	How to move around	Activity cues missing	Activity cues present	Overall context missing	Scene-like ecology	Functional design	Mental schema invoked	Scale information missing	Collective use of items	Expectation of greater	Routine encounter of image	Confusion	total
P1	6	0	29	11	16	0	0	2	0	0	0	0	0	3	4	0	1	1	0	2	0	18	6	3	0	0	2	4	0	108
P2	6	0	18	4	10	0	0	3	0	1	0	0	4	0	1	2	0	3	0	6	0	16	2	1	0	0	6	0	0	83
P3	6	0	36	9	7	0	0	7	0	1	0	0	3	3	1	0	0	1	0	4	0	14	5	1	0	0	0	4	0	102
P4	16	0	33	13	17	0	0	6	0	0	0	0	2	5	2	2	0	3	0	9	0	20	1	1	0	0	4	2	0	136
P5	10	0	39	12	10	0	0	2	0	1	1	0	0	1	2	0	0	1	0	1	0	9	2	1	0	3	4	2	0	101
P6	12	0	35	13	19	0	0	3	0	1	2	0	4	4	1	0	0	5	0	6	0	23	0	2	0	1	8	3	0	142
P7	13	0	31	3	1	0	0	5	0	2	3	0	2	3	0	4	0	0	0	5	0	8	0	2	0	2	1	2	0	87
P8	8	0	14	5	11	0	0	1	0	1	1	0	1	2	2	0	0	2	0	1	0	18	0	2	0	0	6	1	0	76
P9	11	0	16	4	4	0	0	3	0	2	2	0	3	4	4	1	0	1	0	5	0	25	0	1	0	3	3	7	0	99
P10	6	0	17	5	8	0	0	1	0	2	2	0	2	1	5	1	0	5	0	3	0	19	3	1	0	0	5	3	0	89
P11	9	0	27	3	8	0	0	1	0	0	0	0	1	3	5	0	0	1	0	3	0	10	1	0	0	0	2	3	0	77
P12	3	0	20	4	5	0	0	5	0	2	1	0	5	2	5	2	0	0	0	6	0	4	3	1	0	0	2	2	0	72
P13	13	0	48	22	22	0	0	1	0	2	0	0	3	2	3	3	0	2	0	4	0	7	0	0	0	1	5	3	0	141
P14	7	0	11	9	8	0	0	2	0	1	0	0	1	1	4	0	0	1	0	7	0	8	1	0	0	0	3	4	0	68
P15	4	0	23	16	20	0	0	4	0	3	1	0	1	0	3	0	0	0	0	4	0	12	2	1	0	0	1	3	0	98
P16	4	0	16	8	12	0	0	3	0	1	2	0	2	1	5	3	0	2	0	6	0	10	4	0	0	1	3	4	0	87
P17	3	0	5	0	9	0	0	1	0	1	1	0	1	1	2	0	0	1	0	5	0	3	4	1	0	0	2	3	0	43
P18	4	0	27	5	13	0	0	5	0	1	1	0	2	1	2	0	0	0	0	8	0	7	2	1	0	0	3	2	0	84
P19	8	0	11	5	0	0	0	8	0	0	0	0	2	1	3	2	0	1	0	4	0	8	0	2	0	0	2	3	0	60
P20	9	0	7	4	4	0	0	4	0	0	0	0	2	1	3	0	0	0	0	8	0	6	3	0	0	1	5	3	0	60
P21	26	0	2	22	14	0	0	1	0	2	1	0	1	0	1	1	0	2	0	4	0	16	1	0	0	0	2	2	0	98
P22	11	0	3	8	2	0	0	4	1	1	1	0	2	0	4	1	0	1	0	6	0	6	0	0	0	0	2	1	0	54
P23	6	0	6	12	13	0	0	2	0	1	1	0	1	1	2	1	0	3	0	5	0	8	0	0	0	0	0	1	0	63
P24	4	0	3	7	3	0	0	2	0	1	3	0	1	1	3	0	0	0	0	5	0	11	0	0	0	0	1	2	0	47
P25	9	0	25	5	6	0	0	1	0	2	0	1	0	1	2	0	0	0	0	4	0	6	0	2	0	0	3	1	0	68
P26	27	0	33	8	9	0	0	6	0	1	1	0	1	1	5	2	0	0	0	6	0	20	4	3	0	1	3	3	0	134
P27	10	0	13	4	3	0	0	2	0	1	1	0	1	0	1	0	0	0	0	3	0	9	0	0	0	0	4	2	0	54
P28	8	0	35	13	22	0	0	2	0	1	0	0	0	3	6	0	0	5	0	7	0	24	2	0	0	0	3	1	0	132
P29	11	0	18	6	13	0	0	2	0	2	1	0	1	1	7	0	3	2	0	5	0	10	0	0	0	2	3	2	0	89
P30	10	0	13	3	2	0	0	3	0	1	1	0	3	1	2	2	0	2	0	3	0	15	0	0	0	2	5	1	0	69
P31	10	0	19	14	16	0	0	10	0	2	1	0	1	1	2	5	0	3	0	7	0	8	2	0	0	1	3	3	0	108
P32	8	0	5	3	4	0	0	1	0	2	1	0	0	0	4	0	0	2	0	3	0	6	2	0	0	0	3	1	0	45
P33	15	0	5	19	15	0	0	2	0	1	1	0	0	5	1	1	0	2	0	7	0	14	1	0	0	0	1	0	0	90
P34	7	0	6	8	6	0	0	5	0	2	1	0	2	1	0	0	0	0	0	7	0	6	1	0	0	0	2	0	0	54
P35	14	0	3	20	21	0	0	3	0	1	0	0	0	1	0	0	0	1	0	8	0	13	2	0	0	0	2	0	0	89
P36	5	0	1	4	5	0	0	2	0	1	0	0	0	0	0	1	0	1	0	3	0	9	4	0	0	0	0	0	0	36
P37	10	0	6	20	21	0	0	7	0	0	0	0	0	3	3	0	0	0	0	6	0	11	3	0	0	0	1	2	0	93
P38	12	0	5	9	8	0	0	2	0	1	0	0	2	1	3	0	0	1	0	16	0	5	0	0	0	0	2	0	0	67
P39	18	0	7	15	9	0	0	4	0	1	1	0	1	0	1	0	0	7	0	13	0	11	3	0	0	0	4	3	0	98
P40	9	0	2	3	2	0	0	1	0	1	1	0	0	2	3	0	0	0	0	4	0	9	3	0	0	0	0	3	0	43
P41	8	0	0	7	3	0	0	7	1	1	1	0	2	3	1	3	0	0	0	9	0	10	4	0	0	0	5	1	0	66
P42	3	0	0	9	2	0	0	5	0	1	0	0	2	2	2	0	0	1	0	6	0	9	6	0	0	0	3	2	0	53
P43	8	0	0	7	8	0	0	5	0	2	1	0	1	0	2	0	0	0	0	6	0	6	2	0	0	0	0	3	0	51
P44	17	0	4	7	9	0	0	4	0	2	1	0	2	3	1	0	0	0	0	6	0	6	1	0	0	0	4	2	0	69
P45	10	0	1	4	0	0	0	6	0	1	1	0	1	2	2	0	0	0	0	3	0	6	1	0	0	0	3	3	0	44
P46	9	0	1	4	5	0	0	8	0	1	1	0	1	4	1	0	0	0	0	1	0	3	7	0	0	0	8	3	0	57
P47	8	0	1	6	4	0	0	2	0	1	1	0	0	1	0	0	0	0	0	4	0	8	1	0	0	0	0	2	0	39
P48	8	0	1	5	4	0	0	1	0	0	0	0	0	1	0	0	0	1	0	4	0	5	3	0	0	0	2	3	0	38

Table B.6 frequency table for kitchen with spatial conditions removed.

Participant	Affordance evident	Affordance no evident	Object mentions	Objects linked to one another	Contiguity	Absence of integration	Absence of structure	What to do there	What not to do there	Experience	Typical experience	Atypical experience	PEB relations	Collective purpose of items	Social norms	Social interaction	Cues, prompts, signals missing	How to move around	Activity cues missing	Activity cues present	Overall context missing	Scene-like ecology	Functional design	Mental schema invoked	Scale information missing	Collective use of items	Expectation of greater	Routine encounter of image	Confusion	total
P1	0	0	35	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	1	0	0	0	4	0	0	54
P2	0	1	27	0	0	8	23	1	0	1	1	0	0	3	0	0	3	0	0	1	1	1	0	0	1	0	2	1	1	76
P3	0	0	33	0	0	5	6	1	0	1	1	0	0	2	0	0	1	0	0	0	2	1	0	0	0	0	0	1	0	54
P4	5	8	52	0	2	2	2	0	0	1	0	0	0	1	0	0	4	0	0	2	0	0	1	0	0	0	0	0	5	85
P48	3	2	25	2	1	3	2	1	0	2	1	0	0	1	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	45
P5	3	7	54	2	4	5	6	0	0	1	0	2	0	3	0	0	13	0	1	0	1	0	0	0	2	0	0	0	10	114
P6	8	4	47	0	0	13	9	0	0	1	1	0	0	4	0	0	2	1	1	0	0	0	0	0	0	0	1	1	1	94
P7	0	6	23	0	0	5	7	0	0	0	0	0	0	1	0	0	2	0	0	0	1	0	0	0	0	0	1	0	3	49
P8	3	3	19	1	0	1	0	1	0	0	0	0	0	2	0	0	6	0	0	3	0	5	0	0	0	0	2	0	0	46
P9	7	2	39	2	2	8	8	1	0	1	0	1	0	3	0	0	4	0	0	0	3	1	0	2	0	0	0	0	1	85
P10	1	2	39	1	1	3	3	0	0	0	0	0	0	2	0	0	4	0	0	0	1	0	0	2	0	0	0	0	0	59
P11	6	2	45	0	0	9	5	0	0	0	0	1	0	4	3	0	4	0	0	0	1	0	0	0	0	2	0	0	0	82
P12	7	0	38	1	1	6	3	1	0	3	0	0	0	3	1	1	3	0	0	0	0	0	0	0	0	0	2	0	0	70
P13	2	3	56	5	1	5	1	0	0	0	0	0	0	6	0	0	6	0	5	0	0	0	0	0	0	0	0	0	0	90
P14	0	4	49	3	3	2	3	0	0	0	0	0	0	5	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	71
P15	2	0	39	0	0	4	2	5	0	2	0	0	0	4	1	0	3	1	0	0	1	0	0	1	0	0	0	0	0	65
P16	1	3	27	7	0	5	10	0	0	0	0	0	0	7	0	0	2	0	1	3	0	0	0	0	0	1	0	0	0	67
P17	0	1	17	0	0	1	1	0	0	0	0	0	0	1	0	0	1	0	0	0	2	0	0	0	0	0	0	0	0	24
P18	0	3	27	0	0	6	3	2	0	0	0	0	0	4	0	0	3	0	1	1	3	0	0	0	0	0	0	0	1	54
P19	11	0	25	1	0	1	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	41
P20	3	1	19	1	1	7	5	2	0	0	0	0	0	15	1	0	3	0	0	4	1	0	0	2	0	0	0	0	2	67
P21	2	6	26	0	0	4	4	0	0	0	0	1	0	1	0	0	5	0	0	0	4	0	0	0	3	0	0	0	1	57
P22	1	5	7	1	0	4	1	1	0	0	0	0	0	0	0	0	4	0	2	0	2	0	0	0	0	0	0	0	1	29
P23	2	1	26	2	0	1	1	0	0	1	1	0	0	2	1	0	1	0	0	2	0	0	0	0	0	0	0	0	0	41
P24	8	0	21	1	0	0	0	2	0	1	1	0	0	3	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	39
P25	2	3	38	4	1	10	10	1	0	1	0	1	0	4	5	0	7	0	1	0	1	0	0	1	0	0	1	0	4	95
P26	1	1	31	5	0	8	14	0	0	0	0	0	0	8	0	0	4	0	0	4	0	0	0	0	1	0	2	1	1	81
P27	5	0	23	1	0	2	6	2	0	0	0	0	0	2	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	43
P28	3	3	51	4	1	14	12	0	0	0	0	0	0	3	0	0	5	0	0	4	1	0	0	0	0	0	0	0	3	104
P29	1	0	26	1	1	7	7	0	0	0	0	0	0	4	0	0	4	0	0	1	0	1	0	0	0	0	1	0	0	54
P30	4	3	34	0	0	8	7	0	0	0	0	0	0	2	0	0	4	0	1	0	3	0	0	0	0	0	1	0	1	68
P31	3	5	50	3	2	3	7	4	0	0	0	0	0	5	0	0	5	2	2	1	2	0	0	0	0	0	0	0	1	95
P32	1	1	14	0	0	3	2	1	0	1	0	0	0	2	0	0	3	1	0	0	1	0	0	0	0	0	0	0	0	30
P33	0	1	17	3	0	8	7	0	0	0	0	0	0	3	1	0	3	0	0	1	2	0	0	0	0	0	0	0	0	46
P34	0	1	22	0	0	1	1	1	0	1	1	0	0	1	0	0	2	0	0	1	1	0	0	0	0	0	0	0	0	33
P35	1	2	28	2	2	5	3	3	0	0	0	0	0	6	0	1	1	0	0	2	0	0	0	1	0	0	0	0	0	58
P36	1	1	4	1	0	7	2	1	0	0	0	0	0	6	1	0	1	0	0	1	0	0	0	1	0	0	0	0	0	26
P37	1	3	34	0	0	0	0	2	0	1	0	0	0	5	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	47
P38	3	1	16	1	0	0	0	3	0	1	1	0	0	4	1	1	0	0	0	2	0	2	0	0	0	0	0	0	0	36
P39	2	5	44	0	0	6	7	0	0	0	0	0	0	5	0	0	2	0	0	0	2	0	0	0	0	1	0	0	0	74
P40	0	4	17	1	0	1	6	0	0	0	0	0	0	3	0	0	1	0	0	0	3	0	0	0	0	0	0	0	0	36
P41	2	2	41	0	0	12	6	0	0	0	0	0	0	2	0	0	2	0	0	1	1	0	0	0	0	0	0	0	0	69
P42	3	0	26	1	0	2	1	0	0	1	1	0	0	7	0	0	2	0	0	0	2	0	0	0	0	1	0	0	0	47
P43	2	1	13	0	0	0	1	5	0	1	1	0	0	3	1	0	2	0	0	1	1	0	0	0	0	0	0	1	0	33
P44	2	0	22	1	0	4	1	1	0	2	2	0	0	2	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	39
P45	5	1	11	7	1	0	0	3	0	1	1	0	0	3	0	0	1	0	0	2	0	2	0	0	0	0	0	0	2	40
P46	4	1	29	5	1	3	4	1	0	1	0	0	0	3	0	0	3	0	1	0	0	0	0	0	0	0	0	2	0	58
P47	1	0	7	3	0	0	0	1	0	0	0	0	0	1	0	0	1	0	0	1	2	0	0	0	0	0	0	0	0	17

Table B.7 Correlation participants' hair salon with preserved spatial conditions (P1 through P24)

	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14	P15	P16	P17	P18	P19	P20	P21	P22	P23	P24
P1	1	0.778	0.684	0.708	0.504	0.595	0.675	0.572	0.656	0.771	0.872	0.589	0.819	0.612	0.843	0.826	0.909	0.834	0.701	0.863	0.859	0.873	0.529	0.929
P2	0.778	1	0.692	0.751	0.472	0.77	0.67	0.607	0.764	0.708	0.804	0.692	0.608	0.699	0.809	0.771	0.775	0.713	0.485	0.649	0.782	0.795	0.611	0.892
P3	0.684	0.692	1	0.946	0.902	0.837	0.952	0.901	0.905	0.919	0.863	0.85	0.763	0.908	0.817	0.906	0.723	0.765	0.712	0.705	0.654	0.728	0.934	0.762
P4	0.708	0.751	0.946	1	0.894	0.875	0.935	0.924	0.94	0.91	0.933	0.877	0.788	0.908	0.813	0.917	0.788	0.843	0.745	0.776	0.669	0.809	0.911	0.824
P5	0.504	0.472	0.902	0.894	1	0.808	0.863	0.929	0.871	0.828	0.778	0.835	0.762	0.876	0.715	0.814	0.62	0.684	0.613	0.633	0.517	0.632	0.933	0.56
P6	0.595	0.77	0.837	0.875	0.808	1	0.762	0.858	0.944	0.855	0.834	0.915	0.73	0.942	0.876	0.873	0.693	0.735	0.462	0.59	0.736	0.75	0.879	0.721
P7	0.675	0.67	0.952	0.935	0.863	0.762	1	0.874	0.856	0.903	0.854	0.772	0.758	0.843	0.772	0.875	0.701	0.755	0.776	0.727	0.62	0.705	0.905	0.767
P8	0.572	0.607	0.901	0.924	0.929	0.858	0.874	1	0.908	0.828	0.849	0.856	0.757	0.936	0.757	0.844	0.621	0.746	0.552	0.605	0.621	0.694	0.937	0.642
P9	0.656	0.764	0.905	0.94	0.871	0.944	0.856	0.908	1	0.88	0.874	0.943	0.771	0.947	0.857	0.923	0.779	0.754	0.562	0.694	0.688	0.732	0.896	0.766
P10	0.771	0.708	0.919	0.91	0.828	0.855	0.903	0.828	0.88	1	0.889	0.822	0.86	0.857	0.892	0.93	0.824	0.789	0.761	0.831	0.76	0.781	0.876	0.848
P11	0.872	0.804	0.863	0.933	0.778	0.834	0.854	0.849	0.874	0.889	1	0.828	0.867	0.841	0.897	0.929	0.851	0.918	0.746	0.84	0.817	0.903	0.791	0.904
P12	0.589	0.692	0.85	0.877	0.835	0.915	0.772	0.856	0.943	0.822	0.828	1	0.679	0.876	0.78	0.854	0.713	0.723	0.531	0.649	0.576	0.682	0.811	0.666
P13	0.819	0.608	0.763	0.788	0.762	0.73	0.758	0.757	0.771	0.86	0.867	0.679	1	0.781	0.898	0.829	0.8	0.759	0.651	0.778	0.845	0.74	0.757	0.782
P14	0.612	0.699	0.908	0.908	0.876	0.942	0.843	0.936	0.947	0.857	0.841	0.876	0.781	1	0.856	0.886	0.664	0.74	0.482	0.558	0.739	0.713	0.95	0.702
P15	0.843	0.809	0.817	0.813	0.715	0.876	0.772	0.757	0.857	0.892	0.897	0.78	0.898	0.856	1	0.909	0.814	0.798	0.574	0.729	0.934	0.822	0.787	0.857
P16	0.826	0.771	0.906	0.917	0.814	0.873	0.875	0.844	0.923	0.93	0.929	0.854	0.829	0.886	0.909	1	0.877	0.824	0.678	0.829	0.784	0.855	0.845	0.869
P17	0.909	0.775	0.723	0.788	0.62	0.693	0.701	0.621	0.779	0.824	0.851	0.713	0.8	0.664	0.814	0.877	1	0.8	0.718	0.939	0.743	0.856	0.6	0.912
P18	0.834	0.713	0.765	0.843	0.684	0.735	0.755	0.746	0.754	0.789	0.918	0.723	0.759	0.74	0.798	0.824	0.8	1	0.795	0.775	0.757	0.939	0.673	0.834
P19	0.701	0.485	0.712	0.745	0.613	0.462	0.776	0.552	0.562	0.761	0.746	0.531	0.651	0.482	0.574	0.678	0.718	0.795	1	0.836	0.46	0.709	0.552	0.729
P20	0.863	0.649	0.705	0.776	0.633	0.59	0.727	0.605	0.694	0.831	0.84	0.649	0.778	0.558	0.729	0.829	0.939	0.775	0.836	1	0.631	0.81	0.569	0.864
P21	0.859	0.782	0.654	0.669	0.517	0.736	0.62	0.621	0.688	0.76	0.817	0.576	0.845	0.739	0.934	0.784	0.743	0.757	0.46	0.631	1	0.805	0.646	0.846
P22	0.873	0.795	0.728	0.809	0.632	0.75	0.705	0.694	0.732	0.781	0.903	0.682	0.74	0.713	0.822	0.855	0.856	0.939	0.709	0.81	0.805	1	0.655	0.882
P23	0.529	0.611	0.934	0.911	0.933	0.879	0.905	0.937	0.896	0.876	0.791	0.811	0.757	0.95	0.787	0.845	0.6	0.673	0.552	0.569	0.646	0.655	1	0.65
P24	0.929	0.892	0.762	0.824	0.56	0.721	0.767	0.642	0.766	0.848	0.904	0.666	0.782	0.702	0.857	0.869	0.912	0.834	0.729	0.864	0.846	0.882	0.65	1
P25	0.491	0.582	0.769	0.784	0.823	0.879	0.705	0.899	0.859	0.735	0.732	0.773	0.757	0.948	0.786	0.773	0.537	0.593	0.264	0.42	0.711	0.595	0.898	0.561
P27	0.645	0.673	0.859	0.903	0.869	0.878	0.837	0.89	0.96	0.861	0.829	0.899	0.795	0.903	0.804	0.89	0.798	0.746	0.597	0.72	0.631	0.711	0.857	0.719
P28	0.687	0.627	0.865	0.88	0.893	0.868	0.835	0.935	0.892	0.86	0.877	0.804	0.905	0.946	0.884	0.883	0.694	0.756	0.527	0.641	0.795	0.735	0.921	0.709
P29	0.721	0.666	0.887	0.926	0.878	0.784	0.888	0.799	0.871	0.894	0.868	0.791	0.822	0.796	0.801	0.902	0.853	0.788	0.799	0.86	0.625	0.786	0.834	0.793
P30	0.736	0.654	0.895	0.924	0.824	0.743	0.936	0.803	0.838	0.906	0.876	0.752	0.814	0.788	0.792	0.861	0.794	0.851	0.886	0.819	0.651	0.764	0.82	0.81
P31	0.842	0.798	0.724	0.705	0.597	0.769	0.662	0.623	0.7	0.831	0.812	0.635	0.823	0.727	0.925	0.82	0.787	0.724	0.526	0.716	0.92	0.832	0.696	0.846
P32	0.756	0.688	0.718	0.785	0.703	0.811	0.692	0.792	0.851	0.807	0.834	0.802	0.824	0.811	0.843	0.858	0.826	0.739	0.504	0.742	0.765	0.754	0.709	0.753
P33	0.831	0.705	0.866	0.894	0.818	0.837	0.856	0.803	0.872	0.948	0.922	0.801	0.944	0.846	0.928	0.922	0.873	0.86	0.777	0.846	0.814	0.833	0.822	0.853
P34	0.751	0.596	0.912	0.869	0.884	0.809	0.86	0.867	0.873	0.897	0.873	0.82	0.837	0.867	0.863	0.933	0.771	0.811	0.684	0.758	0.709	0.773	0.849	0.734
P35	0.747	0.672	0.837	0.878	0.813	0.816	0.819	0.755	0.862	0.944	0.858	0.819	0.879	0.777	0.848	0.873	0.876	0.764	0.778	0.88	0.689	0.751	0.789	0.814
P36	0.664	0.583	0.844	0.85	0.837	0.725	0.85	0.774	0.842	0.881	0.788	0.821	0.763	0.723	0.727	0.852	0.816	0.681	0.767	0.855	0.509	0.667	0.768	0.714
P37	0.59	0.552	0.933	0.879	0.927	0.84	0.908	0.877	0.873	0.928	0.794	0.823	0.815	0.883	0.817	0.876	0.671	0.673	0.663	0.68	0.619	0.644	0.937	0.65
P38	0.662	0.631	0.942	0.91	0.897	0.829	0.926	0.911	0.911	0.893	0.834	0.854	0.761	0.899	0.792	0.922	0.736	0.723	0.645	0.708	0.623	0.717	0.914	0.715
P39	0.836	0.709	0.887	0.905	0.808	0.77	0.893	0.856	0.881	0.91	0.906	0.784	0.869	0.853	0.843	0.938	0.864	0.786	0.692	0.835	0.76	0.785	0.836	0.865
P40	0.787	0.804	0.809	0.896	0.665	0.77	0.802	0.719	0.828	0.83	0.887	0.752	0.699	0.763	0.775	0.849	0.847	0.905	0.79	0.799	0.694	0.851	0.703	0.896
P41	0.894	0.8	0.616	0.666	0.398	0.543	0.632	0.54	0.609	0.662	0.785	0.47	0.662	0.601	0.737	0.746	0.786	0.741	0.535	0.704	0.828	0.79	0.514	0.907
P42	0.867	0.811	0.683	0.697	0.539	0.763	0.615	0.662	0.751	0.747	0.825	0.652	0.792	0.782	0.909	0.838	0.791	0.757	0.399	0.644	0.952	0.817	0.651	0.851
P43	0.925	0.835	0.67	0.693	0.398	0.564	0.674	0.495	0.627	0.728	0.803	0.538	0.626	0.565	0.751	0.804	0.86	0.779	0.679	0.806	0.768	0.84	0.494	0.945
P44	0.893	0.809	0.518	0.573	0.317	0.604	0.493	0.465	0.559	0.638	0.771	0.456	0.721	0.587	0.823	0.713	0.753	0.726	0.427	0.636	0.937	0.817	0.456	0.872
P45	0.582	0.625	0.916	0.921	0.848	0.792	0.912	0.909	0.883	0.794	0.821	0.833	0.633	0.883	0.691	0.843	0.631	0.784	0.664	0.596	0.534	0.701	0.868	0.67
P46	0.751	0.826	0.696	0.735	0.469	0.706	0.658	0.605	0.705	0.766	0.756	0.621	0.581	0.666	0.717	0.779	0.774	0.673	0.531	0.707	0.698	0.742	0.604	0.864
P47	0.793	0.795	0.45	0.475	0.208	0.483	0.409	0.352	0.468	0.484	0.629	0.338	0.52	0.49	0.681	0.611	0.664	0.606	0.299	0.508	0.81	0.714	0.36	0.787
P48	0.748	0.811	0.705	0.747	0.572	0.82	0.636	0.754	0.799	0.717	0.815	0.72	0.696	0.848	0.838	0.812	0.698	0.735	0.338	0.541	0.87	0.772	0.709	0.792

Table B.8 Participant correlations for hair salon with preserved spatial conditions (P25 through P48).

	P25	P27	P28	P29	P30	P31	P32	P33	P34	P35	P36	P37	P38	P39	P40	P41	P42	P43	P44	P45	P46	P47	P48
P1	0.491	0.645	0.687	0.721	0.736	0.842	0.756	0.831	0.751	0.747	0.664	0.59	0.662	0.836	0.787	0.894	0.867	0.925	0.893	0.582	0.751	0.793	0.748
P2	0.582	0.673	0.627	0.666	0.654	0.798	0.688	0.705	0.596	0.672	0.583	0.552	0.631	0.709	0.804	0.8	0.811	0.835	0.809	0.625	0.826	0.795	0.811
P3	0.769	0.859	0.865	0.887	0.895	0.724	0.718	0.866	0.912	0.837	0.844	0.933	0.942	0.887	0.809	0.616	0.683	0.67	0.518	0.916	0.696	0.45	0.705
P4	0.784	0.903	0.88	0.926	0.924	0.705	0.785	0.894	0.869	0.878	0.85	0.879	0.91	0.905	0.896	0.666	0.697	0.693	0.573	0.921	0.735	0.475	0.747
P5	0.823	0.869	0.893	0.878	0.824	0.597	0.703	0.818	0.884	0.813	0.837	0.927	0.897	0.808	0.665	0.398	0.539	0.398	0.317	0.848	0.469	0.208	0.572
P6	0.879	0.878	0.868	0.784	0.743	0.769	0.811	0.837	0.809	0.816	0.725	0.84	0.829	0.77	0.77	0.543	0.763	0.564	0.604	0.792	0.706	0.483	0.82
P7	0.705	0.837	0.835	0.888	0.936	0.662	0.692	0.856	0.86	0.819	0.85	0.908	0.926	0.893	0.802	0.632	0.615	0.674	0.493	0.912	0.658	0.409	0.636
P8	0.899	0.89	0.935	0.799	0.803	0.623	0.792	0.803	0.867	0.755	0.774	0.877	0.911	0.856	0.719	0.54	0.662	0.495	0.465	0.909	0.605	0.352	0.754
P9	0.859	0.96	0.892	0.871	0.838	0.7	0.851	0.872	0.873	0.862	0.842	0.873	0.911	0.881	0.828	0.609	0.751	0.627	0.559	0.883	0.705	0.468	0.799
P10	0.735	0.861	0.86	0.894	0.906	0.831	0.807	0.948	0.897	0.944	0.881	0.928	0.893	0.91	0.83	0.662	0.747	0.728	0.638	0.794	0.766	0.484	0.717
P11	0.732	0.829	0.877	0.868	0.876	0.812	0.834	0.922	0.873	0.858	0.788	0.794	0.834	0.906	0.887	0.785	0.825	0.803	0.771	0.821	0.756	0.629	0.815
P12	0.773	0.899	0.804	0.791	0.752	0.635	0.802	0.801	0.82	0.819	0.821	0.823	0.854	0.784	0.752	0.47	0.652	0.538	0.456	0.833	0.621	0.338	0.72
P13	0.757	0.795	0.905	0.822	0.814	0.823	0.824	0.944	0.837	0.879	0.763	0.815	0.761	0.869	0.699	0.662	0.792	0.626	0.721	0.633	0.581	0.52	0.696
P14	0.948	0.903	0.946	0.796	0.788	0.727	0.811	0.846	0.867	0.777	0.723	0.883	0.899	0.853	0.763	0.601	0.782	0.565	0.587	0.883	0.666	0.49	0.848
P15	0.786	0.804	0.884	0.801	0.792	0.925	0.843	0.928	0.863	0.848	0.727	0.817	0.792	0.843	0.775	0.737	0.909	0.751	0.823	0.691	0.717	0.681	0.838
P16	0.773	0.89	0.883	0.902	0.861	0.82	0.858	0.922	0.933	0.873	0.852	0.876	0.922	0.938	0.849	0.746	0.838	0.804	0.713	0.843	0.779	0.611	0.812
P17	0.537	0.798	0.694	0.853	0.794	0.787	0.826	0.873	0.771	0.876	0.816	0.671	0.736	0.864	0.847	0.786	0.791	0.86	0.753	0.631	0.774	0.664	0.698
P18	0.593	0.746	0.756	0.788	0.851	0.724	0.739	0.86	0.811	0.764	0.681	0.673	0.723	0.786	0.905	0.741	0.757	0.779	0.726	0.784	0.673	0.606	0.735
P19	0.264	0.597	0.527	0.799	0.886	0.526	0.504	0.777	0.684	0.778	0.767	0.663	0.645	0.692	0.79	0.535	0.399	0.679	0.427	0.664	0.531	0.299	0.338
P20	0.42	0.72	0.641	0.86	0.819	0.716	0.742	0.846	0.758	0.88	0.855	0.68	0.708	0.835	0.799	0.704	0.644	0.806	0.636	0.596	0.707	0.508	0.541
P21	0.711	0.631	0.795	0.625	0.651	0.92	0.765	0.814	0.709	0.689	0.509	0.619	0.623	0.76	0.694	0.828	0.952	0.768	0.937	0.534	0.698	0.81	0.87
P22	0.595	0.711	0.735	0.786	0.764	0.832	0.754	0.833	0.773	0.751	0.667	0.644	0.717	0.785	0.851	0.79	0.817	0.84	0.817	0.701	0.742	0.714	0.772
P23	0.898	0.857	0.921	0.834	0.82	0.696	0.709	0.822	0.849	0.789	0.768	0.937	0.914	0.836	0.703	0.514	0.651	0.494	0.456	0.868	0.604	0.36	0.709
P24	0.561	0.719	0.709	0.793	0.81	0.846	0.753	0.853	0.734	0.814	0.714	0.65	0.715	0.865	0.896	0.907	0.851	0.945	0.872	0.67	0.864	0.787	0.792
P25	1	0.828	0.942	0.668	0.623	0.672	0.785	0.74	0.767	0.663	0.599	0.796	0.798	0.768	0.576	0.507	0.748	0.388	0.538	0.741	0.538	0.425	0.819
P27	0.828	1	0.878	0.872	0.849	0.637	0.894	0.885	0.862	0.874	0.889	0.871	0.914	0.885	0.791	0.551	0.691	0.574	0.499	0.866	0.633	0.373	0.726
P28	0.942	0.878	1	0.816	0.799	0.767	0.846	0.891	0.898	0.805	0.751	0.889	0.883	0.892	0.701	0.624	0.799	0.552	0.633	0.813	0.593	0.478	0.812
P29	0.668	0.872	0.816	1	0.931	0.718	0.744	0.921	0.868	0.93	0.897	0.883	0.859	0.861	0.848	0.595	0.635	0.677	0.526	0.796	0.651	0.437	0.58
P30	0.623	0.849	0.799	0.931	1	0.658	0.73	0.927	0.853	0.899	0.867	0.87	0.855	0.865	0.893	0.632	0.615	0.704	0.533	0.86	0.652	0.408	0.601
P31	0.672	0.637	0.767	0.718	0.658	1	0.717	0.83	0.749	0.773	0.621	0.707	0.665	0.756	0.683	0.75	0.888	0.766	0.861	0.514	0.726	0.754	0.773
P32	0.785	0.894	0.846	0.744	0.73	0.717	1	0.853	0.791	0.806	0.771	0.74	0.801	0.852	0.716	0.646	0.797	0.639	0.677	0.711	0.645	0.494	0.823
P33	0.74	0.885	0.891	0.921	0.927	0.83	0.853	1	0.902	0.956	0.863	0.892	0.854	0.899	0.85	0.672	0.783	0.722	0.699	0.772	0.687	0.519	0.72
P34	0.767	0.862	0.898	0.868	0.853	0.749	0.791	0.902	1	0.834	0.848	0.909	0.908	0.891	0.765	0.629	0.756	0.665	0.579	0.837	0.632	0.467	0.708
P35	0.663	0.874	0.805	0.93	0.899	0.773	0.806	0.956	0.834	1	0.916	0.878	0.819	0.855	0.82	0.568	0.665	0.653	0.573	0.706	0.687	0.401	0.609
P36	0.599	0.889	0.751	0.897	0.867	0.621	0.771	0.863	0.848	0.916	1	0.879	0.86	0.719	0.477	0.533	0.593	0.389	0.773	0.573	0.235	0.513
P37	0.796	0.871	0.889	0.883	0.87	0.707	0.74	0.892	0.909	0.878	0.879	1	0.932	0.839	0.688	0.444	0.605	0.512	0.426	0.829	0.581	0.275	0.604
P38	0.798	0.914	0.883	0.859	0.855	0.665	0.801	0.854	0.908	0.819	0.89	0.932	1	0.92	0.728	0.572	0.667	0.623	0.482	0.927	0.639	0.366	0.711
P39	0.768	0.885	0.892	0.861	0.865	0.756	0.852	0.899	0.891	0.855	0.86	0.839	0.92	1	0.809	0.794	0.808	0.777	0.684	0.836	0.736	0.57	0.796
P40	0.576	0.791	0.701	0.848	0.893	0.683	0.716	0.85	0.765	0.82	0.719	0.688	0.728	0.809	1	0.777	0.73	0.835	0.688	0.799	0.816	0.64	0.728
P41	0.507	0.551	0.624	0.595	0.632	0.75	0.646	0.672	0.629	0.568	0.477	0.444	0.572	0.794	0.777	1	0.876	0.926	0.898	0.563	0.8	0.903	0.816
P42	0.748	0.691	0.799	0.635	0.615	0.888	0.797	0.783	0.756	0.665	0.533	0.605	0.667	0.808	0.73	0.876	1	0.813	0.93	0.59	0.759	0.864	0.929
P43	0.388	0.574	0.552	0.677	0.704	0.766	0.639	0.722	0.665	0.653	0.593	0.512	0.623	0.777	0.835	0.926	0.813	1	0.855	0.598	0.838	0.84	0.729
P44	0.538	0.499	0.633	0.526	0.533	0.861	0.677	0.699	0.579	0.573	0.389	0.426	0.482	0.684	0.688	0.898	0.93	0.855	1	0.421	0.754	0.915	0.833
P45	0.741	0.866	0.813	0.796	0.86	0.514	0.711	0.772	0.837	0.706	0.773	0.829	0.927	0.836	0.799	0.563	0.59	0.598	0.421	1	0.603	0.348	0.7
P46	0.538	0.633	0.593	0.651	0.652	0.726	0.645	0.687	0.632	0.687	0.573	0.581	0.639	0.736	0.816	0.8	0.759	0.838	0.754	0.603	1	0.755	0.756
P47	0.425	0.373	0.478	0.437	0.408	0.754	0.494	0.519	0.467	0.401	0.235	0.275	0.366	0.57	0.64	0.903	0.864	0.84	0.915	0.348	0.755	1	0.756
P48	0.819	0.726	0.812	0.58	0.601	0.773	0.823	0.72	0.708	0.609	0.513	0.604	0.711	0.796	0.728	0.816	0.929	0.729	0.833	0.7	0.756	0.756	1

Table B.9 Correlation between categories for hair salon with preserved spatial conditions.

	Affordance evident	Affordance no evident	Object mentions	Objects linked to one	Contiguity	Absence of integration	What to do there	What not to do there	Experience	Typical experience	Atypical experience	PEB relations	Collective purpose of	Social norms	Social interaction	Cues, prompts,	How to move	Activity cues present	Scene-like ecology	Functional design	Mental schema	Collective use of items	Expectation of greater	Routine encounter of	Confusion
Affordance evident	1	-0.24	0.206	0.222	0.363	-0.24	0.419	0.225	0.082	0.257	-0.03	0.504	0.129	0.48	0.367	-0.02	0.09	0.378	0.247	0.063	0.103	0.002	0.081	0.228	-0.22
Affordances not evident	-0.24	1	0.14	0.05	0.14	0.7	0.28	0.07	0.02	0.08	0.383	0.28	0.04	0.21	0.26	0.637	-0.1	0.11	0.14	0.19	0.11	0.07	-0.1	0.32	0.478
Object mentions	0.206	0.14	1	0.03	0.378	0.11	0.131	0.04	0.082	0.143	0.135	0.236	0.312	0.427	0.247	0.06	0.09	0.231	0.391	0.146	0.103	0.148	0.04	0.131	0.134
Objects linked to one another	0.222	0.05	0.03	1	0.599	0.016	0.144	0.12	0.146	0.236	-0.1	0.201	0.192	0.214	0.088	0.294	0.423	0.345	0.374	0.02	0.05	0.06	0.03	0.234	0.023
Contiguity	0.363	0.14	0.378	0.599	1	-0.1	0.01	-0.1	0.095	0.068	0.12	0.174	0.331	0.287	0.285	0.08	0.04	0.409	0.397	0.097	0.05	0.03	0.11	0.138	0.04
Absence of integration	-0.24	0.7	0.11	0.016	-0.1	1	0.15	0.05	0.07	0.11	0.06	0.15	0.03	0.19	0.15	0.341	0.07	0.08	-0.1	0.13	0.08	0.05	0.07	0.22	0.03
What to do there	0.419	0.28	0.131	0.144	0.01	0.15	1	0.31	0.16	0.257	0.09	0.463	0.106	0.414	0.365	0.12	0.347	0.351	0.233	0.215	0.126	0.042	0.029	0.284	0.31
What not to do there	0.225	0.07	0.04	0.12	-0.1	0.05	0.31	1	0.09	0.164	0.06	0.194	0.17	0.323	0.256	0.17	0.036	0.117	0.03	0.107	-0.0	0.03	0.119	0.299	0.07
Experience	0.082	0.02	0.082	0.146	0.095	0.07	0.16	0.09	1	0.633	0.109	0.256	0.546	0.232	0.193	0.01	0.176	0.146	0.398	0.139	0.352	0.186	0.061	0.149	0.02
Typical experience	0.257	0.08	0.143	0.236	0.068	0.11	0.257	0.164	0.633	1	0.17	0.313	0.37	0.36	0.312	0.07	0.145	0.255	0.46	0.11	0.252	0.132	0.14	0.43	0.15
Atypical experience	-0.03	0.383	0.135	-0.1	0.12	0.06	0.09	0.06	0.109	0.17	1	0.22	0.02	0.03	0.05	0.364	0.017	0.14	0.019	-0.1	-0.1	0.08	0.222	0.28	0.539
PEB relations	0.504	0.28	0.236	0.201	0.174	0.15	0.463	0.194	0.256	0.313	0.22	1	0.27	0.503	0.58	0.18	0.303	0.241	0.281	0.25	0.155	0.202	0.283	0.452	0.28
Collective purpose of items	0.129	0.04	0.312	0.192	0.331	0.03	0.106	0.17	0.546	0.37	0.02	0.27	1	0.485	0.225	0.01	0.07	0.463	0.623	0.164	0.289	0.529	0.055	0.115	-0.1
Social norms	0.48	0.21	0.427	0.214	0.287	0.19	0.414	0.323	0.232	0.36	0.03	0.503	0.485	1	0.437	0.15	0.049	0.559	0.475	0.378	0.102	0.257	0.114	0.324	0.15
Social interaction	0.367	0.26	0.247	0.088	0.285	0.15	0.365	0.256	0.193	0.312	0.05	0.585	0.225	0.437	1	0.23	0.258	0.248	0.345	0.04	0.172	0.03	0.133	0.26	-0.3
Cues, prompts, or signals missing	-0.02	0.637	0.06	0.294	0.08	0.341	0.12	0.17	0.01	0.07	0.364	0.18	0.01	0.15	0.23	1	0.192	0.00	0.11	0.01	0.07	0.08	0.03	0.01	0.487
How to move around	0.09	-0.1	0.423	0.04	0.07	0.07	0.347	0.036	0.176	0.145	0.017	0.303	0.073	0.049	0.258	0.192	1	0.01	0.165	0.036	0.276	0.065	0.116	0.391	-0.1
Activity cues present	0.378	0.11	0.231	0.345	0.409	0.08	0.351	0.117	0.144	0.255	0.14	0.243	0.463	0.559	0.24	0.00	0.01	1	0.443	0.162	0.134	0.385	0.13	0.21	0.16
Scene-like ecology	0.247	0.14	0.391	0.374	0.397	-0.1	0.233	0.03	0.398	0.46	0.019	0.289	0.623	0.475	0.345	0.11	0.165	0.443	1	0.136	0.199	0.211	0.019	0.269	0.06
Functional design	0.063	0.19	0.146	0.02	0.097	0.13	0.215	0.107	0.139	0.11	-0.1	0.254	0.164	0.378	0.049	0.01	0.036	0.162	0.136	1	0.014	0.058	0.06	0.177	0.04
Mental schema invoked	0.103	0.11	0.103	0.05	0.05	0.08	0.126	-0.0	0.352	0.252	-0.1	0.155	0.289	0.102	0.172	0.07	0.27	0.134	0.199	0.014	1	0.06	0.05	0.312	0.11
Collective purpose of items	0.002	-0.07	0.148	0.06	0.03	0.05	0.042	0.03	0.186	0.132	0.08	0.202	0.529	0.257	0.03	0.08	0.065	0.385	0.211	0.058	1	0.05	0.05	0.07	
Expectation of greater environmental context	0.081	-0.04	-0.03	-0.11	0.07	0.07	0.029	0.11	0.061	0.14	0.222	0.283	0.05	0.114	0.03	0.11	0.13	0.03	0.116	0.013	0.01	0.06	0.05	1	-0.1
Routine encounter of image	0.228	0.32	0.131	0.234	0.138	0.22	0.284	0.299	0.149	0.43	0.28	0.452	0.115	0.324	0.26	0.01	0.391	0.21	0.269	0.177	0.312	0.05	0.03	1	0.24
Confusion	-0.22	0.478	0.134	0.023	0.04	0.03	0.31	0.07	0.02	0.15	0.539	0.28	-0.1	0.15	-0.3	0.487	-0.1	0.16	0.06	0.04	0.11	0.07	-0.1	0.24	1

Table B.10 Participant correlation for hair salon with spatial conditions removed (P1 through P24).

	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14	P15	P16	P17	P18	P19	P20	P21	P22	P23	P24
P1	1	0.935	0.962	0.978	0.927	0.98	0.679	0.958	0.912	0.764	0.964	0.985	0.697	0.934	0.761	0.878	0.807	0.882	0.98	0.927	0.812	0.935	0.975	0.932
P2	0.935	1	0.924	0.916	0.874	0.974	0.818	0.866	0.978	0.912	0.89	0.925	0.848	0.879	0.83	0.939	0.848	0.902	0.894	0.937	0.89	0.936	0.929	0.834
P3	0.962	0.924	1	0.96	0.909	0.964	0.703	0.921	0.901	0.751	0.933	0.954	0.678	0.907	0.738	0.864	0.75	0.838	0.951	0.893	0.775	0.91	0.946	0.921
P4	0.978	0.916	0.96	1	0.937	0.966	0.688	0.952	0.872	0.716	0.955	0.983	0.682	0.934	0.736	0.852	0.777	0.875	0.967	0.916	0.804	0.922	0.954	0.944
P5	0.927	0.874	0.909	0.937	1	0.928	0.76	0.929	0.854	0.686	0.942	0.934	0.687	0.966	0.737	0.843	0.825	0.922	0.938	0.916	0.819	0.864	0.958	0.895
P6	0.98	0.974	0.964	0.966	0.928	1	0.778	0.934	0.955	0.836	0.934	0.97	0.752	0.918	0.781	0.9	0.812	0.896	0.959	0.937	0.837	0.935	0.964	0.901
P7	0.679	0.818	0.703	0.688	0.76	0.778	1	0.605	0.779	0.753	0.643	0.678	0.709	0.697	0.638	0.722	0.639	0.748	0.64	0.7	0.786	0.69	0.69	0.585
P8	0.958	0.866	0.921	0.952	0.929	0.934	0.605	1	0.849	0.666	0.935	0.953	0.599	0.918	0.699	0.803	0.783	0.834	0.975	0.886	0.744	0.864	0.949	0.924
P9	0.912	0.978	0.901	0.872	0.854	0.955	0.779	0.849	1	0.947	0.87	0.894	0.838	0.854	0.819	0.946	0.854	0.885	0.879	0.935	0.852	0.914	0.927	0.8
P10	0.764	0.912	0.751	0.716	0.686	0.836	0.753	0.666	0.947	1	0.721	0.748	0.893	0.704	0.8	0.905	0.814	0.812	0.702	0.86	0.835	0.829	0.789	0.609
P11	0.964	0.89	0.933	0.955	0.942	0.934	0.643	0.935	0.87	0.721	1	0.98	0.741	0.984	0.812	0.911	0.852	0.908	0.957	0.931	0.854	0.943	0.982	0.928
P12	0.985	0.925	0.954	0.983	0.934	0.97	0.678	0.953	0.894	0.748	0.98	1	0.724	0.955	0.776	0.896	0.818	0.899	0.977	0.928	0.837	0.938	0.971	0.952
P13	0.697	0.848	0.678	0.682	0.687	0.752	0.709	0.599	0.838	0.893	0.741	0.724	1	0.767	0.884	0.914	0.901	0.866	0.63	0.864	0.94	0.843	0.766	0.563
P14	0.934	0.879	0.907	0.934	0.966	0.918	0.697	0.918	0.854	0.704	0.984	0.955	0.767	1	0.834	0.9	0.879	0.929	0.93	0.933	0.882	0.931	0.973	0.885
P15	0.761	0.83	0.738	0.736	0.737	0.781	0.638	0.699	0.819	0.8	0.812	0.776	0.884	0.834	1	0.89	0.846	0.834	0.709	0.857	0.872	0.907	0.817	0.627
P16	0.878	0.939	0.864	0.852	0.843	0.9	0.722	0.803	0.946	0.905	0.911	0.896	0.914	0.9	0.89	1	0.91	0.924	0.841	0.937	0.921	0.939	0.922	0.8
P17	0.807	0.848	0.75	0.777	0.825	0.812	0.639	0.783	0.854	0.814	0.852	0.818	0.901	0.879	0.846	0.91	1	0.928	0.774	0.929	0.938	0.854	0.876	0.69
P18	0.882	0.902	0.838	0.875	0.922	0.896	0.748	0.834	0.885	0.812	0.908	0.899	0.866	0.929	0.834	0.924	0.928	1	0.855	0.961	0.917	0.882	0.927	0.804
P19	0.98	0.894	0.951	0.967	0.938	0.959	0.64	0.975	0.879	0.702	0.957	0.977	0.63	0.93	0.709	0.841	0.774	0.855	1	0.904	0.756	0.887	0.968	0.962
P20	0.927	0.937	0.893	0.916	0.916	0.937	0.7	0.886	0.935	0.86	0.931	0.928	0.864	0.933	0.857	0.937	0.929	0.961	0.904	1	0.9	0.934	0.965	0.836
P21	0.812	0.89	0.775	0.804	0.819	0.837	0.786	0.744	0.852	0.835	0.854	0.837	0.94	0.882	0.872	0.921	0.938	0.917	0.756	0.9	1	0.893	0.854	0.693
P22	0.935	0.936	0.91	0.922	0.864	0.935	0.69	0.864	0.914	0.829	0.943	0.938	0.843	0.931	0.907	0.939	0.854	0.882	0.887	0.934	0.893	1	0.944	0.83
P23	0.975	0.929	0.946	0.954	0.958	0.964	0.69	0.949	0.927	0.789	0.982	0.971	0.766	0.973	0.817	0.922	0.876	0.927	0.968	0.965	0.854	0.944	1	0.911
P24	0.932	0.834	0.921	0.944	0.895	0.901	0.585	0.924	0.8	0.609	0.928	0.952	0.563	0.885	0.627	0.8	0.69	0.804	0.962	0.836	0.693	0.83	0.911	1
P25	0.914	0.954	0.863	0.875	0.819	0.926	0.761	0.825	0.94	0.914	0.876	0.896	0.852	0.849	0.828	0.923	0.863	0.891	0.851	0.921	0.911	0.924	0.9	0.773
P26	0.446	0.529	0.472	0.463	0.342	0.446	0.316	0.364	0.471	0.47	0.478	0.51	0.51	0.4	0.393	0.591	0.412	0.46	0.452	0.441	0.481	0.45	0.426	0.595
P27	0.972	0.96	0.959	0.945	0.88	0.975	0.687	0.925	0.952	0.835	0.942	0.96	0.751	0.907	0.823	0.919	0.808	0.853	0.954	0.924	0.819	0.953	0.961	0.901
P28	0.892	0.96	0.858	0.844	0.767	0.908	0.716	0.783	0.94	0.911	0.848	0.872	0.865	0.818	0.852	0.935	0.842	0.858	0.822	0.893	0.881	0.924	0.874	0.757
P29	0.79	0.89	0.782	0.765	0.766	0.827	0.782	0.69	0.866	0.856	0.827	0.802	0.914	0.846	0.954	0.93	0.847	0.855	0.723	0.853	0.93	0.916	0.829	0.649
P30	0.858	0.929	0.816	0.828	0.825	0.874	0.781	0.763	0.9	0.877	0.871	0.863	0.925	0.877	0.877	0.953	0.927	0.935	0.791	0.912	0.973	0.91	0.878	0.731
P31	0.969	0.954	0.94	0.936	0.924	0.969	0.697	0.934	0.959	0.848	0.961	0.96	0.802	0.948	0.859	0.944	0.889	0.919	0.953	0.97	0.866	0.957	0.988	0.883
P32	0.893	0.899	0.825	0.856	0.845	0.888	0.654	0.825	0.906	0.874	0.889	0.887	0.856	0.871	0.828	0.923	0.916	0.952	0.847	0.963	0.888	0.891	0.916	0.775
P33	0.942	0.915	0.892	0.915	0.915	0.927	0.656	0.916	0.908	0.807	0.941	0.939	0.79	0.928	0.836	0.913	0.898	0.946	0.932	0.974	0.86	0.906	0.964	0.88
P34	0.891	0.838	0.866	0.888	0.922	0.888	0.655	0.908	0.857	0.745	0.932	0.907	0.715	0.929	0.75	0.858	0.836	0.876	0.909	0.924	0.814	0.865	0.947	0.853
P35	0.924	0.924	0.912	0.911	0.877	0.928	0.663	0.884	0.909	0.809	0.939	0.934	0.803	0.926	0.911	0.926	0.836	0.881	0.911	0.942	0.845	0.96	0.948	0.867
P36	0.929	0.927	0.874	0.903	0.858	0.918	0.632	0.873	0.907	0.837	0.923	0.929	0.851	0.903	0.853	0.93	0.916	0.934	0.895	0.97	0.897	0.934	0.939	0.843
P37	0.941	0.866	0.904	0.914	0.922	0.919	0.612	0.928	0.872	0.715	0.936	0.931	0.662	0.917	0.713	0.855	0.803	0.867	0.955	0.912	0.756	0.879	0.96	0.916
P38	0.918	0.814	0.896	0.918	0.937	0.887	0.571	0.938	0.801	0.607	0.943	0.926	0.598	0.932	0.697	0.808	0.759	0.84	0.951	0.878	0.719	0.846	0.944	0.941
P39	0.817	0.881	0.827	0.759	0.746	0.839	0.608	0.766	0.918	0.873	0.807	0.798	0.785	0.773	0.793	0.906	0.803	0.795	0.809	0.87	0.76	0.837	0.86	0.765
P40	0.86	0.954	0.847	0.812	0.74	0.901	0.721	0.769	0.957	0.94	0.815	0.841	0.863	0.792	0.88	0.922	0.815	0.807	0.802	0.881	0.851	0.925	0.858	0.714
P41	0.868	0.941	0.868	0.817	0.794	0.896	0.699	0.794	0.964	0.919	0.861	0.852	0.869	0.842	0.845	0.961	0.87	0.843	0.831	0.905	0.864	0.919	0.903	0.763
P42	0.939	0.905	0.923	0.914	0.917	0.939	0.639	0.931	0.925	0.795	0.949	0.934	0.747	0.933	0.798	0.91	0.853	0.882	0.949	0.944	0.807	0.914	0.978	0.887
P43	0.79	0.869	0.804	0.778	0.799	0.837	0.645	0.768	0.911	0.893	0.832	0.814	0.889	0.836	0.839	0.932	0.884	0.876	0.781	0.925	0.84	0.864	0.876	0.716
P44	0.979	0.935	0.955	0.95	0.918	0.971	0.669	0.959	0.93	0.788	0.957	0.966	0.714	0.934	0.81	0.894	0.817	0.866	0.973	0.932	0.803	0.938	0.979	0.911
P45	0.751	0.671	0.786	0.809	0.748	0.724	0.455	0.742	0.631	0.449	0.737	0.747	0.403	0.708	0.499	0.618	0.511	0.621	0.776	0.694	0.503	0.68	0.734	0.843
P46	0.906	0.904	0.875	0.892	0.889	0.906	0.659	0.855	0.903	0.83	0.955	0.925	0.879	0.955	0.899	0.958	0.918	0.938	0.874	0.965	0.913	0.963	0.957	0.81
P47	0.873	0.783	0.892	0.884	0.85	0.844	0.542	0.859	0.768	0.618	0.891	0.879	0.594	0.864	0.649	0.781	0.7	0.776	0.875	0.837	0.696	0.839	0.885	0.884
P48	0.863	0.841	0.85	0.858	0.847	0.844	0.557	0.856	0.832	0.724	0.926	0.899	0.755	0.899	0.793	0.907	0.834	0.865	0.881	0.893	0.808	0.857	0.91	0.89

Table B.11 Participant correlations for hair salon with spatial conditions removed (P25 through P48)

	P25	P26	P27	P28	P29	P30	P31	P32	P33	P34	P35	P36	P37	P38	P39	P40	P41	P42	P43	P44	P45	P46	P47	P48
P1	0.914	0.446	0.972	0.892	0.79	0.858	0.969	0.893	0.942	0.891	0.924	0.929	0.941	0.918	0.817	0.86	0.868	0.939	0.79	0.979	0.751	0.906	0.873	0.863
P2	0.954	0.529	0.96	0.96	0.89	0.929	0.954	0.899	0.915	0.838	0.924	0.927	0.866	0.814	0.881	0.954	0.941	0.905	0.869	0.935	0.671	0.904	0.783	0.841
P3	0.863	0.472	0.959	0.858	0.782	0.816	0.94	0.825	0.892	0.866	0.912	0.874	0.904	0.896	0.827	0.847	0.868	0.923	0.804	0.955	0.786	0.875	0.892	0.85
P4	0.875	0.463	0.945	0.844	0.765	0.828	0.936	0.856	0.915	0.888	0.911	0.903	0.914	0.918	0.759	0.812	0.817	0.914	0.778	0.95	0.809	0.892	0.884	0.858
P5	0.819	0.342	0.88	0.767	0.766	0.825	0.924	0.845	0.915	0.922	0.877	0.858	0.922	0.937	0.746	0.74	0.794	0.917	0.799	0.918	0.748	0.889	0.85	0.847
P6	0.926	0.446	0.975	0.908	0.827	0.874	0.969	0.888	0.927	0.888	0.928	0.918	0.919	0.887	0.839	0.901	0.896	0.939	0.837	0.971	0.724	0.906	0.844	0.844
P7	0.761	0.316	0.687	0.716	0.782	0.781	0.697	0.654	0.656	0.655	0.663	0.632	0.612	0.571	0.608	0.721	0.699	0.639	0.645	0.669	0.455	0.659	0.542	0.557
P8	0.825	0.364	0.925	0.783	0.69	0.763	0.934	0.825	0.916	0.908	0.884	0.873	0.928	0.938	0.766	0.769	0.794	0.931	0.768	0.959	0.742	0.855	0.859	0.856
P9	0.94	0.471	0.952	0.94	0.866	0.9	0.959	0.906	0.908	0.857	0.909	0.907	0.872	0.801	0.918	0.957	0.964	0.925	0.911	0.93	0.631	0.903	0.768	0.832
P10	0.914	0.47	0.835	0.911	0.856	0.877	0.848	0.874	0.807	0.745	0.809	0.837	0.715	0.607	0.873	0.94	0.919	0.795	0.893	0.788	0.449	0.83	0.618	0.724
P11	0.876	0.478	0.942	0.848	0.827	0.871	0.961	0.889	0.941	0.932	0.939	0.923	0.936	0.943	0.807	0.815	0.861	0.949	0.832	0.957	0.737	0.955	0.891	0.926
P12	0.896	0.51	0.96	0.872	0.802	0.863	0.96	0.887	0.939	0.907	0.934	0.929	0.931	0.926	0.798	0.841	0.852	0.934	0.814	0.966	0.747	0.925	0.879	0.899
P13	0.852	0.51	0.751	0.865	0.914	0.925	0.802	0.856	0.79	0.715	0.803	0.851	0.662	0.598	0.785	0.863	0.869	0.747	0.889	0.714	0.403	0.879	0.594	0.755
P14	0.849	0.4	0.907	0.818	0.846	0.877	0.948	0.871	0.928	0.929	0.926	0.903	0.917	0.932	0.773	0.792	0.842	0.933	0.836	0.934	0.708	0.955	0.864	0.899
P15	0.828	0.393	0.823	0.852	0.954	0.877	0.859	0.828	0.836	0.75	0.911	0.853	0.713	0.697	0.793	0.88	0.845	0.798	0.839	0.81	0.499	0.899	0.649	0.793
P16	0.923	0.591	0.919	0.935	0.93	0.953	0.944	0.923	0.913	0.858	0.926	0.93	0.855	0.808	0.906	0.922	0.961	0.91	0.932	0.894	0.618	0.958	0.781	0.907
P17	0.863	0.412	0.808	0.842	0.847	0.927	0.889	0.916	0.898	0.836	0.836	0.916	0.803	0.759	0.803	0.815	0.87	0.853	0.884	0.817	0.511	0.918	0.7	0.834
P18	0.891	0.46	0.853	0.858	0.855	0.935	0.919	0.952	0.946	0.876	0.881	0.934	0.867	0.84	0.795	0.807	0.843	0.882	0.876	0.866	0.621	0.938	0.776	0.865
P19	0.851	0.452	0.954	0.822	0.723	0.791	0.953	0.847	0.932	0.909	0.911	0.895	0.955	0.951	0.809	0.802	0.831	0.949	0.781	0.973	0.776	0.874	0.875	0.881
P20	0.921	0.441	0.924	0.893	0.853	0.912	0.97	0.963	0.974	0.924	0.942	0.97	0.912	0.878	0.87	0.881	0.905	0.944	0.925	0.932	0.694	0.965	0.837	0.893
P21	0.911	0.481	0.819	0.881	0.93	0.973	0.866	0.888	0.86	0.814	0.845	0.897	0.756	0.719	0.76	0.851	0.864	0.807	0.84	0.803	0.503	0.913	0.696	0.808
P22	0.924	0.45	0.953	0.924	0.916	0.91	0.957	0.891	0.906	0.865	0.96	0.934	0.879	0.846	0.837	0.925	0.919	0.914	0.864	0.938	0.68	0.963	0.839	0.857
P23	0.9	0.426	0.961	0.874	0.829	0.878	0.988	0.916	0.964	0.947	0.948	0.939	0.96	0.944	0.86	0.858	0.903	0.978	0.876	0.979	0.734	0.957	0.885	0.91
P24	0.773	0.595	0.901	0.757	0.649	0.731	0.883	0.775	0.88	0.853	0.867	0.843	0.916	0.941	0.765	0.714	0.763	0.887	0.716	0.911	0.843	0.81	0.884	0.89
P25	1	0.489	0.918	0.961	0.884	0.951	0.928	0.948	0.916	0.84	0.881	0.937	0.833	0.756	0.843	0.931	0.91	0.864	0.832	0.894	0.567	0.901	0.753	0.808
P26	0.489	1	0.508	0.574	0.461	0.539	0.45	0.461	0.497	0.345	0.5	0.539	0.41	0.419	0.585	0.494	0.534	0.434	0.457	0.427	0.462	0.436	0.4	0.655
P27	0.918	0.508	1	0.93	0.847	0.865	0.98	0.875	0.929	0.877	0.962	0.927	0.915	0.891	0.895	0.934	0.933	0.955	0.845	0.987	0.743	0.914	0.849	0.889
P28	0.961	0.574	0.93	1	0.905	0.946	0.918	0.903	0.885	0.747	0.894	0.928	0.802	0.738	0.881	0.967	0.941	0.847	0.817	0.89	0.588	0.881	0.726	0.819
P29	0.884	0.461	0.847	0.905	1	0.943	0.865	0.834	0.82	0.748	0.889	0.849	0.719	0.684	0.801	0.912	0.889	0.796	0.824	0.815	0.502	0.899	0.657	0.784
P30	0.951	0.539	0.865	0.946	0.943	1	0.9	0.928	0.895	0.793	0.866	0.928	0.791	0.737	0.818	0.895	0.905	0.831	0.835	0.84	0.541	0.916	0.709	0.826
P31	0.928	0.45	0.98	0.918	0.865	0.9	1	0.929	0.969	0.923	0.966	0.954	0.94	0.91	0.901	0.917	0.938	0.975	0.896	0.985	0.71	0.956	0.852	0.907
P32	0.948	0.461	0.875	0.903	0.834	0.928	0.929	1	0.96	0.878	0.881	0.963	0.863	0.802	0.841	0.856	0.87	0.884	0.879	0.877	0.579	0.935	0.778	0.856
P33	0.916	0.497	0.929	0.885	0.82	0.895	0.969	0.96	1	0.918	0.942	0.973	0.928	0.907	0.881	0.852	0.876	0.943	0.868	0.945	0.704	0.931	0.836	0.922
P34	0.84	0.345	0.877	0.747	0.748	0.793	0.923	0.878	0.918	1	0.888	0.867	0.91	0.907	0.796	0.758	0.818	0.943	0.88	0.91	0.671	0.919	0.867	0.884
P35	0.881	0.5	0.962	0.894	0.889	0.866	0.966	0.881	0.942	0.888	1	0.936	0.899	0.898	0.892	0.909	0.904	0.938	0.878	0.961	0.744	0.944	0.855	0.923
P36	0.937	0.539	0.927	0.928	0.849	0.928	0.954	0.963	0.973	0.867	0.936	1	0.905	0.861	0.881	0.89	0.904	0.918	0.865	0.92	0.675	0.941	0.823	0.896
P37	0.833	0.41	0.915	0.802	0.719	0.791	0.94	0.863	0.928	0.91	0.899	0.905	1	0.954	0.856	0.781	0.854	0.946	0.813	0.941	0.758	0.886	0.907	0.871
P38	0.756	0.419	0.891	0.738	0.684	0.737	0.91	0.802	0.907	0.907	0.898	0.861	0.954	1	0.793	0.706	0.782	0.936	0.763	0.933	0.823	0.861	0.923	0.908
P39	0.843	0.585	0.895	0.881	0.801	0.818	0.901	0.841	0.881	0.796	0.892	0.881	0.856	0.793	1	0.898	0.954	0.897	0.882	0.872	0.645	0.836	0.766	0.87
P40	0.931	0.494	0.934	0.967	0.912	0.895	0.917	0.856	0.852	0.758	0.909	0.89	0.781	0.706	0.898	1	0.956	0.855	0.858	0.889	0.559	0.872	0.689	0.783
P41	0.91	0.534	0.933	0.941	0.889	0.905	0.938	0.87	0.876	0.818	0.904	0.904	0.854	0.782	0.954	0.956	1	0.917	0.908	0.9	0.608	0.905	0.763	0.849
P42	0.864	0.434	0.955	0.847	0.796	0.831	0.975	0.884	0.943	0.943	0.938	0.918	0.946	0.936	0.897	0.855	0.917	1	0.897	0.965	0.718	0.934	0.859	0.909
P43	0.832	0.457	0.845	0.817	0.824	0.835	0.896	0.879	0.868	0.88	0.878	0.865	0.813	0.763	0.882	0.858	0.908	0.897	1	0.838	0.55	0.927	0.746	0.858
P44	0.894	0.427	0.987	0.89	0.815	0.84	0.985	0.877	0.945	0.91	0.961	0.92	0.941	0.933	0.872	0.889	0.9	0.965	0.838	1	0.752	0.918	0.88	0.9
P45	0.567	0.462	0.743	0.588	0.502	0.541	0.71	0.579	0.704	0.671	0.744	0.675	0.758	0.823	0.645	0.559	0.608	0.718	0.55	0.752	1	0.626	0.829	0.737
P46	0.901	0.436	0.914	0.881	0.899	0.916	0.956	0.935	0.931	0.919	0.944	0.941	0.886	0.861	0.836	0.872	0.905	0.934	0.927	0.918	0.626	1	0.833	0.9
P47	0.753	0.4	0.849	0.726	0.657	0.709	0.852	0.778	0.836	0.867	0.855	0.823	0.907	0.923	0.766	0.689	0.763	0.859	0.746	0.88	0.829	0.833	1	0.859
P48	0.808	0.655	0.889	0.819	0.784	0.826	0.907	0.856	0.922	0.884	0.923	0.896	0.871	0.908	0.87	0.783	0.849	0.909	0.858	0.9	0.737	0.9	0.859	1

Table B.12 Category correlation for hair salon with spatial conditions removed.

	Affordance evident	Affordance not evident	Objects mentioned	Objects linked to one another	Contiguity	Absence of integration	Absence of structure	Activity	Experience	Typical experience	Atypical experience	Collective purpose of items	Social norms	Social interaction	Cues, prompts, or signals	How to move around	Activity cues missing	Activity cues present	Overall context missing	Scene-like ecology	Mental Schema invoked	Scale information missing	Routine encounter of image	Confusion
Affordance evident	1	-0.101	-0.12	0.051	-0.02	0.136	0.077	0.027	0.162	0.037	0.066	-0.04	-0.05	0.017	0.132	-0.07	-0.12	0.052	-0.09	0.033	-0.1	-0.14	-0.01	-0.19
Affordance not evident	-0.101	1	0.051	-0.239	0.28	-0.08	0.057	-0.36	0.108	-0.23	0.135	0.123	-0.1	-0.06	0.136	0.067	0.347	0.09	0.149	-0.17	-0.06	0.149	0.099	-0.05
Object mentions	-0.12	0.051	1	0.055	0.503	0.405	0.383	0.136	0.023	-0.29	0.179	0.029	0.029	-0.19	0.064	-0.16	0.108	-0.14	0.365	0.075	0.201	-0.01	0.061	0.286
Objects linked to one another	0.051	-0.235	0.055	1	0.042	-0.12	-0.04	0.336	0.242	0.45	-0.02	0.29	-0.13	0.088	-0.09	-0.08	-0.2	0.288	-0.18	0.243	0.071	-0.13	0.24	-0.17
Contiguity	-0.029	0.283	0.503	0.042	1	-0.05	0.225	0.049	0.185	-0.07	0.239	0.117	-0.01	-0.08	-0.12	-0.05	-0.19	0.119	0.196	0.091	0.18	-0.1	0.067	-0.06
Absence of integration	0.136	-0.08	0.405	-0.12	-0.05	1	0.71	-0.11	0.062	-0.38	0.286	-0.03	-0.04	-0.12	0.369	-0.05	0.312	-0.3	0.523	-0.11	0.01	0.237	-0.25	0.335
Absence of structure	0.077	0.057	0.383	-0.04	0.225	0.71	1	-0.21	0.164	-0.32	0.296	0.114	-0.09	-0.19	0.25	-0.09	0.32	-0.09	0.685	0.067	-0.14	0.18	-0.28	0.266
Activity	0.027	-0.366	0.136	0.339	0.049	-0.11	-0.21	1	0.038	0.509	-0.23	-0.03	-0.12	0.392	-0.2	-0.07	-0.25	0.156	-0.08	0.355	0.23	-0.17	0.316	0.025
Experience	0.162	0.108	0.023	0.24	0.185	0.062	0.164	0.038	1	0.235	0.45	0.242	-0.07	-0.11	-0.03	0.089	-0.07	0.058	0.132	-0.12	0.109	-0.05	-0.07	-0.32
Typical experience	0.037	-0.23	-0.29	0.452	-0.07	-0.38	-0.32	0.509	0.235	1	-0.37	0.16	-0.1	0.349	-0.19	-0.06	-0.23	0.43	-0.24	0.122	-0.07	-0.09	0.313	-0.19
Atypical experience	0.066	0.135	0.179	-0.02	0.239	0.286	0.296	-0.23	0.45	-0.37	1	-0.08	-0.05	-0.2	-0.03	0.28	0.087	-0.21	0.207	-0.14	0.422	0.101	-0.24	-0.06
Collective use of item	-0.04	0.123	0.029	0.297	0.114	-0.03	0.114	-0.03	0.242	0.16	-0.08	1	-0.12	-0.02	0.132	-0.11	-0.11	0.063	-0.08	-0.01	0.023	-0.16	0.009	-0.15
Social norms	-0.05	-0.1	0.029	-0.13	-0.01	-0.04	-0.09	-0.12	-0.07	-0.1	-0.05	-0.12	1	-0.05	-0.19	-0.04	-0.13	0.354	-0.23	-0.07	0.008	0.076	-0.06	-0.13
Social interaction	0.017	-0.06	-0.19	0.088	-0.08	-0.12	-0.19	0.392	-0.11	0.349	-0.2	-0.02	-0.05	1	-0.19	-0.03	0.076	0.068	-0.18	-0.06	-0.1	-0.1	0.196	-0.01
Cues, prompts or signals missing	0.132	0.136	0.064	-0.09	-0.12	0.369	0.25	-0.2	-0.03	-0.19	-0.03	0.132	-0.19	-0.19	1	-0.03	0.244	-0.26	0.243	-0.1	-0.12	-0	-0.24	0.12
How to move around	-0.07	0.067	-0.16	-0.08	-0.05	-0.05	-0.09	-0.07	0.089	-0.06	0.28	-0.11	-0.04	-0.03	-0.03	1	0.053	-0.07	-0.12	-0.04	-0.07	-0.07	-0.04	-0.02
Activity cues missing	-0.12	0.347	0.108	-0.2	-0.19	0.312	0.32	-0.25	-0.07	-0.23	0.087	-0.11	-0.13	0.076	0.244	0.053	1	-0.26	0.393	-0.16	-0.03	0.136	0.036	0.26
Activity cues present	0.052	0.09	-0.14	0.288	0.119	-0.3	-0.09	0.156	0.058	0.43	-0.21	0.063	0.354	0.068	-0.26	-0.07	-0.26	1	-0.28	0.194	-0.17	-0.1	0.198	-0.25
Overall context missing	-0.09	0.149	0.365	-0.18	0.196	0.523	0.685	-0.08	0.132	-0.24	0.207	-0.08	-0.23	-0.18	0.243	-0.12	0.393	-0.28	1	0.031	-0.03	0.351	-0.27	0.468
Scene-like ecology	0.033	-0.17	0.075	0.24	0.091	-0.11	0.067	0.355	-0.12	0.122	-0.14	-0.01	-0.07	-0.06	-0.1	-0.04	-0.16	0.194	0.031	1	0.055	-0.05	-0.07	-0.02
Mental schema invoked	-0.1	-0.06	0.201	0.071	0.18	0.01	-0.14	0.23	0.109	-0.07	0.422	0.023	0.008	-0.1	-0.12	-0.07	-0.03	-0.17	-0.03	0.055	1	0.125	0.008	-0.04
Scale information missing	-0.14	0.149	-0.01	-0.13	-0.1	0.237	0.18	-0.17	-0.05	-0.09	0.101	-0.16	0.076	-0.1	-0	-0.07	0.136	-0.1	0.351	-0.05	0.125	1	-0.06	0.417
Routine encounter of image	-0.01	0.099	0.061	0.247	0.067	-0.25	-0.28	0.316	-0.07	0.313	-0.24	0.009	-0.06	0.196	-0.24	-0.04	0.036	0.198	-0.27	-0.07	0.008	-0.06	1	0.179
Confusion	-0.19	-0.05	0.286	-0.17	-0.06	0.335	0.266	0.025	-0.32	-0.19	-0.06	-0.15	-0.13	-0.01	0.12	-0.02	0.26	-0.25	0.468	-0.02	-0.04	0.417	0.179	1

Table B.13 Participant correlation for waiting room with preserved spatial conditions (P1 through P24).

	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14	P15	P16	P17	P18	P19	P20	P21	P23	P24
P1	1	0.775	0.859	0.841	0.448	0.785	0.744	0.809	0.782	0.781	0.806	0.749	0.638	0.683	0.613	0.872	0.799	0.659	0.821	0.795	0.542	0.804	0.821
P2	0.775	1	0.904	0.79	0.583	0.892	0.877	0.851	0.932	0.931	0.877	0.806	0.734	0.875	0.856	0.859	0.838	0.862	0.636	0.712	0.714	0.724	0.72
P3	0.859	0.904	1	0.922	0.681	0.94	0.884	0.897	0.94	0.889	0.92	0.838	0.865	0.915	0.83	0.883	0.805	0.885	0.759	0.714	0.826	0.854	0.776
P4	0.841	0.79	0.922	1	0.821	0.929	0.797	0.875	0.929	0.825	0.887	0.913	0.931	0.872	0.684	0.785	0.677	0.836	0.608	0.619	0.868	0.716	0.694
P5	0.448	0.583	0.681	0.821	1	0.814	0.624	0.709	0.809	0.623	0.651	0.876	0.905	0.768	0.435	0.416	0.318	0.788	0.254	0.144	0.851	0.326	0.245
P6	0.785	0.892	0.94	0.929	0.814	1	0.916	0.934	0.975	0.914	0.908	0.945	0.918	0.933	0.754	0.8	0.757	0.908	0.642	0.572	0.876	0.706	0.674
P7	0.744	0.877	0.884	0.797	0.624	0.916	1	0.899	0.89	0.869	0.858	0.815	0.817	0.898	0.854	0.869	0.876	0.853	0.74	0.684	0.798	0.74	0.743
P8	0.809	0.851	0.897	0.875	0.709	0.934	0.899	1	0.911	0.893	0.872	0.887	0.849	0.849	0.71	0.824	0.801	0.831	0.721	0.603	0.786	0.702	0.673
P9	0.782	0.932	0.94	0.929	0.809	0.975	0.89	0.911	1	0.92	0.896	0.938	0.904	0.94	0.783	0.819	0.767	0.933	0.605	0.614	0.862	0.699	0.683
P10	0.781	0.931	0.889	0.825	0.623	0.914	0.869	0.893	0.92	1	0.865	0.812	0.779	0.856	0.809	0.803	0.856	0.858	0.584	0.646	0.782	0.665	0.713
P11	0.806	0.877	0.92	0.887	0.651	0.908	0.858	0.872	0.896	0.865	1	0.812	0.816	0.881	0.818	0.894	0.774	0.841	0.647	0.758	0.792	0.808	0.767
P12	0.749	0.806	0.838	0.913	0.876	0.945	0.815	0.887	0.938	0.812	0.812	1	0.886	0.853	0.569	0.707	0.63	0.838	0.559	0.449	0.789	0.556	0.541
P13	0.638	0.734	0.865	0.931	0.905	0.918	0.817	0.849	0.904	0.779	0.816	0.886	1	0.919	0.709	0.674	0.607	0.864	0.507	0.443	0.969	0.609	0.555
P14	0.683	0.875	0.915	0.872	0.768	0.933	0.898	0.849	0.94	0.856	0.881	0.853	0.919	1	0.868	0.811	0.751	0.938	0.605	0.609	0.911	0.74	0.676
P15	0.613	0.856	0.83	0.684	0.435	0.754	0.854	0.71	0.783	0.809	0.818	0.569	0.709	0.868	1	0.833	0.827	0.794	0.58	0.774	0.773	0.766	0.756
P16	0.872	0.859	0.883	0.785	0.416	0.8	0.869	0.824	0.819	0.803	0.894	0.707	0.674	0.811	0.833	1	0.911	0.749	0.837	0.908	0.624	0.897	0.896
P17	0.799	0.838	0.805	0.677	0.318	0.757	0.876	0.801	0.767	0.856	0.774	0.63	0.607	0.751	0.827	0.911	1	0.718	0.755	0.837	0.595	0.782	0.899
P18	0.659	0.862	0.885	0.836	0.788	0.908	0.853	0.831	0.933	0.858	0.841	0.838	0.864	0.938	0.794	0.749	0.718	1	0.538	0.554	0.862	0.68	0.622
P19	0.821	0.636	0.759	0.608	0.254	0.642	0.74	0.721	0.605	0.584	0.647	0.559	0.507	0.605	0.58	0.837	0.755	0.538	1	0.689	0.404	0.851	0.726
P20	0.795	0.712	0.714	0.619	0.144	0.572	0.684	0.603	0.614	0.646	0.758	0.449	0.443	0.609	0.774	0.908	0.837	0.554	0.689	1	0.441	0.842	0.922
P21	0.542	0.714	0.826	0.868	0.851	0.876	0.798	0.786	0.862	0.782	0.792	0.789	0.969	0.911	0.773	0.624	0.595	0.862	0.404	0.441	1	0.587	0.55
P23	0.804	0.724	0.854	0.716	0.326	0.706	0.74	0.702	0.699	0.665	0.808	0.556	0.609	0.74	0.766	0.897	0.782	0.68	0.851	0.842	0.587	1	0.891
P24	0.821	0.72	0.776	0.694	0.245	0.674	0.743	0.673	0.683	0.713	0.767	0.541	0.555	0.676	0.756	0.896	0.899	0.622	0.726	0.922	0.55	0.891	1
P25	0.706	0.798	0.869	0.938	0.918	0.954	0.826	0.889	0.955	0.842	0.829	0.963	0.952	0.911	0.652	0.694	0.641	0.914	0.509	0.452	0.898	0.583	0.561
P26	0.876	0.827	0.922	0.931	0.687	0.93	0.858	0.942	0.905	0.914	0.875	0.868	0.869	0.849	0.719	0.838	0.82	0.802	0.725	0.65	0.815	0.745	0.753
P27	0.678	0.701	0.857	0.932	0.89	0.921	0.79	0.868	0.888	0.793	0.814	0.89	0.969	0.873	0.627	0.657	0.615	0.858	0.519	0.42	0.93	0.618	0.583
P28	0.626	0.756	0.876	0.915	0.907	0.93	0.823	0.841	0.914	0.799	0.824	0.879	0.989	0.936	0.726	0.662	0.599	0.904	0.496	0.428	0.974	0.619	0.545
P29	0.82	0.78	0.872	0.872	0.628	0.885	0.845	0.883	0.861	0.898	0.861	0.799	0.831	0.861	0.74	0.838	0.85	0.821	0.68	0.672	0.806	0.754	0.794
P30	0.895	0.756	0.874	0.943	0.703	0.9	0.807	0.905	0.876	0.846	0.833	0.893	0.853	0.81	0.618	0.809	0.765	0.757	0.711	0.627	0.769	0.711	0.735
P31	0.677	0.791	0.884	0.885	0.794	0.906	0.905	0.882	0.901	0.793	0.841	0.844	0.954	0.952	0.819	0.788	0.722	0.879	0.636	0.58	0.926	0.695	0.635
P32	0.861	0.864	0.943	0.887	0.686	0.922	0.893	0.928	0.921	0.84	0.891	0.876	0.818	0.857	0.719	0.883	0.804	0.873	0.795	0.681	0.739	0.82	0.755
P33	0.753	0.553	0.664	0.552	0.019	0.468	0.517	0.505	0.474	0.564	0.644	0.296	0.368	0.484	0.651	0.783	0.762	0.425	0.682	0.881	0.379	0.865	0.916
P34	0.852	0.602	0.716	0.687	0.271	0.631	0.7	0.741	0.622	0.665	0.682	0.57	0.538	0.551	0.561	0.837	0.847	0.526	0.81	0.778	0.465	0.793	0.873
P35	0.784	0.772	0.806	0.687	0.257	0.693	0.743	0.707	0.709	0.802	0.767	0.525	0.591	0.726	0.827	0.877	0.913	0.656	0.713	0.867	0.613	0.879	0.945
P36	0.865	0.638	0.722	0.612	0.078	0.535	0.588	0.586	0.554	0.608	0.686	0.413	0.396	0.527	0.644	0.863	0.799	0.468	0.803	0.918	0.356	0.895	0.918
P37	0.677	0.714	0.761	0.619	0.221	0.615	0.712	0.617	0.647	0.696	0.751	0.423	0.559	0.738	0.88	0.867	0.837	0.661	0.673	0.892	0.61	0.893	0.895
P38	0.797	0.572	0.584	0.492	-0.028	0.438	0.492	0.504	0.465	0.567	0.585	0.354	0.255	0.442	0.543	0.795	0.745	0.378	0.721	0.866	0.218	0.778	0.825
P39	0.619	0.538	0.64	0.471	0.006	0.436	0.546	0.477	0.453	0.522	0.597	0.224	0.367	0.522	0.724	0.756	0.74	0.469	0.665	0.851	0.423	0.883	0.882
P40	0.63	0.739	0.58	0.367	-0.031	0.47	0.605	0.523	0.526	0.675	0.593	0.347	0.219	0.507	0.703	0.777	0.813	0.486	0.61	0.795	0.229	0.655	0.711
P41	0.749	0.698	0.774	0.633	0.182	0.604	0.687	0.613	0.634	0.649	0.726	0.435	0.515	0.66	0.797	0.872	0.84	0.608	0.731	0.917	0.532	0.932	0.958
P42	0.687	0.802	0.82	0.655	0.348	0.74	0.834	0.708	0.742	0.771	0.765	0.566	0.637	0.8	0.874	0.85	0.874	0.758	0.728	0.782	0.674	0.895	0.882
P43	0.736	0.576	0.71	0.603	0.173	0.582	0.655	0.623	0.549	0.605	0.69	0.412	0.512	0.621	0.689	0.809	0.786	0.534	0.779	0.81	0.518	0.922	0.902
P44	0.667	0.492	0.627	0.52	0.035	0.446	0.524	0.505	0.446	0.537	0.621	0.255	0.388	0.499	0.664	0.752	0.734	0.445	0.648	0.85	0.432	0.861	0.89
P45	0.547	0.416	0.538	0.368	-0.038	0.298	0.448	0.318	0.328	0.26	0.472	0.15	0.258	0.403	0.585	0.678	0.543	0.346	0.699	0.777	0.255	0.841	0.735
P46	0.798	0.669	0.632	0.507	-0.006	0.479	0.52	0.511	0.527	0.627	0.639	0.37	0.26	0.448	0.592	0.811	0.79	0.433	0.665	0.895	0.237	0.79	0.883
P47	0.613	0.683	0.677	0.501	0.106	0.556	0.723	0.541	0.568	0.633	0.642	0.349	0.456	0.63	0.84	0.785	0.86	0.566	0.626	0.844	0.517	0.808	0.908
P48	0.864	0.785	0.919	0.876	0.554	0.838	0.796	0.827	0.846	0.794	0.864	0.742	0.769	0.81	0.741	0.888	0.817	0.8	0.763	0.79	0.734	0.923	0.899

Table B.14 Participant correlation for waiting room with preserved spatial conditions (P25 through P48).

	P25	P26	P27	P28	P29	P30	P31	P32	P33	P34	P35	P36	P37	P38	P39	P40	P41	P42	P43	P44	P45	P46	P47	P48
P1	0.706	0.876	0.678	0.626	0.82	0.895	0.677	0.861	0.753	0.852	0.784	0.865	0.677	0.797	0.619	0.63	0.749	0.687	0.736	0.667	0.547	0.798	0.613	0.864
P2	0.798	0.827	0.701	0.756	0.78	0.756	0.791	0.864	0.553	0.602	0.772	0.638	0.714	0.572	0.538	0.739	0.698	0.802	0.576	0.492	0.416	0.669	0.683	0.785
P3	0.869	0.922	0.857	0.876	0.872	0.874	0.884	0.943	0.664	0.716	0.806	0.722	0.761	0.584	0.64	0.58	0.774	0.82	0.71	0.627	0.538	0.632	0.677	0.919
P4	0.938	0.931	0.932	0.915	0.872	0.943	0.885	0.887	0.552	0.687	0.687	0.612	0.619	0.492	0.471	0.367	0.633	0.655	0.603	0.52	0.368	0.507	0.501	0.876
P5	0.918	0.687	0.89	0.907	0.628	0.703	0.794	0.686	0.019	0.271	0.257	0.078	0.221	-0.028	0.006	-0.031	0.182	0.348	0.173	0.035	-0.038	-0.006	0.106	0.554
P6	0.954	0.93	0.921	0.93	0.885	0.9	0.906	0.922	0.468	0.631	0.693	0.535	0.615	0.438	0.436	0.47	0.604	0.74	0.582	0.446	0.298	0.479	0.556	0.838
P7	0.826	0.858	0.79	0.823	0.845	0.807	0.905	0.893	0.517	0.7	0.743	0.588	0.712	0.492	0.546	0.605	0.687	0.834	0.655	0.524	0.448	0.52	0.723	0.796
P8	0.889	0.942	0.868	0.841	0.883	0.905	0.882	0.928	0.505	0.741	0.707	0.586	0.617	0.504	0.477	0.523	0.613	0.708	0.623	0.505	0.318	0.511	0.541	0.827
P9	0.955	0.905	0.888	0.914	0.861	0.876	0.901	0.921	0.474	0.622	0.709	0.554	0.647	0.465	0.453	0.526	0.634	0.742	0.549	0.446	0.328	0.527	0.568	0.846
P10	0.842	0.914	0.793	0.799	0.898	0.846	0.793	0.84	0.564	0.665	0.802	0.608	0.696	0.567	0.522	0.675	0.649	0.771	0.605	0.537	0.26	0.627	0.633	0.794
P11	0.829	0.875	0.814	0.824	0.861	0.833	0.841	0.891	0.644	0.682	0.767	0.686	0.751	0.585	0.597	0.593	0.726	0.765	0.69	0.621	0.472	0.639	0.642	0.864
P12	0.963	0.868	0.89	0.879	0.799	0.893	0.844	0.876	0.296	0.57	0.525	0.413	0.423	0.354	0.224	0.347	0.435	0.566	0.412	0.255	0.15	0.37	0.349	0.742
P13	0.952	0.869	0.969	0.989	0.831	0.853	0.954	0.818	0.368	0.538	0.591	0.396	0.559	0.255	0.367	0.219	0.515	0.637	0.512	0.388	0.258	0.26	0.456	0.769
P14	0.911	0.849	0.873	0.936	0.861	0.81	0.952	0.857	0.484	0.551	0.726	0.527	0.738	0.442	0.522	0.507	0.66	0.8	0.621	0.499	0.403	0.448	0.63	0.81
P15	0.652	0.719	0.627	0.726	0.74	0.618	0.819	0.719	0.651	0.561	0.827	0.644	0.88	0.543	0.724	0.703	0.797	0.874	0.689	0.664	0.585	0.592	0.84	0.741
P16	0.694	0.838	0.657	0.662	0.838	0.809	0.788	0.883	0.783	0.837	0.877	0.863	0.867	0.795	0.756	0.777	0.872	0.85	0.809	0.752	0.678	0.811	0.785	0.888
P17	0.641	0.82	0.615	0.599	0.85	0.765	0.722	0.804	0.762	0.847	0.913	0.799	0.837	0.745	0.74	0.813	0.84	0.874	0.786	0.734	0.543	0.79	0.86	0.817
P18	0.914	0.802	0.858	0.904	0.821	0.757	0.879	0.873	0.425	0.526	0.656	0.468	0.661	0.378	0.469	0.486	0.608	0.758	0.534	0.445	0.346	0.433	0.566	0.8
P19	0.509	0.725	0.519	0.496	0.68	0.711	0.636	0.795	0.682	0.81	0.713	0.803	0.673	0.721	0.665	0.61	0.731	0.728	0.779	0.648	0.699	0.665	0.626	0.763
P20	0.452	0.65	0.42	0.428	0.672	0.627	0.58	0.681	0.881	0.778	0.867	0.918	0.892	0.866	0.851	0.795	0.917	0.782	0.81	0.85	0.777	0.895	0.844	0.79
P21	0.898	0.815	0.93	0.974	0.806	0.769	0.926	0.739	0.379	0.465	0.613	0.356	0.61	0.218	0.423	0.229	0.532	0.674	0.518	0.432	0.255	0.237	0.517	0.734
P23	0.583	0.745	0.618	0.619	0.754	0.711	0.695	0.82	0.865	0.793	0.879	0.895	0.893	0.778	0.883	0.655	0.932	0.895	0.922	0.861	0.841	0.79	0.808	0.923
P24	0.561	0.753	0.583	0.545	0.794	0.735	0.635	0.755	0.916	0.873	0.945	0.918	0.895	0.825	0.882	0.711	0.958	0.882	0.902	0.89	0.735	0.883	0.908	0.899
P25	1	0.88	0.959	0.958	0.854	0.884	0.905	0.877	0.332	0.56	0.573	0.403	0.51	0.314	0.307	0.313	0.484	0.619	0.46	0.336	0.18	0.335	0.408	0.784
P26	0.88	1	0.892	0.853	0.952	0.975	0.864	0.887	0.632	0.792	0.804	0.686	0.687	0.607	0.553	0.514	0.678	0.734	0.709	0.607	0.348	0.601	0.587	0.875
P27	0.959	0.892	1	0.969	0.876	0.885	0.898	0.848	0.403	0.608	0.602	0.422	0.53	0.28	0.38	0.203	0.517	0.634	0.55	0.429	0.225	0.302	0.44	0.811
P28	0.958	0.853	0.969	1	0.831	0.825	0.944	0.826	0.357	0.497	0.588	0.38	0.567	0.241	0.377	0.235	0.515	0.661	0.509	0.386	0.257	0.26	0.467	0.771
P29	0.854	0.952	0.876	0.831	1	0.934	0.845	0.85	0.663	0.794	0.842	0.686	0.764	0.638	0.614	0.549	0.709	0.777	0.766	0.679	0.355	0.616	0.641	0.872
P30	0.884	0.975	0.885	0.825	0.934	1	0.833	0.87	0.599	0.804	0.745	0.675	0.622	0.62	0.489	0.453	0.631	0.665	0.676	0.567	0.32	0.579	0.506	0.862
P31	0.905	0.864	0.898	0.944	0.845	0.833	1	0.849	0.442	0.596	0.666	0.492	0.684	0.371	0.481	0.378	0.615	0.724	0.602	0.477	0.401	0.35	0.585	0.786
P32	0.877	0.887	0.848	0.826	0.85	0.87	0.849	1	0.583	0.788	0.726	0.683	0.665	0.554	0.563	0.562	0.718	0.785	0.673	0.561	0.514	0.61	0.614	0.916
P33	0.332	0.632	0.403	0.357	0.663	0.599	0.442	0.583	1	0.809	0.91	0.961	0.874	0.871	0.94	0.682	0.936	0.766	0.902	0.961	0.779	0.897	0.827	0.801
P34	0.56	0.792	0.608	0.497	0.794	0.804	0.596	0.788	0.809	1	0.827	0.86	0.71	0.772	0.73	0.611	0.804	0.743	0.831	0.789	0.609	0.779	0.7	0.856
P35	0.573	0.804	0.602	0.588	0.842	0.745	0.666	0.726	0.91	0.827	1	0.893	0.942	0.83	0.896	0.764	0.939	0.912	0.912	0.898	0.664	0.862	0.891	0.875
P36	0.403	0.686	0.422	0.38	0.686	0.675	0.492	0.683	0.961	0.86	0.893	1	0.849	0.933	0.884	0.748	0.922	0.767	0.885	0.9	0.799	0.941	0.788	0.83
P37	0.51	0.687	0.53	0.567	0.764	0.622	0.684	0.665	0.874	0.71	0.942	0.849	1	0.788	0.931	0.739	0.943	0.896	0.895	0.909	0.763	0.789	0.89	0.823
P38	0.314	0.607	0.28	0.241	0.638	0.62	0.371	0.554	0.871	0.772	0.83	0.933	0.788	1	0.785	0.817	0.804	0.668	0.803	0.824	0.646	0.931	0.657	0.699
P39	0.307	0.553	0.38	0.377	0.614	0.489	0.481	0.563	0.94	0.73	0.896	0.884	0.931	0.785	1	0.67	0.961	0.842	0.91	0.974	0.854	0.807	0.882	0.784
P40	0.313	0.514	0.203	0.235	0.549	0.453	0.378	0.562	0.682	0.611	0.764	0.748	0.739	0.817	0.67	1	0.719	0.717	0.601	0.628	0.514	0.839	0.698	0.572
P41	0.484	0.678	0.517	0.515	0.709	0.631	0.615	0.718	0.936	0.804	0.939	0.922	0.943	0.804	0.961	0.719	1	0.9	0.903	0.93	0.849	0.861	0.921	0.885
P42	0.619	0.734	0.634	0.661	0.777	0.665	0.724	0.785	0.766	0.743	0.912	0.767	0.896	0.668	0.842	0.717	0.9	1	0.867	0.79	0.713	0.724	0.908	0.863
P43	0.46	0.709	0.55	0.509	0.766	0.676	0.602	0.673	0.902	0.831	0.912	0.885	0.895	0.803	0.91	0.601	0.903	0.867	1	0.932	0.78	0.778	0.834	0.842
P44	0.336	0.607	0.429	0.386	0.679	0.567	0.477	0.561	0.961	0.789	0.898	0.9	0.909	0.824	0.974	0.628	0.93	0.79	0.932	1	0.782	0.814	0.824	0.798
P45	0.18	0.348	0.225	0.257	0.355	0.32	0.401	0.514	0.779	0.609	0.664	0.799	0.763	0.646	0.854	0.514	0.849	0.713	0.78	0.782	1	0.677	0.762	0.661
P46	0.335	0.601	0.302	0.26	0.616	0.579	0.35	0.61	0.897	0.779	0.862	0.941	0.789	0.931	0.807	0.839	0.861	0.724	0.778	0.814	0.677	1	0.756	0.749
P47	0.408	0.587	0.44	0.467	0.641	0.506	0.585	0.614	0.827	0.7	0.891	0.788	0.89	0.657	0.882	0.698	0.921	0.908	0.834	0.824	0.762	0.756	1	0.745
P48	0.784	0.875	0.811	0.771	0.872	0.862	0.786	0.916	0.801	0.856	0.875	0.83	0.823	0.699	0.784	0.572	0.885	0.863	0.842	0.798	0.661	0.749	0.745	1

Table B.15 category correlations for waiting room with preserved spatial conditions.

	Affordance evident	Affordance not evident	Object mentions	Objects linked to one another	Contiguity	What to do there	What not to do there	Experience	Typical experience	Atypical experience	PEB relations	Collective use of items	Social norms	Social interaction	Cues, prompts, or signals missing	How to move around	Activity cues present	Scene-like ecology	Functional design	Mental image invoked	Collective use of items	Expectation of greater environmental context	Routine encounter o image	Confusion
Affordances evident	1	-0.203	0.178	0.484	0.216	0.574	0.422	0.318	0.31	0.082	0.348	0.031	0.14	0.463	0.071	0.266	0.22	0.553	0.108	0.189	0.043	0.27	0.038	-0.232
Affordances not evident	-0.203	1	-0.105	-0.026	-0.064	-0.173	-0.059	0.098	0.214	-0.03	-0.189	-0.089	-0.08	-0.136	0.338	-0.112	-0.005	-0.122	0.078	-0.02	-0.063	-0.082	0.155	-0.03
Object mentions	0.178	-0.105	1	0.055	0.445	-0.219	0.297	0.242	0.223	0.106	0.013	0.229	-0.21	0.202	0.102	0.168	-0.245	0.31	0.132	0.402	0.289	0.277	-0.023	0.304
Objects linked to one another	0.484	-0.026	0.055	1	0.63	0.472	0.111	0.268	0.199	-0.107	0.227	-0.012	0.126	0.071	0.04	0.072	0.27	0.247	0.305	-0.065	0.018	0.107	0.182	-0.143
Contiguity	0.216	-0.064	0.445	0.63	1	-0.07	0.303	0.246	0.062	0.01	0.064	0.264	0.049	0.073	-0.019	0.13	0.108	0.279	0.485	0.203	0.096	0.286	0.221	-0.063
What to do there	0.574	-0.173	-0.219	0.472	-0.07	1	0.183	0.159	0.102	-0.14	0.424	0.024	0.251	0.345	0.046	-0.027	0.328	0.266	-0.133	-0.149	0.023	0.049	-0.045	-0.14
What not to do there	0.422	-0.059	0.297	0.111	0.303	0.183	1	0.005	-0.099	-0.041	0.348	0.124	0.027	0.37	0.129	0.158	0.037	0.357	0.064	0.203	0.12	0.127	0.07	-0.041
Experience	0.318	0.098	0.242	0.268	0.246	0.159	0.005	1	0.684	0.178	0.078	0.236	0.009	0.462	-0.091	0.069	0.287	0.228	0.058	0.209	0.255	0.24	0.039	-0.26
Typical experience	0.31	0.214	0.223	0.199	0.062	0.102	-0.099	0.684	1	-0.185	-0.017	0.184	-0.103	0.291	-0.039	-0.177	0.091	0.195	-0.08	0.085	0.05	0.271	0.195	-0.185
Atypical experience	0.082	-0.03	0.106	-0.107	0.01	-0.14	-0.041	0.178	-0.185	1	0.054	-0.005	-0.006	0.19	-0.047	0.721	0.168	0.091	0.272	0.24	-0.044	0.045	-0.253	-0.021
PEB relations	0.348	-0.189	0.013	0.227	0.064	0.424	0.348	0.078	-0.017	0.054	1	0.222	0.077	0.441	0.052	0.382	0.344	0.303	0.1	-0.036	0.177	0.284	0.189	-0.195
Collective purpose of items	0.031	-0.089	0.229	-0.012	0.264	0.024	0.124	0.236	0.184	-0.005	0.222	1	0.054	0.206	-0.106	0.136	0.332	0.225	0.159	0.243	0.523	0.319	0.283	-0.119
Social norms	0.14	-0.08	-0.21	0.126	0.049	0.251	0.027	0.009	-0.103	-0.006	0.077	0.054	1	0.093	-0.097	-0.012	0.161	0.059	0.112	-0.293	-0.064	0.143	0.236	-0.106
Social interaction	0.463	-0.136	0.202	0.071	0.073	0.345	0.37	0.462	0.291	0.19	0.441	0.206	0.093	1	-0.106	0.347	0.447	0.501	0.007	0.336	0.164	0.425	0.063	-0.19
Cues, prompts, signals missing	0.071	0.338	0.102	0.04	-0.019	0.046	0.129	-0.091	-0.039	-0.047	0.052	-0.106	-0.097	-0.106	1	0.016	0.199	0.016	0.061	0.11	-0.098	-0.014	-0.12	0.521
How to move around	0.266	-0.112	0.168	0.072	0.13	-0.027	0.158	0.069	-0.177	0.721	0.382	0.136	-0.012	0.347	-0.016	1	0.217	0.303	0.433	0.279	0.015	0.302	0.117	-0.079
Activity cues present	0.22	-0.005	-0.245	0.27	0.108	0.328	0.037	0.287	0.091	0.168	0.344	0.332	0.161	0.447	-0.199	0.217	1	0.319	0.229	0.078	0.111	0.219	0.151	-0.289
Scene-like ecology	0.553	-0.122	0.31	0.247	0.279	0.266	0.357	0.228	0.195	0.091	0.303	0.225	0.059	0.501	-0.016	0.303	0.319	1	0.315	0.607	0.202	0.553	0.099	-0.181
Functional design	0.108	0.078	0.132	0.305	0.485	-0.133	0.064	0.058	-0.08	0.272	0.1	0.159	0.112	0.007	-0.061	0.433	0.229	0.315	1	0.469	0.113	0.452	0.262	-0.054
Mental schema invoked	0.189	-0.02	0.402	-0.065	0.203	-0.149	0.203	0.209	0.085	0.24	-0.036	0.243	-0.293	0.336	0.11	0.279	0.078	0.607	0.469	1	0.321	0.461	-0.096	0.071
Collective use of items	0.043	-0.063	0.289	0.018	0.096	0.023	0.12	0.255	0.05	-0.044	0.177	0.523	-0.064	0.164	-0.098	0.015	0.111	0.202	0.113	0.321	1	0.145	0.149	-0.044
Expectation of greater environmental context	0.27	-0.082	0.277	0.107	0.286	0.049	0.127	0.24	0.271	0.045	0.284	0.319	0.143	0.425	-0.014	0.302	0.219	0.553	0.452	0.461	0.145	1	0.285	-0.16
Routine encounter of image	0.038	0.155	-0.023	0.182	0.221	-0.045	0.07	0.039	0.195	-0.253	0.189	0.283	0.236	0.063	-0.12	0.117	0.151	0.099	0.262	-0.096	0.149	0.285	1	0.036
Confusion	-0.232	-0.03	0.304	-0.143	-0.063	-0.14	-0.041	-0.26	-0.185	-0.021	-0.195	-0.119	-0.106	-0.19	0.521	-0.079	-0.289	-0.181	-0.054	0.071	-0.044	-0.16	0.036	1

Table B.16 Participant correlation for waiting room with spatial conditions removed (P1 through P24).

	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14	P15	P16	P17	P18	P19	P20	P21	P22	P23	P24
P1	1	0.944	0.987	0.959	0.941	0.955	0.867	0.941	0.972	0.977	0.944	0.97	0.953	0.961	0.981	0.823	0.915	0.96	0.981	0.98	0.797	0.937	0.963	0.906
P2	0.944	1	0.963	0.917	0.924	0.966	0.867	0.888	0.965	0.948	0.891	0.912	0.899	0.9	0.937	0.834	0.864	0.902	0.948	0.941	0.781	0.917	0.904	0.86
P3	0.987	0.963	1	0.951	0.928	0.97	0.847	0.934	0.987	0.988	0.93	0.96	0.94	0.948	0.977	0.825	0.915	0.946	0.983	0.981	0.781	0.938	0.955	0.903
P4	0.959	0.917	0.951	1	0.964	0.915	0.904	0.974	0.953	0.96	0.985	0.975	0.976	0.965	0.986	0.828	0.921	0.974	0.978	0.967	0.811	0.976	0.975	0.973
P5	0.941	0.924	0.928	0.964	1	0.899	0.908	0.945	0.945	0.927	0.954	0.968	0.974	0.964	0.953	0.816	0.901	0.974	0.95	0.951	0.773	0.933	0.967	0.914
P6	0.955	0.966	0.97	0.915	0.899	1	0.906	0.918	0.967	0.97	0.914	0.927	0.927	0.929	0.959	0.881	0.926	0.915	0.947	0.965	0.873	0.943	0.917	0.851
P7	0.867	0.867	0.847	0.904	0.908	0.906	1	0.909	0.872	0.878	0.926	0.888	0.934	0.906	0.918	0.907	0.91	0.899	0.864	0.897	0.947	0.936	0.878	0.831
P8	0.941	0.888	0.934	0.974	0.945	0.918	0.909	1	0.936	0.957	0.981	0.973	0.979	0.968	0.975	0.838	0.941	0.96	0.963	0.961	0.829	0.97	0.967	0.956
P9	0.972	0.965	0.987	0.953	0.945	0.967	0.872	0.936	1	0.981	0.934	0.958	0.947	0.952	0.972	0.841	0.915	0.952	0.975	0.984	0.794	0.943	0.958	0.904
P10	0.977	0.948	0.988	0.96	0.927	0.97	0.878	0.957	0.981	1	0.945	0.959	0.951	0.95	0.982	0.855	0.931	0.954	0.975	0.978	0.818	0.958	0.955	0.912
P11	0.944	0.891	0.93	0.985	0.954	0.914	0.926	0.981	0.934	0.945	1	0.971	0.982	0.967	0.981	0.866	0.924	0.965	0.964	0.96	0.845	0.972	0.963	0.961
P12	0.97	0.912	0.96	0.975	0.968	0.927	0.888	0.973	0.958	0.959	0.971	1	0.985	0.995	0.982	0.82	0.94	0.987	0.982	0.988	0.801	0.957	0.993	0.944
P13	0.953	0.899	0.94	0.976	0.974	0.927	0.934	0.979	0.947	0.951	0.982	0.985	1	0.989	0.979	0.847	0.95	0.987	0.961	0.974	0.848	0.967	0.984	0.932
P14	0.961	0.9	0.948	0.965	0.964	0.929	0.906	0.968	0.952	0.95	0.967	0.995	0.989	1	0.977	0.823	0.956	0.987	0.969	0.987	0.838	0.959	0.993	0.927
P15	0.981	0.937	0.977	0.986	0.953	0.959	0.918	0.975	0.972	0.982	0.981	0.982	0.979	0.977	1	0.857	0.946	0.969	0.988	0.988	0.852	0.978	0.975	0.948
P16	0.823	0.834	0.825	0.828	0.816	0.881	0.907	0.838	0.841	0.855	0.866	0.82	0.847	0.823	0.857	1	0.844	0.828	0.802	0.842	0.881	0.86	0.787	0.737
P17	0.915	0.864	0.915	0.921	0.901	0.926	0.91	0.941	0.915	0.931	0.924	0.94	0.95	0.956	0.946	0.844	1	0.935	0.913	0.948	0.89	0.955	0.943	0.875
P18	0.96	0.902	0.946	0.974	0.974	0.915	0.899	0.96	0.952	0.954	0.965	0.987	0.987	0.987	0.969	0.828	0.935	1	0.961	0.976	0.807	0.953	0.99	0.923
P19	0.981	0.948	0.983	0.978	0.95	0.947	0.864	0.963	0.975	0.975	0.964	0.982	0.961	0.969	0.988	0.802	0.913	0.961	1	0.986	0.78	0.958	0.977	0.958
P20	0.98	0.941	0.981	0.967	0.951	0.965	0.897	0.961	0.984	0.978	0.96	0.988	0.974	0.987	0.988	0.842	0.948	0.976	0.986	1	0.835	0.965	0.984	0.926
P21	0.797	0.781	0.781	0.811	0.773	0.873	0.947	0.829	0.794	0.818	0.845	0.801	0.848	0.838	0.852	0.881	0.89	0.807	0.78	0.835	1	0.884	0.795	0.734
P22	0.937	0.917	0.938	0.976	0.933	0.943	0.936	0.97	0.943	0.958	0.972	0.957	0.967	0.959	0.978	0.86	0.955	0.953	0.958	0.965	0.884	1	0.96	0.951
P23	0.963	0.904	0.955	0.975	0.967	0.917	0.878	0.967	0.958	0.955	0.963	0.993	0.984	0.993	0.975	0.787	0.943	0.99	0.977	0.984	0.795	0.96	1	0.947
P24	0.906	0.86	0.903	0.973	0.914	0.851	0.831	0.956	0.904	0.912	0.961	0.944	0.932	0.927	0.948	0.737	0.875	0.923	0.958	0.926	0.734	0.951	0.947	1
P25	0.955	0.961	0.964	0.914	0.906	0.982	0.911	0.899	0.964	0.963	0.909	0.914	0.917	0.912	0.956	0.905	0.903	0.908	0.934	0.951	0.86	0.92	0.898	0.831
P26	0.944	0.933	0.943	0.946	0.972	0.948	0.939	0.948	0.966	0.949	0.955	0.958	0.973	0.961	0.963	0.896	0.933	0.96	0.943	0.966	0.842	0.943	0.95	0.882
P27	0.971	0.945	0.976	0.976	0.966	0.945	0.886	0.971	0.975	0.971	0.968	0.985	0.975	0.973	0.983	0.841	0.923	0.969	0.987	0.982	0.788	0.957	0.975	0.944
P28	0.976	0.93	0.969	0.987	0.966	0.942	0.907	0.979	0.973	0.975	0.982	0.989	0.981	0.98	0.993	0.85	0.927	0.98	0.988	0.987	0.818	0.967	0.981	0.952
P29	0.922	0.932	0.927	0.921	0.885	0.948	0.902	0.915	0.934	0.935	0.934	0.912	0.908	0.897	0.946	0.9	0.85	0.891	0.938	0.935	0.833	0.926	0.884	0.881
P30	0.963	0.948	0.964	0.97	0.947	0.972	0.946	0.965	0.968	0.973	0.969	0.964	0.969	0.967	0.99	0.889	0.962	0.954	0.969	0.98	0.895	0.983	0.958	0.924
P31	0.93	0.918	0.924	0.962	0.956	0.935	0.957	0.96	0.942	0.937	0.96	0.961	0.978	0.972	0.966	0.863	0.952	0.962	0.944	0.964	0.894	0.98	0.964	0.919
P32	0.989	0.953	0.991	0.977	0.945	0.961	0.88	0.956	0.981	0.986	0.957	0.977	0.962	0.969	0.992	0.817	0.931	0.965	0.993	0.989	0.814	0.965	0.976	0.939
P33	0.91	0.889	0.907	0.903	0.881	0.962	0.961	0.926	0.908	0.931	0.924	0.914	0.94	0.929	0.942	0.92	0.955	0.914	0.898	0.937	0.951	0.951	0.902	0.83
P34	0.97	0.907	0.961	0.979	0.969	0.922	0.89	0.967	0.969	0.963	0.97	0.99	0.984	0.99	0.984	0.811	0.94	0.987	0.978	0.987	0.806	0.957	0.993	0.943
P35	0.891	0.867	0.883	0.905	0.866	0.936	0.961	0.924	0.883	0.911	0.923	0.909	0.931	0.921	0.933	0.91	0.938	0.905	0.889	0.924	0.954	0.954	0.894	0.843
P36	0.957	0.909	0.944	0.941	0.906	0.932	0.889	0.926	0.926	0.94	0.938	0.96	0.936	0.958	0.964	0.857	0.917	0.942	0.952	0.963	0.862	0.935	0.941	0.888
P37	0.96	0.899	0.949	0.974	0.97	0.919	0.894	0.971	0.953	0.952	0.969	0.995	0.99	0.995	0.975	0.807	0.945	0.993	0.972	0.983	0.809	0.961	0.997	0.94
P38	0.854	0.798	0.851	0.902	0.875	0.785	0.762	0.886	0.86	0.864	0.869	0.891	0.893	0.88	0.863	0.697	0.804	0.92	0.872	0.871	0.652	0.865	0.908	0.874
P39	0.974	0.965	0.981	0.946	0.916	0.988	0.913	0.929	0.975	0.982	0.933	0.942	0.939	0.94	0.979	0.879	0.93	0.935	0.962	0.975	0.873	0.956	0.935	0.881
P40	0.911	0.934	0.937	0.834	0.808	0.961	0.802	0.833	0.917	0.927	0.829	0.856	0.831	0.839	0.891	0.867	0.83	0.834	0.892	0.902	0.772	0.852	0.826	0.76
P41	0.964	0.902	0.951	0.975	0.964	0.92	0.891	0.972	0.955	0.958	0.963	0.99	0.985	0.991	0.975	0.798	0.941	0.992	0.972	0.982	0.811	0.958	0.994	0.937
P42	0.964	0.915	0.959	0.965	0.957	0.953	0.922	0.973	0.961	0.966	0.966	0.985	0.989	0.993	0.983	0.843	0.976	0.98	0.968	0.987	0.865	0.973	0.986	0.921
P43	0.957	0.927	0.961	0.926	0.909	0.974	0.913	0.934	0.963	0.969	0.933	0.95	0.943	0.95	0.967	0.921	0.943	0.939	0.943	0.974	0.875	0.941	0.931	0.859
P44	0.966	0.915	0.959	0.969	0.964	0.933	0.885	0.97	0.962	0.958	0.966	0.996	0.983	0.996	0.976	0.815	0.947	0.988	0.98	0.989	0.807	0.959	0.995	0.939
P45	0.966	0.907	0.956	0.983	0.968	0.918	0.886	0.969	0.961	0.962	0.968	0.987	0.984	0.986	0.978	0.793	0.935	0.991	0.976	0.98	0.8	0.961	0.995	0.947
P46	0.895	0.885	0.892	0.821	0.772	0.904	0.802	0.794	0.857	0.882	0.795	0.817	0.797	0.808	0.873	0.779	0.781	0.801	0.857	0.86	0.797	0.815	0.792	0.73
P47	0.971	0.911	0.962	0.971	0.959	0.934	0.896	0.964	0.96	0.963	0.959	0.991	0.983	0.995	0.982	0.809	0.961	0.986	0.974	0.989	0.833	0.963	0.995	0.929
P48	0.975	0.927	0.971	0.982	0.949	0.948	0.904	0.969	0.966	0.974	0.967	0.983	0.976	0.983	0.992	0.818	0.958	0.974	0.983	0.988	0.85	0.981	0.986	0.948

Table B.17 participant correlation for waiting room with spatial conditions removed (P25 through P48).

	P25	P26	P27	P28	P29	P30	P31	P32	P33	P34	P35	P36	P37	P38	P39	P40	P41	P42	P43	P44	P45	P46	P47	P48
P1	0.955	0.944	0.971	0.976	0.922	0.963	0.93	0.989	0.91	0.97	0.891	0.957	0.96	0.854	0.974	0.911	0.964	0.964	0.957	0.966	0.966	0.895	0.971	0.975
P2	0.961	0.933	0.945	0.93	0.932	0.948	0.918	0.953	0.889	0.907	0.867	0.909	0.899	0.798	0.965	0.934	0.902	0.915	0.927	0.915	0.907	0.885	0.911	0.927
P3	0.964	0.943	0.976	0.969	0.927	0.964	0.924	0.991	0.907	0.961	0.883	0.944	0.949	0.851	0.981	0.937	0.951	0.959	0.961	0.959	0.956	0.892	0.962	0.971
P4	0.914	0.946	0.976	0.987	0.921	0.97	0.962	0.977	0.903	0.979	0.905	0.941	0.974	0.902	0.946	0.834	0.975	0.965	0.926	0.969	0.983	0.821	0.971	0.982
P5	0.906	0.972	0.966	0.966	0.885	0.947	0.956	0.945	0.881	0.969	0.866	0.906	0.97	0.875	0.916	0.808	0.964	0.957	0.909	0.964	0.968	0.772	0.959	0.949
P6	0.982	0.948	0.945	0.942	0.948	0.972	0.935	0.961	0.962	0.922	0.936	0.932	0.919	0.785	0.988	0.961	0.92	0.953	0.974	0.933	0.918	0.904	0.934	0.948
P7	0.911	0.939	0.886	0.907	0.902	0.946	0.957	0.88	0.961	0.89	0.961	0.889	0.894	0.762	0.913	0.802	0.891	0.922	0.913	0.885	0.886	0.802	0.896	0.904
P8	0.899	0.948	0.971	0.979	0.915	0.965	0.96	0.956	0.926	0.967	0.924	0.926	0.971	0.886	0.929	0.833	0.972	0.973	0.934	0.97	0.969	0.794	0.964	0.969
P9	0.964	0.966	0.975	0.973	0.934	0.968	0.942	0.981	0.908	0.969	0.883	0.926	0.953	0.86	0.975	0.917	0.955	0.961	0.963	0.962	0.961	0.857	0.96	0.966
P10	0.963	0.949	0.971	0.975	0.935	0.973	0.937	0.986	0.931	0.963	0.911	0.94	0.952	0.864	0.982	0.927	0.958	0.966	0.969	0.958	0.962	0.882	0.963	0.974
P11	0.909	0.955	0.968	0.982	0.934	0.969	0.96	0.957	0.924	0.97	0.923	0.938	0.969	0.869	0.933	0.829	0.963	0.966	0.933	0.966	0.968	0.795	0.959	0.967
P12	0.914	0.958	0.985	0.989	0.912	0.964	0.961	0.977	0.914	0.99	0.909	0.96	0.995	0.891	0.942	0.856	0.99	0.985	0.95	0.996	0.987	0.817	0.991	0.983
P13	0.917	0.973	0.975	0.981	0.908	0.969	0.978	0.962	0.94	0.984	0.931	0.936	0.99	0.893	0.939	0.831	0.985	0.989	0.943	0.983	0.984	0.797	0.983	0.976
P14	0.912	0.961	0.973	0.98	0.897	0.967	0.972	0.969	0.929	0.99	0.921	0.958	0.995	0.88	0.94	0.839	0.991	0.993	0.95	0.996	0.986	0.808	0.995	0.983
P15	0.956	0.963	0.983	0.993	0.946	0.99	0.966	0.992	0.942	0.984	0.933	0.964	0.975	0.863	0.979	0.891	0.975	0.983	0.967	0.976	0.978	0.873	0.982	0.992
P16	0.905	0.896	0.841	0.85	0.9	0.889	0.863	0.817	0.92	0.811	0.91	0.857	0.807	0.697	0.879	0.867	0.798	0.843	0.921	0.815	0.793	0.779	0.809	0.818
P17	0.903	0.933	0.923	0.927	0.85	0.962	0.952	0.931	0.955	0.94	0.938	0.917	0.945	0.804	0.93	0.83	0.941	0.976	0.943	0.947	0.935	0.781	0.961	0.958
P18	0.908	0.96	0.969	0.98	0.891	0.954	0.962	0.965	0.914	0.987	0.905	0.942	0.993	0.92	0.935	0.834	0.992	0.98	0.939	0.988	0.991	0.801	0.986	0.974
P19	0.934	0.943	0.987	0.988	0.938	0.969	0.944	0.993	0.898	0.978	0.889	0.952	0.972	0.872	0.962	0.892	0.972	0.968	0.943	0.98	0.976	0.857	0.974	0.983
P20	0.951	0.966	0.982	0.987	0.935	0.98	0.964	0.989	0.937	0.987	0.924	0.963	0.983	0.871	0.975	0.902	0.982	0.987	0.974	0.989	0.98	0.86	0.989	0.988
P21	0.86	0.842	0.788	0.818	0.833	0.895	0.894	0.814	0.951	0.806	0.954	0.862	0.809	0.652	0.873	0.772	0.811	0.865	0.875	0.807	0.8	0.797	0.833	0.85
P22	0.92	0.943	0.957	0.967	0.926	0.983	0.98	0.965	0.951	0.957	0.954	0.935	0.961	0.865	0.956	0.852	0.958	0.973	0.941	0.959	0.961	0.815	0.963	0.981
P23	0.898	0.95	0.975	0.981	0.884	0.958	0.964	0.976	0.902	0.993	0.894	0.941	0.997	0.908	0.935	0.826	0.994	0.986	0.931	0.995	0.995	0.792	0.995	0.986
P24	0.831	0.882	0.944	0.952	0.881	0.924	0.919	0.939	0.83	0.943	0.843	0.888	0.94	0.874	0.881	0.76	0.937	0.921	0.859	0.939	0.947	0.73	0.929	0.948
P25	1	0.955	0.936	0.941	0.952	0.967	0.918	0.952	0.943	0.92	0.915	0.928	0.902	0.768	0.988	0.955	0.904	0.932	0.977	0.91	0.906	0.923	0.92	0.933
P26	0.955	1	0.967	0.966	0.929	0.971	0.962	0.946	0.939	0.963	0.913	0.91	0.958	0.838	0.95	0.875	0.949	0.969	0.963	0.957	0.95	0.805	0.952	0.947
P27	0.936	0.967	1	0.986	0.935	0.969	0.96	0.98	0.911	0.977	0.902	0.943	0.975	0.892	0.955	0.888	0.97	0.973	0.952	0.98	0.973	0.83	0.972	0.975
P28	0.941	0.966	0.986	1	0.948	0.977	0.962	0.985	0.922	0.989	0.917	0.957	0.983	0.893	0.963	0.878	0.984	0.977	0.96	0.983	0.985	0.851	0.98	0.983
P29	0.952	0.929	0.935	0.948	1	0.946	0.91	0.931	0.919	0.901	0.921	0.919	0.893	0.791	0.95	0.932	0.891	0.903	0.95	0.904	0.891	0.88	0.888	0.911
P30	0.967	0.971	0.969	0.977	0.946	1	0.977	0.978	0.963	0.966	0.951	0.957	0.96	0.829	0.984	0.898	0.958	0.981	0.973	0.964	0.96	0.869	0.97	0.983
P31	0.918	0.962	0.96	0.962	0.91	0.977	1	0.951	0.95	0.96	0.954	0.939	0.967	0.874	0.945	0.831	0.962	0.976	0.939	0.965	0.96	0.806	0.969	0.972
P32	0.952	0.946	0.98	0.985	0.931	0.978	0.951	1	0.918	0.979	0.906	0.961	0.971	0.87	0.981	0.903	0.974	0.975	0.956	0.975	0.978	0.888	0.982	0.992
P33	0.943	0.939	0.911	0.922	0.919	0.963	0.95	0.918	1	0.905	0.989	0.926	0.915	0.776	0.954	0.895	0.913	0.954	0.965	0.917	0.904	0.853	0.926	0.933
P34	0.92	0.963	0.977	0.989	0.901	0.966	0.96	0.979	0.905	1	0.892	0.942	0.992	0.893	0.946	0.836	0.989	0.984	0.946	0.988	0.992	0.81	0.991	0.986
P35	0.915	0.913	0.902	0.917	0.921	0.951	0.954	0.906	0.989	0.892	1	0.934	0.909	0.795	0.937	0.87	0.907	0.938	0.947	0.909	0.895	0.848	0.917	0.927
P36	0.928	0.91	0.943	0.957	0.919	0.957	0.939	0.961	0.926	0.942	0.934	1	0.944	0.825	0.956	0.891	0.948	0.949	0.953	0.953	0.939	0.905	0.96	0.963
P37	0.902	0.958	0.975	0.983	0.893	0.96	0.967	0.971	0.915	0.992	0.909	0.944	1	0.904	0.934	0.83	0.994	0.988	0.938	0.996	0.992	0.793	0.993	0.983
P38	0.768	0.838	0.892	0.893	0.791	0.829	0.874	0.87	0.776	0.893	0.795	0.825	0.904	1	0.816	0.714	0.917	0.864	0.808	0.896	0.916	0.689	0.885	0.875
P39	0.988	0.95	0.955	0.963	0.95	0.984	0.945	0.981	0.954	0.946	0.937	0.956	0.934	0.816	1	0.946	0.939	0.959	0.978	0.941	0.941	0.928	0.954	0.97
P40	0.955	0.875	0.888	0.878	0.932	0.898	0.831	0.903	0.895	0.836	0.87	0.891	0.83	0.714	0.946	1	0.833	0.863	0.944	0.856	0.829	0.916	0.848	0.864
P41	0.904	0.949	0.97	0.984	0.891	0.958	0.962	0.974	0.913	0.989	0.907	0.948	0.994	0.917	0.939	0.833	1	0.984	0.935	0.992	0.995	0.818	0.992	0.984
P42	0.932	0.969	0.973	0.977	0.903	0.981	0.976	0.975	0.954	0.984	0.938	0.949	0.988	0.864	0.959	0.863	0.984	1	0.962	0.989	0.981	0.82	0.993	0.988
P43	0.977	0.963	0.952	0.96	0.95	0.973	0.939	0.956	0.965	0.946	0.947	0.953	0.938	0.808	0.978	0.944	0.935	0.962	1	0.947	0.929	0.882	0.949	0.952
P44	0.91	0.957	0.98	0.983	0.904	0.964	0.965	0.975	0.917	0.988	0.909	0.953	0.996	0.896	0.941	0.856	0.992	0.989	0.947	1	0.988	0.804	0.992	0.983
P45	0.906	0.95	0.973	0.985	0.891	0.96	0.96	0.978	0.904	0.992	0.895	0.939	0.992	0.916	0.941	0.829	0.995	0.981	0.929	0.988	1	0.809	0.99	0.985
P46	0.923	0.805	0.83	0.851	0.88	0.869	0.806	0.888	0.853	0.81	0.848	0.905	0.793	0.689	0.928	0.916	0.818	0.82	0.882	0.804	0.809	1	0.832	0.856
P47	0.92	0.952	0.972	0.98	0.888	0.97	0.969	0.982	0.926	0.991	0.917	0.96	0.993	0.885	0.954	0.848	0.992	0.993	0.949	0.992	0.99	0.832	1	0.993
P48	0.933	0.947	0.975	0.983	0.911	0.983	0.972	0.992	0.933	0.986	0.927	0.963	0.983	0.875	0.97	0.864	0.984	0.988	0.952	0.983	0.985	0.856	0.993	1

Table B.18 category correlations for waiting room with spatial conditions removed.

	Affordance evident	Affordances not evident	Object mentions	Objects linked to one another	Contiguity	Absence of integration	Absence of structure	What to do there	Experience	Typical experience	Atypical experience	Collective purpose of items	Social norms	Social interaction	Cues, prompts or signals missing	How to move around	Activity cues missing	Activity cues present	Overall context missing	Scene-like ecology	Mental image invoked	Scale information missing	Expectation of greater environmental context	Routine encounter of image	Confusion
Affordance evident	1	-0.064	0.31	0.237	0.133	-0.024	-0.107	0.257	0.398	0.179	-0.157	0.089	0.122	0.079	0.221	0.075	0.175	-0.077	-0.007	0.174	0.269	-0.006	-0.069	0.547	0.1
Affordance not evident	-0.064	1	0.141	0.11	-0.159	0.226	0.056	-0.193	0.138	0.089	0.133	-0.082	0.052	-0.034	0.571	0.076	0.302	-0.179	0.073	-0.112	-0.055	0.261	-0.167	-0.077	0.134
Object mentions	0.31	0.141	1	0.17	0.165	0.093	0.138	0.211	0.174	0.11	-0.092	-0.048	0.245	0.097	0.271	0.063	0.009	0.013	0.061	0.089	0.323	-0.015	0.169	0.422	0.266
Objects linked to one another	0.237	0.11	0.17	1	0.286	-0.092	0.042	0.233	0.12	0.158	-0.078	0.067	0.058	0.129	0.183	0.094	0.021	0.125	0.046	0.158	0.058	-0.006	-0.072	0.009	0.295
Contiguity	0.133	-0.159	0.165	0.286	1	-0.098	-0.004	0.256	0.305	0.134	0.064	-0.02	-0.098	-0.084	-0.015	0.114	-0.107	0.077	0.056	0.02	0.163	0.16	-0.055	0.236	0.104
Absence of integration	-0.024	0.226	0.093	-0.092	-0.098	1	0.731	-0.143	0.132	-0.057	0.038	-0.104	0.034	0.03	0.268	-0.162	0.133	0	0.438	0.102	0.438	0.307	0.215	0.132	0.256
Absence of structure	-0.107	0.056	0.138	0.042	-0.004	0.731	1	-0.201	-0.111	0.037	0.081	-0.069	0.021	0.114	0.152	-0.053	-0.016	0.098	0.51	0.006	0.382	0.302	0.107	-0.051	0.34
What to do there	0.257	-0.193	0.211	0.233	0.256	-0.143	-0.201	1	0.545	0.252	-0.241	-0.03	-0.004	0.294	-0.112	0.131	-0.008	0.563	-0.067	0.126	0.283	-0.174	-0.003	0.431	0.141
Experience	0.398	-0.138	0.174	0.12	0.305	-0.132	-0.111	0.545	1	0.607	0.117	-0.06	-0.154	0.317	-0.073	0.201	-0.043	0.485	0.055	0.534	0.28	-0.154	-0.087	0.402	0.034
Typical experience	0.179	-0.089	0.11	0.158	0.134	-0.057	0.037	0.252	0.607	1	-0.1	-0.055	-0.091	0.678	-0.003	0.213	-0.166	0.313	0.198	0.765	-0.091	0.05	-0.052	0.147	-0.138
Atypical experience	-0.157	0.133	-0.092	-0.078	0.064	0.038	0.081	-0.241	0.117	-0.1	1	0.252	0.161	-0.063	0.056	0.325	-0.069	-0.097	0.349	-0.105	0.161	0.233	-0.041	-0.059	0.126
Collective purpose of items	0.089	0.082	-0.048	0.067	-0.02	-0.104	-0.069	-0.03	-0.06	-0.055	0.252	1	0.085	0.086	0.014	-0.079	0.172	0.039	-0.14	0.113	-0.157	0.007	0.008	0.076	-0.156
Social norms	-0.122	0.052	0.245	0.058	-0.098	0.034	0.021	-0.004	-0.154	-0.091	0.161	0.085	1	0.058	0.23	0.234	-0.121	-0.088	0.038	-0.095	0.289	0.11	-0.038	-0.054	0.052
Social interaction	0.079	-0.034	0.097	0.129	-0.084	0.03	0.114	0.294	0.317	0.678	-0.063	0.086	0.058	1	0.027	0.094	-0.055	0.508	0.338	0.482	-0.058	0.044	-0.033	0.046	-0.105
Cues, prompts, signals missing	0.221	0.571	0.271	0.183	-0.015	0.268	0.152	-0.112	-0.073	-0.003	0.056	0.014	0.23	0.027	1	0.11	0.416	-0.11	0.28	0.031	0.166	0.487	-0.069	0.212	0.378
How to move around	0.075	0.076	0.063	0.094	0.114	-0.162	-0.053	0.131	0.201	0.213	0.325	-0.079	0.234	0.094	0.11	1	-0.057	-0.103	0.062	0.271	-0.078	0.107	-0.044	-0.063	0.072
Activity cues missing	0.175	0.302	0.009	0.021	-0.107	0.133	-0.016	-0.008	-0.043	-0.166	-0.069	0.172	-0.121	-0.055	0.416	-0.057	1	-0.006	0.23	-0.144	0.073	0.246	0.096	0.02	0.144
Activity cues present	-0.077	-0.179	0.013	0.125	0.077	0	0.098	0.563	0.485	0.313	-0.097	0.039	-0.088	0.508	-0.11	-0.103	-0.006	1	0.014	0.306	0.194	-0.183	-0.05	-0.071	0.151
Overall context missing	-0.007	0.073	0.061	0.046	0.056	0.438	0.51	-0.067	0.055	0.198	0.349	-0.14	0.038	0.338	0.28	0.062	0.23	-0.014	1	0.123	0.282	0.358	0.159	0.154	0.047
Scene-like ecology	0.174	-0.112	0.089	0.158	0.02	0.102	0.006	0.126	0.534	0.765	-0.105	0.113	-0.095	0.482	0.031	0.271	-0.144	0.306	0.123	1	-0.095	-0.082	0.131	0.187	-0.183
Mental image evoked	0.269	-0.055	0.323	0.058	0.163	0.438	0.382	0.283	0.28	-0.091	0.161	-0.157	0.289	-0.058	0.166	-0.078	0.073	0.194	0.282	-0.095	1	0.11	-0.038	0.377	0.523
Scale information missing	-0.006	0.261	-0.015	-0.006	0.16	0.307	0.302	-0.174	-0.154	0.05	0.233	-0.007	0.11	-0.044	0.487	0.107	0.246	-0.183	0.358	-0.082	0.11	1	-0.103	0.118	0.273
Expectation of greater environmental context	-0.069	-0.167	0.169	-0.072	-0.055	0.215	0.107	-0.003	0.087	-0.052	-0.041	0.008	0.038	-0.033	0.069	0.044	0.096	-0.05	0.159	0.131	-0.038	-0.103	1	-0.03	-0.082
Routine encounter of image	0.547	-0.077	0.422	0.009	0.236	0.132	-0.051	0.431	0.402	0.147	-0.059	0.076	-0.054	-0.046	0.212	-0.063	0.02	-0.071	0.154	0.187	0.377	0.118	-0.03	1	0.073
Confusion	0.1	0.134	0.266	0.295	0.104	0.256	0.34	0.141	0.034	-0.138	0.126	-0.156	0.052	-0.105	0.378	0.072	0.144	0.151	0.047	-0.183	0.523	0.273	-0.082	0.073	1

Table B.19 participant correlation for kitchen with preserved spatial conditions (P1 through P24).

	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14	P15	P16	P17	P18	P19	P20	P21	P22	P23	P24
P1	1	0.898	0.925	0.939	0.911	0.954	0.771	0.886	0.77	0.901	0.92	0.82	0.893	0.855	0.933	0.937	0.67	0.905	0.695	0.632	0.49	0.429	0.725	0.617
P2	0.898	1	0.851	0.933	0.811	0.954	0.76	0.934	0.843	0.944	0.864	0.787	0.785	0.837	0.825	0.896	0.676	0.865	0.75	0.743	0.502	0.527	0.69	0.68
P3	0.925	0.851	1	0.911	0.952	0.903	0.913	0.752	0.732	0.819	0.943	0.923	0.894	0.775	0.834	0.855	0.525	0.931	0.794	0.622	0.326	0.4	0.546	0.503
P4	0.939	0.933	0.911	1	0.906	0.977	0.85	0.897	0.811	0.883	0.93	0.832	0.903	0.915	0.896	0.919	0.659	0.912	0.816	0.778	0.613	0.627	0.777	0.676
P5	0.911	0.811	0.952	0.906	1	0.909	0.91	0.747	0.649	0.775	0.951	0.886	0.966	0.783	0.85	0.841	0.508	0.924	0.721	0.6	0.388	0.41	0.574	0.428
P6	0.954	0.954	0.903	0.977	0.909	1	0.811	0.934	0.817	0.922	0.922	0.809	0.901	0.884	0.906	0.919	0.65	0.907	0.747	0.706	0.559	0.528	0.755	0.662
P7	0.771	0.76	0.913	0.85	0.91	0.811	1	0.656	0.694	0.703	0.916	0.874	0.829	0.675	0.653	0.707	0.409	0.849	0.817	0.632	0.304	0.452	0.389	0.393
P8	0.886	0.934	0.752	0.897	0.747	0.934	0.656	1	0.886	0.951	0.81	0.619	0.721	0.817	0.806	0.836	0.62	0.742	0.689	0.679	0.635	0.549	0.732	0.746
P9	0.77	0.843	0.732	0.811	0.649	0.817	0.694	0.886	1	0.91	0.762	0.597	0.562	0.755	0.628	0.73	0.47	0.628	0.794	0.71	0.553	0.602	0.557	0.816
P10	0.901	0.944	0.819	0.883	0.775	0.922	0.703	0.951	0.91	1	0.85	0.712	0.722	0.82	0.787	0.875	0.61	0.77	0.729	0.678	0.52	0.521	0.664	0.751
P11	0.92	0.864	0.943	0.93	0.951	0.922	0.916	0.81	0.762	0.85	1	0.9	0.904	0.808	0.809	0.862	0.61	0.928	0.76	0.675	0.378	0.444	0.556	0.488
P12	0.82	0.787	0.923	0.832	0.886	0.809	0.874	0.619	0.597	0.712	0.9	1	0.865	0.752	0.773	0.843	0.592	0.939	0.752	0.657	0.204	0.401	0.485	0.412
P13	0.893	0.785	0.894	0.903	0.966	0.901	0.829	0.721	0.562	0.722	0.904	0.865	1	0.829	0.909	0.872	0.571	0.923	0.655	0.597	0.466	0.446	0.698	0.431
P14	0.855	0.837	0.775	0.915	0.783	0.884	0.675	0.817	0.755	0.82	0.808	0.752	0.829	1	0.887	0.923	0.712	0.82	0.767	0.863	0.718	0.761	0.866	0.791
P15	0.933	0.825	0.834	0.896	0.85	0.906	0.653	0.806	0.628	0.787	0.809	0.773	0.909	0.887	1	0.941	0.687	0.886	0.616	0.604	0.572	0.484	0.864	0.633
P16	0.937	0.896	0.855	0.919	0.841	0.919	0.707	0.836	0.73	0.875	0.862	0.843	0.872	0.923	0.941	1	0.78	0.908	0.697	0.735	0.528	0.537	0.811	0.684
P17	0.67	0.676	0.525	0.659	0.508	0.65	0.409	0.62	0.47	0.61	0.61	0.592	0.571	0.712	0.687	0.78	1	0.716	0.367	0.682	0.392	0.353	0.643	0.425
P18	0.905	0.865	0.931	0.912	0.924	0.907	0.849	0.742	0.628	0.77	0.928	0.939	0.923	0.82	0.886	0.908	0.716	1	0.696	0.672	0.313	0.386	0.627	0.458
P19	0.695	0.75	0.794	0.816	0.721	0.747	0.817	0.689	0.794	0.729	0.76	0.752	0.655	0.767	0.616	0.697	0.367	0.696	1	0.8	0.52	0.749	0.519	0.666
P20	0.632	0.743	0.622	0.778	0.6	0.706	0.632	0.679	0.71	0.678	0.675	0.657	0.597	0.863	0.604	0.735	0.682	0.672	0.8	1	0.652	0.83	0.629	0.695
P21	0.49	0.502	0.326	0.613	0.388	0.559	0.304	0.635	0.553	0.52	0.378	0.204	0.466	0.718	0.572	0.528	0.392	0.313	0.52	0.652	1	0.853	0.82	0.732
P22	0.429	0.527	0.4	0.627	0.41	0.528	0.452	0.549	0.602	0.521	0.444	0.401	0.446	0.761	0.484	0.537	0.353	0.386	0.749	0.83	0.853	1	0.688	0.773
P23	0.725	0.69	0.546	0.777	0.574	0.755	0.389	0.732	0.557	0.664	0.556	0.485	0.698	0.866	0.864	0.811	0.643	0.627	0.519	0.629	0.82	0.688	1	0.756
P24	0.617	0.68	0.503	0.676	0.428	0.662	0.393	0.746	0.816	0.751	0.488	0.412	0.431	0.791	0.633	0.684	0.425	0.458	0.666	0.695	0.732	0.773	0.756	1
P25	0.879	0.829	0.933	0.917	0.973	0.901	0.942	0.754	0.679	0.776	0.968	0.899	0.936	0.8	0.806	0.82	0.554	0.932	0.758	0.673	0.394	0.47	0.548	0.44
P26	0.843	0.847	0.856	0.926	0.862	0.875	0.895	0.833	0.83	0.832	0.91	0.774	0.803	0.829	0.736	0.793	0.559	0.804	0.869	0.808	0.628	0.694	0.609	0.62
P27	0.825	0.879	0.84	0.923	0.852	0.901	0.872	0.867	0.865	0.861	0.89	0.755	0.797	0.855	0.735	0.792	0.531	0.796	0.87	0.834	0.636	0.712	0.614	0.681
P28	0.974	0.935	0.892	0.96	0.886	0.973	0.754	0.913	0.785	0.923	0.914	0.807	0.887	0.887	0.935	0.949	0.686	0.909	0.693	0.662	0.526	0.49	0.786	0.669
P29	0.891	0.868	0.811	0.935	0.857	0.918	0.766	0.865	0.754	0.85	0.909	0.79	0.872	0.908	0.874	0.907	0.727	0.874	0.721	0.768	0.615	0.628	0.775	0.635
P30	0.762	0.895	0.767	0.857	0.732	0.854	0.789	0.891	0.941	0.904	0.807	0.663	0.646	0.757	0.625	0.73	0.433	0.679	0.853	0.767	0.578	0.667	0.544	0.73
P31	0.837	0.802	0.797	0.907	0.814	0.861	0.708	0.742	0.6	0.716	0.775	0.775	0.88	0.898	0.919	0.907	0.676	0.858	0.751	0.741	0.649	0.653	0.862	0.612
P32	0.686	0.755	0.582	0.782	0.617	0.743	0.59	0.802	0.756	0.798	0.703	0.553	0.609	0.84	0.642	0.739	0.647	0.601	0.712	0.858	0.774	0.822	0.701	0.729
P33	0.626	0.611	0.449	0.725	0.48	0.676	0.356	0.709	0.59	0.604	0.472	0.342	0.577	0.813	0.723	0.675	0.516	0.472	0.537	0.672	0.939	0.798	0.935	0.799
P34	0.665	0.739	0.631	0.816	0.609	0.749	0.574	0.693	0.632	0.639	0.596	0.613	0.67	0.88	0.766	0.759	0.598	0.684	0.743	0.851	0.784	0.845	0.851	0.784
P35	0.587	0.579	0.377	0.665	0.419	0.626	0.246	0.661	0.481	0.537	0.394	0.294	0.544	0.782	0.734	0.665	0.589	0.462	0.434	0.639	0.907	0.73	0.949	0.731
P36	0.592	0.671	0.42	0.635	0.339	0.594	0.287	0.725	0.691	0.685	0.399	0.276	0.351	0.677	0.587	0.629	0.566	0.391	0.525	0.659	0.793	0.679	0.756	0.805
P37	0.663	0.587	0.47	0.7	0.491	0.658	0.291	0.656	0.476	0.553	0.46	0.407	0.615	0.812	0.813	0.739	0.62	0.548	0.489	0.63	0.827	0.681	0.957	0.714
P38	0.442	0.554	0.387	0.641	0.403	0.545	0.41	0.49	0.467	0.452	0.451	0.458	0.497	0.795	0.549	0.601	0.604	0.52	0.559	0.837	0.72	0.842	0.747	0.671
P39	0.551	0.634	0.473	0.719	0.49	0.649	0.455	0.636	0.598	0.604	0.5	0.414	0.55	0.838	0.613	0.652	0.551	0.501	0.663	0.841	0.884	0.902	0.821	0.756
P40	0.516	0.566	0.415	0.611	0.352	0.535	0.421	0.661	0.793	0.656	0.488	0.316	0.315	0.694	0.428	0.54	0.488	0.34	0.649	0.775	0.776	0.805	0.58	0.813
P41	0.324	0.507	0.267	0.49	0.172	0.407	0.239	0.497	0.563	0.458	0.229	0.253	0.192	0.608	0.352	0.457	0.398	0.265	0.61	0.776	0.685	0.805	0.576	0.77
P42	0.395	0.459	0.308	0.433	0.185	0.391	0.119	0.458	0.517	0.487	0.193	0.253	0.204	0.61	0.43	0.495	0.355	0.243	0.519	0.649	0.623	0.682	0.604	0.791
P43	0.438	0.475	0.293	0.554	0.263	0.471	0.21	0.525	0.493	0.448	0.304	0.276	0.36	0.733	0.58	0.58	0.611	0.372	0.522	0.732	0.845	0.819	0.821	0.752
P44	0.484	0.558	0.393	0.676	0.442	0.591	0.455	0.624	0.559	0.499	0.491	0.371	0.507	0.747	0.54	0.557	0.58	0.457	0.615	0.83	0.884	0.865	0.726	0.626
P45	0.294	0.405	0.301	0.483	0.254	0.388	0.379	0.479	0.616	0.43	0.327	0.25	0.221	0.568	0.267	0.347	0.259	0.221	0.739	0.774	0.724	0.87	0.437	0.668
P46	0.284	0.324	0.222	0.369	0.217	0.314	0.197	0.379	0.302	0.291	0.228	0.219	0.227	0.433	0.285	0.346	0.454	0.239	0.452	0.652	0.539	0.547	0.371	0.342
P47	0.525	0.58	0.397	0.654	0.363	0.586	0.36	0.678	0.71	0.601	0.412	0.267	0.396	0.755	0.562	0.574	0.473	0.367	0.624	0.748	0.923	0.862	0.785	0.868
P48	0.487	0.531	0.353	0.611	0.356	0.541	0.324	0.602	0.591	0.535	0.4	0.26	0.404	0.75	0.505	0.56	0.579	0.36	0.557	0.816	0.894	0.827	0.727	0.712

Table B.19 participant correlation for kitchen with preserved spatial conditions (P25 through P48).

	P25	P26	P27	P28	P29	P30	P31	P32	P33	P34	P35	P36	P37	P38	P39	P40	P41	P42	P43	P44	P45	P46	P47	P48
P1	0.879	0.843	0.825	0.974	0.891	0.762	0.837	0.686	0.626	0.665	0.587	0.592	0.663	0.442	0.551	0.516	0.324	0.395	0.438	0.484	0.294	0.284	0.525	0.487
P2	0.829	0.847	0.879	0.935	0.868	0.895	0.802	0.755	0.611	0.739	0.579	0.671	0.587	0.554	0.634	0.566	0.507	0.459	0.475	0.558	0.405	0.324	0.58	0.531
P3	0.933	0.856	0.84	0.892	0.811	0.767	0.797	0.582	0.449	0.631	0.377	0.42	0.47	0.387	0.473	0.415	0.267	0.308	0.293	0.393	0.301	0.222	0.397	0.353
P4	0.917	0.926	0.923	0.96	0.935	0.857	0.907	0.782	0.725	0.816	0.665	0.635	0.7	0.641	0.719	0.611	0.49	0.433	0.554	0.676	0.483	0.369	0.654	0.611
P5	0.973	0.862	0.852	0.886	0.857	0.732	0.814	0.617	0.48	0.609	0.419	0.339	0.491	0.403	0.49	0.352	0.172	0.185	0.263	0.442	0.254	0.217	0.363	0.356
P6	0.901	0.875	0.901	0.973	0.918	0.854	0.861	0.743	0.676	0.749	0.626	0.594	0.658	0.545	0.649	0.535	0.407	0.391	0.471	0.591	0.388	0.314	0.586	0.541
P7	0.942	0.895	0.872	0.754	0.766	0.789	0.708	0.59	0.356	0.574	0.246	0.287	0.291	0.41	0.455	0.421	0.239	0.119	0.21	0.455	0.379	0.197	0.36	0.324
P8	0.754	0.833	0.867	0.913	0.865	0.891	0.742	0.802	0.709	0.693	0.661	0.725	0.656	0.49	0.636	0.661	0.497	0.458	0.525	0.624	0.479	0.379	0.678	0.602
P9	0.679	0.83	0.865	0.785	0.754	0.941	0.6	0.756	0.59	0.632	0.481	0.691	0.476	0.467	0.598	0.793	0.563	0.517	0.493	0.559	0.616	0.302	0.71	0.591
P10	0.776	0.832	0.861	0.923	0.85	0.904	0.716	0.798	0.604	0.639	0.537	0.685	0.553	0.452	0.604	0.656	0.458	0.487	0.448	0.499	0.43	0.291	0.601	0.535
P11	0.968	0.91	0.89	0.914	0.909	0.807	0.775	0.703	0.472	0.596	0.394	0.399	0.46	0.451	0.5	0.488	0.229	0.193	0.304	0.491	0.327	0.228	0.412	0.4
P12	0.899	0.774	0.755	0.807	0.79	0.663	0.775	0.553	0.342	0.613	0.294	0.276	0.407	0.458	0.414	0.316	0.253	0.253	0.276	0.371	0.25	0.219	0.267	0.26
P13	0.936	0.803	0.797	0.887	0.872	0.646	0.88	0.609	0.577	0.67	0.544	0.351	0.615	0.497	0.55	0.315	0.192	0.204	0.36	0.507	0.221	0.227	0.396	0.404
P14	0.8	0.829	0.855	0.887	0.908	0.757	0.898	0.84	0.813	0.88	0.782	0.677	0.812	0.795	0.838	0.694	0.608	0.61	0.733	0.747	0.568	0.433	0.755	0.75
P15	0.806	0.736	0.735	0.935	0.874	0.625	0.919	0.642	0.723	0.766	0.734	0.587	0.813	0.549	0.613	0.428	0.352	0.43	0.58	0.54	0.267	0.285	0.562	0.505
P16	0.82	0.793	0.792	0.949	0.907	0.73	0.907	0.739	0.675	0.759	0.665	0.629	0.739	0.601	0.652	0.54	0.457	0.495	0.58	0.557	0.347	0.346	0.574	0.56
P17	0.554	0.559	0.531	0.686	0.727	0.433	0.676	0.647	0.516	0.598	0.589	0.566	0.62	0.604	0.551	0.488	0.398	0.355	0.611	0.58	0.259	0.454	0.473	0.579
P18	0.932	0.804	0.796	0.909	0.874	0.679	0.858	0.601	0.472	0.684	0.462	0.391	0.548	0.52	0.501	0.34	0.265	0.243	0.372	0.457	0.221	0.239	0.367	0.36
P19	0.758	0.869	0.87	0.693	0.721	0.853	0.751	0.712	0.537	0.743	0.434	0.525	0.489	0.559	0.663	0.649	0.61	0.519	0.522	0.615	0.739	0.452	0.624	0.557
P20	0.673	0.808	0.834	0.662	0.768	0.767	0.741	0.858	0.672	0.851	0.639	0.659	0.63	0.837	0.841	0.775	0.776	0.649	0.732	0.83	0.774	0.652	0.748	0.816
P21	0.394	0.628	0.636	0.526	0.615	0.578	0.649	0.774	0.939	0.784	0.907	0.793	0.827	0.72	0.884	0.776	0.685	0.623	0.845	0.884	0.724	0.539	0.923	0.894
P22	0.47	0.694	0.712	0.49	0.628	0.667	0.653	0.822	0.798	0.845	0.73	0.679	0.681	0.842	0.902	0.805	0.805	0.682	0.819	0.865	0.87	0.547	0.862	0.827
P23	0.548	0.609	0.614	0.786	0.775	0.544	0.862	0.701	0.935	0.851	0.949	0.756	0.957	0.747	0.821	0.58	0.576	0.604	0.821	0.726	0.437	0.371	0.785	0.727
P24	0.44	0.62	0.681	0.669	0.635	0.73	0.612	0.729	0.799	0.784	0.731	0.805	0.714	0.671	0.756	0.813	0.77	0.791	0.752	0.626	0.668	0.342	0.868	0.712
P25	1	0.904	0.893	0.873	0.88	0.766	0.794	0.678	0.475	0.64	0.406	0.347	0.453	0.497	0.53	0.42	0.224	0.166	0.296	0.511	0.319	0.222	0.399	0.394
P26	0.904	1	0.97	0.837	0.892	0.901	0.791	0.85	0.631	0.736	0.543	0.608	0.55	0.594	0.699	0.719	0.479	0.366	0.519	0.718	0.62	0.422	0.665	0.639
P27	0.893	0.97	1	0.836	0.879	0.939	0.779	0.854	0.638	0.765	0.552	0.594	0.542	0.608	0.723	0.705	0.525	0.412	0.516	0.722	0.647	0.436	0.681	0.652
P28	0.873	0.837	0.836	1	0.928	0.794	0.859	0.734	0.676	0.72	0.638	0.622	0.69	0.541	0.617	0.531	0.373	0.401	0.484	0.528	0.307	0.241	0.563	0.503
P29	0.88	0.892	0.879	0.928	1	0.794	0.864	0.85	0.693	0.751	0.661	0.581	0.693	0.653	0.689	0.611	0.394	0.333	0.581	0.694	0.45	0.347	0.612	0.589
P30	0.766	0.901	0.939	0.794	0.794	1	0.667	0.812	0.584	0.684	0.477	0.651	0.452	0.51	0.651	0.725	0.577	0.466	0.449	0.622	0.643	0.376	0.664	0.584
P31	0.794	0.791	0.779	0.859	0.864	0.667	1	0.711	0.763	0.869	0.763	0.617	0.831	0.679	0.751	0.492	0.528	0.486	0.689	0.699	0.476	0.473	0.641	0.625
P32	0.678	0.85	0.854	0.734	0.85	0.812	0.711	1	0.745	0.761	0.692	0.742	0.65	0.727	0.837	0.844	0.641	0.549	0.714	0.832	0.726	0.57	0.784	0.804
P33	0.475	0.631	0.638	0.676	0.693	0.584	0.763	0.745	1	0.866	0.969	0.825	0.932	0.78	0.884	0.731	0.714	0.688	0.857	0.841	0.623	0.497	0.91	0.855
P34	0.64	0.736	0.765	0.72	0.751	0.684	0.869	0.761	0.866	1	0.851	0.754	0.844	0.873	0.895	0.677	0.796	0.716	0.85	0.843	0.691	0.559	0.842	0.789
P35	0.406	0.543	0.552	0.638	0.661	0.477	0.763	0.692	0.969	0.851	1	0.817	0.966	0.77	0.851	0.639	0.679	0.666	0.89	0.813	0.538	0.508	0.862	0.831
P36	0.347	0.608	0.594	0.622	0.581	0.651	0.617	0.742	0.825	0.754	0.817	1	0.762	0.626	0.778	0.827	0.796	0.787	0.816	0.699	0.625	0.521	0.89	0.823
P37	0.453	0.55	0.542	0.69	0.693	0.452	0.831	0.65	0.932	0.844	0.966	0.762	1	0.708	0.784	0.581	0.634	0.671	0.87	0.752	0.507	0.533	0.794	0.759
P38	0.497	0.594	0.608	0.541	0.653	0.51	0.679	0.727	0.78	0.873	0.77	0.626	0.708	1	0.893	0.667	0.733	0.593	0.81	0.822	0.608	0.401	0.767	0.786
P39	0.53	0.699	0.723	0.617	0.689	0.651	0.751	0.837	0.884	0.895	0.851	0.778	0.784	0.893	1	0.777	0.778	0.705	0.851	0.879	0.742	0.55	0.893	0.923
P40	0.42	0.719	0.705	0.531	0.611	0.725	0.492	0.844	0.731	0.677	0.639	0.827	0.581	0.667	0.777	1	0.758	0.681	0.758	0.782	0.826	0.529	0.903	0.863
P41	0.224	0.479	0.525	0.373	0.394	0.577	0.528	0.641	0.714	0.796	0.679	0.796	0.634	0.733	0.778	0.758	1	0.879	0.795	0.732	0.819	0.68	0.828	0.801
P42	0.166	0.366	0.412	0.401	0.333	0.466	0.486	0.549	0.688	0.716	0.666	0.787	0.671	0.593	0.705	0.681	0.879	1	0.737	0.535	0.662	0.592	0.752	0.729
P43	0.296	0.519	0.516	0.484	0.581	0.449	0.689	0.714	0.857	0.85	0.89	0.816	0.87	0.81	0.851	0.758	0.795	0.737	1	0.851	0.731	0.612	0.902	0.868
P44	0.511	0.718	0.722	0.528	0.694	0.622	0.699	0.832	0.841	0.843	0.813	0.699	0.752	0.822	0.879	0.782	0.732	0.535	0.851	1	0.818	0.709	0.865	0.9
P45	0.319	0.62	0.647	0.307	0.45	0.643	0.476	0.726	0.623	0.691	0.538	0.625	0.507	0.608	0.742	0.826	0.819	0.662	0.731	0.818	1	0.745	0.811	0.793
P46	0.222	0.422	0.436	0.241	0.347	0.376	0.473	0.57	0.497	0.559	0.508	0.521	0.533	0.401	0.55	0.529	0.68	0.592	0.612	0.709	0.745	1	0.548	0.692
P47	0.399	0.665	0.681	0.563	0.612	0.664	0.641	0.784	0.91	0.842	0.862	0.89	0.794	0.767	0.893	0.903	0.828	0.752	0.902	0.865	0.811	0.548	1	0.925
P48	0.394	0.639	0.652	0.503	0.589	0.584	0.625	0.804	0.855	0.789	0.831	0.823	0.759	0.786	0.923	0.863	0.801	0.729	0.868	0.9	0.793	0.692	0.925	1

Table B.20 category correlation for kitchen with preserved spatial conditions.

	Affordance evident	Object mentions	Objects linked to one another	Contiguity	What to do there	What not to do there	Experience	Typical experience	Atypical experience	PEB relations	Collective purpose of items	Social norms	Social interaction	Cues, prompts or signals missing	How to move around	Activity cues present	Scene-like ecology	Functional design	Mental image evoke	Collective use of items	Expectation of greater environmental context	Routine encounter of image
Affordance evident	1	0.097	0.426	0.19	0.046	-0.003	0.045	0.022	-0.016	-0.097	0.114	-0.096	0.148	0.007	0.16	0.216	0.294	-0.222	0.096	0.18	0.133	-0.025
Object mentions	0.097	1	0.193	0.448	-0.007	-0.207	0.07	-0.035	0.123	0.28	0.28	0.297	0.258	0.095	0.239	-0.131	0.42	-0.104	0.549	0.4	0.229	0.237
Objects linked to one another	0.426	0.193	1	0.766	0.052	-0.037	0.073	-0.195	-0.093	-0.154	0.131	-0.097	0.086	-0.042	0.312	0.257	0.272	-0.067	-0.133	-0.057	-0.07	-0.108
Contiguity	0.19	0.448	0.766	1	-0.075	0.218	0.067	-0.216	0.071	0.111	0.204	0.138	0.023	0.141	0.398	0.16	0.404	-0.022	0.069	-0.027	0.089	-0.062
What to do there	0.046	-0.007	0.052	-0.075	1	0.187	-0.065	-0.021	-0.16	0.256	0.224	-0.149	0.391	-0.122	0.179	0.197	-0.113	0.29	0.072	-0.007	0.071	0.142
What not to do there	-0.003	-0.207	-0.037	0.218	0.187	1	-0.051	0.052	-0.03	0.106	-0.019	0.01	0.212	-0.039	-0.11	0.162	-0.103	0.01	-0.134	-0.1	0.072	0.184
Experience	0.045	0.07	0.073	0.067	-0.065	-0.051	1	0.422	0.177	0.175	-0.247	0.047	0.171	0.09	-0.013	-0.066	-0.07	-0.223	0.048	0.194	-0.042	-0.011
Typical experience	0.022	-0.035	-0.195	-0.216	-0.021	0.052	0.422	1	-0.157	0.176	0.033	0.012	0.226	-0.015	0.035	-0.127	0.112	-0.225	0.094	0.367	0.05	0.198
Atypical experience	-0.016	0.123	-0.093	0.071	-0.16	-0.03	0.177	-0.157	1	-0.172	-0.068	-0.036	0.093	-0.027	-0.123	-0.073	-0.124	-0.154	0.253	-0.07	0.013	-0.128
PEB relations	-0.097	0.28	-0.154	0.111	0.256	0.106	0.175	0.176	-0.172	1	0.145	0.063	0.368	-0.101	0.118	0.191	0.124	-0.12	0.161	0.2	0.386	0.149
Collective purpose of items	0.114	0.28	0.131	0.204	0.224	-0.019	-0.247	0.033	-0.068	0.145	1	-0.005	0.075	-0.017	0.029	-0.007	0.365	0.107	0.179	0.114	0.201	0.211
Social norms	-0.096	0.297	-0.097	0.138	-0.149	0.01	0.047	0.012	-0.036	0.063	-0.005	1	0.006	0.417	0.134	-0.029	0.21	-0.016	0.104	0.18	0.015	0.31
Social interaction	0.148	0.258	0.086	0.023	0.391	0.212	0.171	0.226	-0.093	0.368	0.075	0.006	1	-0.118	0.116	0.089	0.059	-0.075	0.122	0.311	0.091	0.026
Cues, prompts or signals missing	0.007	0.095	-0.042	0.141	-0.122	0.039	0.09	-0.015	0.027	-0.101	-0.017	0.417	-0.118	1	0.049	-0.076	0.043	-0.043	0.046	0.268	-0.008	0.043
How to more around	0.16	0.239	0.312	0.398	-0.179	-0.11	-0.013	0.035	-0.123	0.118	0.029	0.134	0.116	0.049	1	0.23	0.498	-0.085	-0.01	0.034	0.347	-0.019
Activity cues present	0.216	-0.131	0.257	0.16	0.197	0.162	-0.066	-0.127	-0.073	0.191	-0.007	-0.029	0.089	-0.076	0.23	1	-0.038	-0.09	-0.224	-0.153	-0.048	-0.205
Scene-like ecology	0.294	0.42	0.272	0.404	-0.113	-0.103	-0.07	0.112	-0.124	0.124	0.365	0.21	0.059	0.043	0.498	-0.038	1	-0.073	0.402	0.235	0.233	0.182
Functional design	-0.222	-0.104	-0.067	0.022	0.29	0.01	-0.223	0.225	-0.154	-0.12	0.107	0.016	0.075	0.043	0.085	-0.09	-0.073	1	0.057	-0.228	0.032	0.211
Mental image evoked	0.096	0.549	-0.133	0.069	0.072	-0.134	0.048	0.094	0.253	0.161	0.179	0.104	0.122	0.046	-0.01	-0.224	0.402	0.057	1	0.167	0.146	0.223
Collective use of items	0.18	0.4	-0.057	0.027	0.007	-0.1	0.194	0.367	-0.07	0.2	0.114	0.18	0.311	0.268	0.034	-0.153	0.235	-0.228	0.167	1	0.209	0.329
Expectation of greater environmental context	0.133	0.229	-0.07	0.089	0.071	0.072	-0.042	0.05	0.013	0.386	0.201	0.015	0.091	-0.008	0.347	-0.048	0.233	0.032	0.146	0.209	1	0.044
Routine encounter of image	-25	0.237	-0.108	-0.062	0.142	-0.184	-0.011	0.198	-0.128	0.149	0.211	0.31	0.026	0.043	-0.019	-0.205	0.182	0.211	0.223	0.329	0.044	1

Table B.21 participant correlation for kitchen with spatial conditions removed.

	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14	P15	P16	P17	P18	P19	P20	P21	P22	P23	P24
P1	1	0.066	0.097	-0.136	-0.132	-0.023	-0.008	0.487	-0.014	-0.096	-0.069	-0.1	-0.12	-0.101	-0.117	-0.066	-0.078	-0.085	-0.071	-0.096	-0.105	-0.105	-0.163	-0.113
P2	0.066	1	0.88	0.151	0.359	0.665	0.755	0.012	0.682	0.587	0.546	0.375	0.193	0.396	0.354	0.728	0.447	0.526	-0.064	0.402	0.464	0.228	0.216	-0.078
P3	0.097	0.88	1	0.112	0.293	0.756	0.691	0.022	0.756	0.613	0.666	0.503	0.285	0.394	0.56	0.671	0.618	0.734	-0.055	0.544	0.493	0.338	0.236	-0.046
P4	-0.136	0.151	0.112	1	0.765	0.455	0.64	0.4	0.508	0.508	0.423	0.356	0.337	0.4	0.166	0.194	0.457	0.434	0.348	0.146	0.719	0.713	0.289	0.261
P5	-0.132	0.359	0.293	0.765	1	0.424	0.652	0.435	0.531	0.74	0.482	0.353	0.507	0.436	0.286	0.365	0.457	0.536	0.063	0.254	0.705	0.679	0.249	-0.008
P6	-0.023	0.665	0.756	0.455	0.424	1	0.718	0.189	0.887	0.65	0.9	0.798	0.448	0.444	0.536	0.615	0.456	0.694	0.436	0.559	0.578	0.526	0.454	0.341
P7	-0.008	0.755	0.691	0.64	0.652	0.718	1	0.17	0.655	0.674	0.587	0.318	0.335	0.551	0.279	0.626	0.61	0.718	-0.076	0.33	0.764	0.68	0.216	-0.152
P8	0.487	0.012	0.022	0.4	0.435	0.189	0.17	1	0.278	0.433	0.294	0.277	0.593	0.192	0.255	0.182	0.236	0.29	0.238	0.264	0.378	0.439	0.418	0.303
P9	-0.014	0.682	0.756	0.508	0.531	0.887	0.655	0.278	1	0.742	0.862	0.809	0.488	0.462	0.587	0.643	0.584	0.675	0.481	0.544	0.644	0.522	0.471	0.385
P10	-0.096	0.587	0.613	0.508	0.74	0.65	0.674	0.433	0.742	1	0.764	0.545	0.67	0.611	0.5	0.639	0.687	0.743	0.092	0.534	0.843	0.679	0.411	0.05
P11	-0.069	0.546	0.666	0.423	0.482	0.9	0.587	0.294	0.862	0.764	1	0.827	0.544	0.404	0.614	0.548	0.523	0.709	0.479	0.618	0.652	0.532	0.506	0.359
P12	-0.1	0.375	0.503	0.356	0.353	0.798	0.318	0.277	0.809	0.545	0.827	1	0.479	0.281	0.648	0.436	0.277	0.47	0.668	0.525	0.362	0.334	0.565	0.616
P13	-0.12	0.193	0.285	0.337	0.507	0.448	0.335	0.593	0.488	0.67	0.544	0.479	1	0.636	0.443	0.672	0.428	0.621	0.161	0.697	0.431	0.511	0.774	0.296
P14	-0.101	0.396	0.394	0.4	0.436	0.444	0.551	0.192	0.462	0.611	0.404	0.281	0.636	1	0.298	0.767	0.473	0.577	-0.026	0.647	0.42	0.422	0.495	0.067
P15	-0.117	0.354	0.56	0.166	0.286	0.536	0.279	0.255	0.587	0.5	0.614	0.648	0.443	0.298	1	0.377	0.421	0.684	0.201	0.666	0.316	0.345	0.353	0.365
P16	-0.066	0.728	0.671	0.194	0.365	0.615	0.626	0.182	0.643	0.639	0.548	0.436	0.672	0.767	0.377	1	0.462	0.601	0.053	0.678	0.408	0.322	0.651	0.145
P17	-0.078	0.447	0.618	0.457	0.457	0.456	0.61	0.236	0.584	0.687	0.523	0.277	0.428	0.473	0.421	0.462	1	0.818	-0.064	0.482	0.792	0.643	0.225	-0.058
P18	-0.085	0.526	0.734	0.434	0.536	0.694	0.718	0.29	0.675	0.743	0.709	0.47	0.621	0.577	0.684	0.601	0.818	1	-0.054	0.693	0.713	0.729	0.338	0.017
P19	-0.071	-0.064	-0.055	0.348	0.063	0.436	-0.076	0.238	0.481	0.092	0.479	0.668	0.161	-0.026	0.201	0.053	-0.064	-0.054	1	0.171	0.105	0.049	0.467	0.888
P20	-0.096	0.402	0.544	0.146	0.254	0.559	0.33	0.264	0.544	0.534	0.618	0.525	0.697	0.647	0.666	0.678	0.482	0.693	0.171	1	0.271	0.18	0.594	0.372
P21	-0.105	0.464	0.493	0.719	0.705	0.578	0.764	0.378	0.644	0.843	0.652	0.362	0.431	0.42	0.316	0.408	0.792	0.713	0.105	0.271	1	0.821	0.24	-0.003
P22	-0.105	0.228	0.338	0.713	0.679	0.526	0.68	0.439	0.522	0.679	0.532	0.334	0.511	0.422	0.345	0.322	0.643	0.729	0.049	0.18	0.821	1	0.232	-0.043
P23	-0.163	0.216	0.236	0.289	0.249	0.454	0.216	0.418	0.471	0.411	0.506	0.565	0.774	0.495	0.353	0.651	0.225	0.338	0.467	0.594	0.24	0.232	1	0.621
P24	-0.113	-0.078	-0.046	0.261	-0.008	0.341	-0.152	0.303	0.385	0.05	0.359	0.616	0.296	0.067	0.365	0.145	-0.058	0.017	0.888	0.372	-0.003	-0.043	0.621	1
P25	-0.072	0.731	0.746	0.418	0.676	0.756	0.772	0.222	0.791	0.773	0.797	0.596	0.555	0.537	0.549	0.727	0.541	0.732	0.088	0.523	0.611	0.584	0.447	-0.003
P26	-0.013	0.861	0.867	0.202	0.436	0.702	0.703	0.11	0.767	0.739	0.666	0.488	0.506	0.63	0.488	0.884	0.656	0.71	0.023	0.664	0.542	0.346	0.428	0.04
P27	-0.053	0.714	0.632	0.291	0.295	0.746	0.476	0.168	0.817	0.51	0.677	0.716	0.293	0.349	0.564	0.643	0.289	0.4	0.574	0.493	0.365	0.188	0.476	0.573
P28	0.015	0.779	0.869	0.405	0.569	0.86	0.808	0.175	0.888	0.772	0.803	0.623	0.511	0.509	0.493	0.736	0.648	0.792	0.124	0.5	0.671	0.602	0.37	0.026
P29	0.091	0.813	0.864	0.21	0.506	0.81	0.68	0.3	0.817	0.791	0.796	0.641	0.608	0.554	0.586	0.782	0.54	0.756	0.067	0.691	0.52	0.417	0.43	0.063
P30	-0.023	0.732	0.809	0.534	0.587	0.915	0.809	0.279	0.918	0.795	0.876	0.698	0.477	0.442	0.532	0.626	0.707	0.811	0.285	0.505	0.774	0.687	0.369	0.174
P31	-0.148	0.608	0.571	0.545	0.62	0.601	0.677	0.381	0.707	0.758	0.576	0.473	0.609	0.737	0.616	0.751	0.625	0.726	0.165	0.592	0.65	0.624	0.495	0.263
P32	-0.093	0.553	0.71	0.429	0.607	0.732	0.608	0.413	0.768	0.827	0.784	0.691	0.625	0.463	0.804	0.552	0.702	0.848	0.138	0.638	0.691	0.65	0.411	0.172
P33	-0.03	0.783	0.881	0.209	0.449	0.78	0.727	0.15	0.796	0.765	0.77	0.558	0.6	0.559	0.529	0.822	0.647	0.804	-0.009	0.604	0.586	0.517	0.448	-0.043
P34	-0.143	0.396	0.524	0.366	0.507	0.365	0.47	0.46	0.442	0.638	0.417	0.341	0.582	0.34	0.621	0.408	0.665	0.715	-0.127	0.466	0.605	0.583	0.458	0.086
P35	-0.113	0.45	0.634	0.235	0.292	0.605	0.481	0.208	0.625	0.598	0.607	0.511	0.696	0.741	0.699	0.723	0.604	0.825	0.082	0.854	0.408	0.394	0.532	0.27
P36	-0.05	0.428	0.684	0.191	0.293	0.746	0.491	0.164	0.66	0.613	0.79	0.631	0.642	0.613	0.708	0.644	0.569	0.84	0.144	0.851	0.416	0.42	0.478	0.202
P37	-0.117	0.015	0.1	0.387	0.252	0.221	0.222	0.351	0.192	0.337	0.271	0.271	0.485	0.627	0.558	0.353	0.366	0.482	0.138	0.682	0.283	0.28	0.444	0.394
P38	0.152	-0.087	0.011	0.085	-0.102	0.139	-0.134	0.425	0.153	0.006	0.191	0.35	0.38	0.267	0.493	0.239	0.011	0.171	0.442	0.55	-0.096	-0.074	0.598	0.733
P39	-0.05	0.744	0.793	0.516	0.509	0.841	0.85	0.227	0.802	0.804	0.802	0.56	0.526	0.699	0.52	0.763	0.744	0.842	0.141	0.682	0.771	0.598	0.438	0.134
P40	-0.057	0.733	0.669	0.455	0.418	0.508	0.786	0.124	0.59	0.639	0.444	0.212	0.346	0.689	0.285	0.748	0.78	0.651	-0.065	0.481	0.693	0.468	0.335	-0.027
P41	-0.002	0.666	0.828	0.305	0.4	0.916	0.724	0.151	0.816	0.682	0.857	0.669	0.499	0.412	0.538	0.608	0.544	0.805	0.145	0.542	0.591	0.574	0.343	0.059
P42	-0.113	0.192	0.381	0.222	0.249	0.455	0.143	0.278	0.53	0.484	0.559	0.582	0.601	0.531	0.611	0.503	0.523	0.548	0.375	0.859	0.277	0.161	0.601	0.53
P43	-0.164	0.109	0.205	0.177	0.139	0.155	0.05	0.317	0.241	0.227	0.241	0.323	0.294	0.194	0.761	0.184	0.256	0.385	0.23	0.484	0.167	0.178	0.368	0.518
P44	-0.096	0.341	0.639	0.194	0.23	0.728	0.318	0.138	0.687	0.488	0.706	0.776	0.488	0.307	0.697	0.437	0.419	0.625	0.349	0.56	0.338	0.372	0.552	0.416
P45	0.046	-0.12	-0.072	0.106	0.019	0.1	-0.165	0.377	0.231	0.093	0.102	0.333	0.496	0.325	0.234	0.37	-0.083	-0.013	0.506	0.285	-0.082	0.031	0.659	0.655
P46	-0.122	0.483	0.501	0.32	0.445	0.641	0.395	0.305	0.743	0.644	0.621	0.694	0.656	0.611	0.489	0.765	0.324	0.449	0.45	0.547	0.378	0.394	0.672	0.454
P47	-0.14	-0.078	0.026	0.065	0.095	-0.035	-0.103	0.265	0.232	0.222	0.07	0.161	0.528	0.257	0.241	0.381	0.348	0.21	0.23	0.246	0.145	0.194	0.526	0.362
P48	-0.124	0.382	0.548	0.486	0.255	0.714	0.484	0.096	0.766	0.476	0.616	0.695	0.384	0.468	0.469	0.507	0.499	0.527	0.486	0.354	0.503	0.486	0.562	0.476

Table B.22 participant correlation for kitchen with spatial conditions removed (P25 through P48).

	P25	P26	P27	P28	P29	P30	P31	P32	P33	P34	P35	P36	P37	P38	P39	P40	P41	P42	P43
P1	-0.072	-0.013	-0.053	0.015	0.091	-0.023	-0.148	-0.093	-0.03	-0.143	-0.113	-0.05	-0.117	0.152	-0.05	-0.057	-0.002	-0.113	-0.164
P2	0.731	0.861	0.714	0.779	0.813	0.732	0.608	0.553	0.783	0.396	0.45	0.428	0.015	-0.087	0.744	0.733	0.666	0.192	0.109
P3	0.746	0.867	0.632	0.869	0.864	0.809	0.571	0.71	0.881	0.524	0.634	0.684	0.1	0.011	0.793	0.669	0.828	0.381	0.205
P4	0.418	0.202	0.291	0.405	0.21	0.534	0.545	0.429	0.209	0.366	0.235	0.191	0.387	0.085	0.516	0.455	0.305	0.222	0.177
P5	0.676	0.436	0.295	0.569	0.506	0.587	0.62	0.607	0.449	0.507	0.292	0.293	0.252	-0.102	0.509	0.418	0.4	0.249	0.139
P6	0.756	0.702	0.746	0.86	0.81	0.915	0.601	0.732	0.78	0.365	0.605	0.746	0.221	0.139	0.841	0.508	0.916	0.455	0.155
P7	0.772	0.703	0.476	0.808	0.68	0.809	0.677	0.608	0.727	0.47	0.481	0.491	0.222	-0.134	0.85	0.786	0.724	0.143	0.05
P8	0.222	0.11	0.168	0.175	0.3	0.279	0.381	0.413	0.15	0.46	0.208	0.164	0.351	0.425	0.227	0.124	0.151	0.278	0.317
P9	0.791	0.767	0.817	0.888	0.817	0.918	0.707	0.768	0.796	0.442	0.625	0.66	0.192	0.153	0.802	0.59	0.816	0.53	0.241
P10	0.773	0.739	0.51	0.772	0.791	0.795	0.758	0.827	0.765	0.638	0.598	0.613	0.337	0.006	0.804	0.639	0.682	0.484	0.227
P11	0.797	0.666	0.677	0.803	0.796	0.876	0.576	0.784	0.77	0.417	0.607	0.79	0.271	0.191	0.802	0.444	0.857	0.559	0.241
P12	0.596	0.488	0.716	0.623	0.641	0.698	0.473	0.691	0.558	0.341	0.511	0.631	0.271	0.35	0.56	0.212	0.669	0.582	0.323
P13	0.555	0.506	0.293	0.511	0.608	0.477	0.609	0.625	0.6	0.582	0.696	0.642	0.485	0.38	0.526	0.346	0.499	0.601	0.294
P14	0.537	0.63	0.349	0.509	0.554	0.442	0.737	0.463	0.559	0.34	0.741	0.613	0.627	0.267	0.699	0.689	0.412	0.531	0.194
P15	0.549	0.488	0.564	0.493	0.586	0.532	0.616	0.804	0.529	0.621	0.699	0.708	0.558	0.493	0.52	0.285	0.538	0.611	0.761
P16	0.727	0.884	0.643	0.736	0.782	0.626	0.751	0.552	0.822	0.408	0.723	0.644	0.353	0.239	0.763	0.748	0.608	0.503	0.184
P17	0.541	0.656	0.289	0.648	0.54	0.707	0.625	0.702	0.647	0.665	0.604	0.569	0.366	0.011	0.744	0.78	0.544	0.523	0.256
P18	0.732	0.71	0.4	0.792	0.756	0.811	0.726	0.848	0.804	0.715	0.825	0.84	0.482	0.171	0.842	0.651	0.805	0.548	0.385
P19	0.088	0.023	0.574	0.124	0.067	0.285	0.165	0.138	-0.009	-0.127	0.082	0.144	0.138	0.442	0.141	-0.065	0.145	0.375	0.23
P20	0.523	0.664	0.493	0.5	0.691	0.505	0.592	0.638	0.604	0.466	0.854	0.851	0.682	0.55	0.682	0.481	0.542	0.859	0.484
P21	0.611	0.542	0.365	0.671	0.52	0.774	0.65	0.691	0.586	0.605	0.408	0.416	0.283	-0.096	0.771	0.693	0.591	0.277	0.167
P22	0.584	0.346	0.188	0.602	0.417	0.687	0.624	0.65	0.517	0.583	0.394	0.42	0.28	-0.074	0.598	0.468	0.574	0.161	0.178
P23	0.447	0.428	0.476	0.37	0.43	0.369	0.495	0.411	0.448	0.458	0.532	0.478	0.444	0.598	0.438	0.335	0.343	0.601	0.368
P24	-0.003	0.04	0.573	0.026	0.063	0.174	0.263	0.172	-0.043	0.086	0.27	0.202	0.394	0.733	0.134	-0.027	0.059	0.53	0.518
P25	1	0.818	0.598	0.898	0.863	0.837	0.696	0.759	0.896	0.496	0.586	0.693	0.171	-0.015	0.767	0.597	0.795	0.381	0.172
P26	0.818	1	0.695	0.866	0.889	0.792	0.729	0.696	0.908	0.464	0.703	0.703	0.248	0.064	0.84	0.798	0.718	0.548	0.186
P27	0.598	0.695	1	0.644	0.664	0.695	0.708	0.579	0.584	0.274	0.501	0.453	0.236	0.351	0.648	0.536	0.55	0.451	0.426
P28	0.898	0.866	0.644	1	0.895	0.934	0.673	0.765	0.951	0.474	0.653	0.725	0.076	-0.061	0.841	0.652	0.918	0.377	0.067
P29	0.863	0.889	0.664	0.895	1	0.85	0.674	0.807	0.926	0.528	0.705	0.772	0.201	0.077	0.815	0.587	0.864	0.505	0.17
P30	0.837	0.792	0.695	0.934	0.85	1	0.704	0.824	0.855	0.534	0.602	0.691	0.174	-0.007	0.882	0.662	0.9	0.435	0.168
P31	0.696	0.729	0.708	0.673	0.674	0.704	1	0.758	0.661	0.625	0.724	0.553	0.563	0.318	0.779	0.773	0.524	0.499	0.541
P32	0.759	0.696	0.579	0.765	0.807	0.824	0.758	1	0.765	0.764	0.677	0.743	0.449	0.176	0.777	0.548	0.755	0.602	0.448
P33	0.896	0.908	0.584	0.951	0.926	0.855	0.661	0.765	1	0.527	0.721	0.786	0.124	-0.016	0.826	0.662	0.894	0.429	0.107
P34	0.496	0.464	0.274	0.474	0.528	0.534	0.625	0.764	0.527	1	0.544	0.44	0.458	0.254	0.548	0.51	0.447	0.437	0.582
P35	0.586	0.703	0.501	0.653	0.705	0.602	0.724	0.677	0.721	0.544	1	0.87	0.612	0.493	0.746	0.585	0.663	0.68	0.499
P36	0.693	0.703	0.453	0.725	0.772	0.691	0.553	0.743	0.786	0.44	0.87	1	0.514	0.342	0.771	0.456	0.805	0.727	0.314
P37	0.171	0.248	0.236	0.076	0.201	0.174	0.563	0.449	0.124	0.458	0.612	0.514	1	0.693	0.476	0.422	0.096	0.689	0.674
P38	-0.015	0.064	0.351	-0.061	0.077	-0.007	0.318	0.176	-0.016	0.254	0.493	0.342	0.693	1	0.163	0.086	-0.017	0.564	0.716
P39	0.767	0.84	0.648	0.841	0.815	0.882	0.779	0.777	0.826	0.548	0.746	0.771	0.476	0.163	1	0.848	0.813	0.553	0.251
P40	0.597	0.798	0.536	0.652	0.587	0.662	0.773	0.548	0.662	0.51	0.585	0.456	0.422	0.086	0.848	1	0.478	0.403	0.233
P41	0.795	0.718	0.55	0.918	0.864	0.9	0.524	0.755	0.894	0.447	0.663	0.805	0.096	-0.017	0.813	0.478	1	0.353	0.06
P42	0.381	0.548	0.451	0.377	0.505	0.435	0.499	0.602	0.429	0.437	0.68	0.727	0.689	0.564	0.553	0.403	0.353	1	0.462
P43	0.172	0.186	0.426	0.067	0.17	0.168	0.541	0.448	0.107	0.582	0.499	0.314	0.674	0.716	0.251	0.233	0.06	0.462	1
P44	0.552	0.526	0.494	0.648	0.619	0.642	0.405	0.704	0.637	0.554	0.626	0.758	0.304	0.338	0.559	0.244	0.715	0.639	0.36
P45	0.059	0.135	0.354	0.061	0.054	-0.01	0.333	0.07	0.072	0.075	0.332	0.163	0.339	0.65	0.021	0.029	-0.051	0.376	0.427
P46	0.666	0.703	0.729	0.659	0.659	0.614	0.722	0.597	0.656	0.337	0.579	0.547	0.316	0.299	0.578	0.466	0.516	0.55	0.332
P47	0.144	0.282	0.203	0.181	0.084	0.098	0.378	0.19	0.241	0.283	0.394	0.189	0.2	0.363	0.064	0.217	-0.013	0.399	0.353
P48	0.504	0.524	0.602	0.66	0.463	0.669	0.561	0.546	0.572	0.406	0.588	0.546	0.287	0.296	0.632	0.506	0.615	0.451	0.288

Table B.23 category correlation for kitchen with spatial conditions removed.

	Affordance evident	Affordance not evident	Object mentions	Objects linked to one another	Contiguity	Absence of integrations	Absence of structure	What to do there	Experience	Typical experience	Atypical experience	Collective purpose of items	Social norms	Social interaction	Cues, prompts, signals	How to move around	Activity cues missing	Activity cues present	Overall context missing	Scene-like ecology	Functional design	Mental image evoke	Scale missing	Collective use of items	Expectation of greater environment	Routine encounter of image	Confusion
Affordance evident	1	-0.069	0.208	0.02	0.108	0.068	-0.121	0.036	0.271	0.085	0.332	-0.032	0.15	0.117	-0.004	0.145	-0.008	-0.039	-0.23	-0.108	-0.149	0.207	-0.019	0.195	-0.165	0.107	0.056
Affordances not evident	-0.069	1	0.434	-0.026	0.421	0.148	0.151	-0.237	0.245	-0.335	0.303	-0.081	-0.111	-0.146	0.513	0.056	0.441	-0.107	0.29	-0.17	-0.155	-0.004	0.331	-0.112	0.083	-0.199	0.631
Object mentions	0.208	0.434	1	0.059	0.531	0.416	0.294	-0.229	0.051	-0.233	0.292	0.095	0.039	-0.041	0.47	0.19	0.201	-0.1	0.039	-0.017	0.062	0.12	0.247	0.074	0.042	-0.159	0.424
Objects linked to one another	0.02	-0.026	0.059	1	0.304	0.048	0.153	-0.022	0.088	0.087	0.01	0.281	0.053	-0.026	0.161	-0.062	0.233	0.364	-0.06	-0.07	-0.12	-0.028	0.124	0.158	-0.085	0.293	0.047
Contiguity	0.108	0.421	0.531	0.304	1	0.06	0.057	0.009	0.082	-0.228	0.422	0.155	-0.049	0.139	0.52	0.053	0.304	0.006	-0.005	-0.094	-0.085	0.24	0.133	0.032	-0.177	0.012	0.586
Absence of integration	0.068	0.148	0.416	0.048	0.06	1	0.674	-0.311	-0.12	-0.201	0.158	0.248	0.238	-0.056	0.364	0.021	0.144	-0.117	0.312	-0.177	-0.142	0.156	0.131	0.069	0.111	0.056	0.231
Absence of structure	-0.121	0.151	0.294	0.153	0.057	0.674	1	-0.229	-0.139	-0.106	0.097	0.21	0.063	-0.14	0.298	0.082	0.141	-0.126	0.311	-0.116	-0.112	0.06	0.226	0.043	0.324	0.198	0.258
What to do there	0.036	-0.237	0.229	0.022	0.009	-0.311	-0.229	1	0.308	0.206	-0.191	0.168	0.098	0.269	-0.156	0.418	0.069	0.191	-0.132	0.047	-0.11	0.142	-0.261	0.047	-0.202	0.24	-0.188
Experience	0.271	-0.245	0.051	-0.088	0.082	-0.12	-0.139	0.308	1	0.541	0.015	-0.138	0.127	0.29	-0.064	0.057	-0.142	-0.19	0.237	0.112	0.112	0.167	-0.156	0.408	-0.159	0.11	0.061
Typical experience	0.085	-0.335	0.233	0.087	0.228	0.201	0.106	0.206	0.541	1	-0.198	0.117	-0.078	0.033	-0.363	-0.069	0.184	0.066	0.189	0.024	0.081	0.105	0.145	0.109	0.059	0.234	-0.177
Atypical experience	0.332	0.303	0.292	0.01	0.422	0.158	0.097	-0.191	0.015	-0.198	1	0.094	0.38	-0.092	0.6	-0.069	0.123	-0.22	0.097	-0.076	0.052	0.199	0.56	0.109	0.079	-0.149	0.621
collective purpose of items	-0.032	-0.081	0.095	0.281	0.155	0.248	0.21	0.168	-0.138	0.117	0.094	1	0.148	0.098	0.083	0.037	0.024	0.461	-0.018	0.216	0.196	0.44	-0.044	0.075	-0.01	0.375	-0.104
Social norms	0.15	-0.111	0.039	0.053	-0.049	0.238	0.063	0.098	0.127	-0.078	0.38	0.148	1	0.092	0.172	-0.069	0.034	-0.042	0.146	0.091	0.059	0.26	0.063	0.07	-0.01	-0.039	0.109
Social interaction	0.117	-0.146	0.041	-0.026	0.139	-0.056	-0.14	0.269	0.29	0.033	-0.092	0.098	0.092	1	-0.157	0.083	-0.124	0.14	0.017	-0.038	0.059	0.091	0.098	0.493	-0.105	-0.108	-0.106
Cues, prompts, signals missing	-0.004	0.513	0.47	0.161	0.52	0.364	0.298	-0.156	-0.064	-0.363	0.6	0.083	0.172	-0.157	1	0.061	0.354	0.033	0.202	-0.107	-0.174	0.158	0.458	-0.005	0.048	-0.067	0.737
How to move around	0.145	0.056	0.19	-0.062	0.053	0.021	0.082	0.418	0.057	-0.069	-0.069	0.037	-0.069	0.083	0.061	1	0.361	-0.105	0.068	0.093	0.047	0	0.122	0.063	0.061	0.037	0.039
Activity cues missing	-0.008	0.441	0.201	0.233	0.304	0.144	0.141	0.069	-0.142	0.184	0.123	0.024	0.034	-0.124	0.354	0.361	1	0.087	0.034	0.139	-0.07	-0.085	0.061	0.032	-0.039	0.018	0.289
Activity cues present	-0.039	0.107	-0.1	0.364	0.006	-0.117	-0.126	0.191	-0.19	0.066	-0.22	0.461	-0.042	0.14	0.033	-0.105	0.087	1	0.329	0.064	-0.09	0.089	0.205	0.05	0.038	0.204	-0.22
Overall context missing	-0.23	0.29	0.039	-0.06	-0.005	0.312	0.311	-0.132	0.237	0.189	0.097	-0.018	0.146	0.017	0.202	0.068	0.034	0.329	1	0.212	0.154	0.15	0.267	-0.209	0.086	-0.12	0.188
Scene-like ecology	-0.108	-0.17	0.017	-0.07	-0.094	0.177	0.116	0.047	0.112	0.024	-0.076	0.216	0.091	0.017	-0.107	0.093	0.139	0.064	0.212	1	0.894	-0.055	0.093	0.057	0.767	0.001	-0.086
Functional design	-0.149	0.155	0.062	-0.12	-0.085	-0.142	-0.112	-0.11	0.112	0.081	0.052	0.196	0.059	0.038	-0.174	0.047	-0.07	-0.09	0.154	0.894	1	0.052	0.055	0.029	0.7	0.061	-0.06
Mental image evoked	0.207	-0.004	0.12	-0.028	0.24	0.156	0.06	0.142	0.167	0.105	0.199	0.44	0.26	0.091	0.158	0	-0.085	0.089	0.15	-0.055	0.052	1	-0.134	-0.07	-0.086	0.174	0.136
Scale information missing	-0.019	0.331	0.247	-0.124	0.133	0.131	0.226	-0.261	-0.156	0.145	0.56	-0.044	0.063	0.098	0.458	0.122	0.061	0.205	0.267	0.093	0.055	-0.134	1	0.075	0.134	0.043	0.3
Collectivize use of items	0.195	-0.112	0.074	0.158	0.032	0.069	0.043	-0.047	0.408	0.109	0.109	0.075	0.07	0.493	-0.005	0.063	0.032	0.05	-0.209	0.057	0.029	-0.07	0.075	1	-0.08	0.082	0.081
Expectation of greater environmental context	-0.165	0.083	0.042	-0.085	-0.177	0.111	0.324	-0.202	-0.159	0.059	0.079	-0.01	-0.01	-0.105	0.048	0.061	-0.039	0.038	0.086	0.767	0.7	-0.086	0.134	-0.08	1	0.077	0.037
Routine encounter of image	0.107	-0.199	-0.159	0.293	0.012	0.056	0.198	0.24	0.11	0.234	-0.149	0.375	-0.039	-0.108	-0.067	0.037	0.018	0.204	-0.12	0.001	0.061	0.174	0.043	0.082	0.077	1	-0.105
Confusion	0.056	0.631	0.424	0.047	0.586	0.231	0.258	-0.188	0.061	-0.177	0.621	-0.104	0.109	-0.106	0.737	0.039	0.289	-0.22	0.188	-0.086	-0.06	0.136	0.3	0.081	0.037	-0.105	1