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THE AFFORDANCES OF THE HOME, NEIGHBOURHOOD, SCHOOL AND TOWN CENTRE FOR ADOLESCENTS

CHARLOTTE CLARK AND DAVID L. UZZELL

Department of Psychology, University of Surrey, Guildford, U.K.

Abstract

Gibson's theory of affordances offers environmental psychology a method of examining the functional significance of environments for adolescents. The aim of this study was to develop rating scales that would measure the affordances of the home, neighbourhood, school and town centre for adolescents. The affordances measured related to two developmental needs in adolescence, the need for places of social interaction and for places of retreat. Five hundred and thirty-nine adolescents aged between 11 and 16 years rated the number of places available for 34 different affordances in each of the environments. The neighbourhood, school and town centre all supported both social interaction and retreat behaviours. The home environment did not support social interaction behaviours; it instead provided affordances for two different types of retreat, retreat involving close friends and retreat involving seeking out security. Gender and age differences in scale scores and how often the environments are used were also explored. In conclusion, utilising Gibson's theory of affordances enabled a systematic comparison of the affordances of adolescents' key environments to be carried out. Gibson's theory of affordances is a useful methodology for examining the functional significance of environments for different user groups.

Introduction

Over the years environmental psychology has considered both how environments can be described and how they are perceived. Descriptions of environments can comprise many forms and can be based upon either the physical characteristics of the environment, the individual's psychological/behavioural responses to an environment or a combination of the two. In recent years J.J. Gibson's theory of affordances (1966, 1979) has been used to examine the relationship between the functional properties of the environment and how environments are used. Gibson's theory enables the functional properties of the environment and the psychological/behavioural response to the environment to be examined together.

Gibson's theory of affordances

Gibson's theory of affordances states that environmental perception is a direct process and that perception takes the form of the individual perceiving affordances in the environment; 'The affordances of the environment are what it *offers* the animal, what it *provides* or *furnishes* either for good or ill' (Gibson, 1979, p. 127). Affordances are therefore the possibility for action afforded to an observer by an object in the environment (Bruce & Green, 1993). Objects have instantly detectable functions and are perceived in terms of what they afford, not what properties or qualities they have.

Gibson states that affordances can be physical such as a fire affording warmth, light and illumination but can also be provided by the presence of other people, for example social interaction, fighting and nurturing. In fact, Gibson believed that the richest and most intricate affordances of the environment are those provided by other people. These types of affordances are therefore distinguished from physical affordances by their social component.

What is not clear in Gibson's theory is the exact difference between physical affordances and the affordances provided by other people. It is unclear if Gibson considered people themselves as objects,

which possess their own affordances or if he saw people as a mediator in the perceptual process. If the presence of other people is a mediator in the perceptual process then the affordances available in an environment would alter with the presence or absence of other people.

The affordances of an object or environment do not change as the needs of the observer change. Instead, it is up to the observer to perceive the affordances of an object or environment according to his/her needs at the time. Thus, the relationship between the observer and the environment is reciprocal; perception guides action in the environment and this action provides information for perception (E.J. Gibson, 1991). The observer obtains knowledge of the environment and this knowledge guides action; the environment will support the action as knowledge was derived from the environment.

Gibson's theory has been embraced by both cognitive and environmental psychologists. Cognitive psychologists have found strong support for the theory of affordances and in particular for relationships between the properties of the environment and an observer's actions (Warren, 1984; Mark, 1987): even infants can directly perceive the affordances of the environment and use them to guide action (Gibson & Walk, 1960; Gibson *et al.*, 1987).

Affordances and environmental psychology

Gibson's theory offers environmental psychology a method of examining the functional significance of environments. By examining the affordances of an environment we can understand the different behaviours that it can and cannot support. One of the first environmental psychologists to utilize Gibson's theory to examine functionality was Heft (1988). Heft's aim was to create a taxonomy that would describe the functionally significant properties of children's environments. Heft compared three books which are considered to provide the most detailed accounts of children's outdoor activities; they were '*One Boy's Day*' by Barker and Wright (1951), '*Children's Experience of Place*' by Hart (1979) and '*Childhood's Domain*' by Moore (1986). In these books Heft found copious examples of the potential affordances of children's environments, i.e. environmental features that supported an activity. Heft drew together the examples from the three books to create a preliminary functional taxonomy of children's outdoor environments.

Heft's taxonomy is a valuable attempt to identify some of the dimensions of children's environmental experiences. However, one notable absence from the taxonomy is a consideration of the affordances provided by other people in the child's environment; as pointed out above, for Gibson this was one of the richest types of affordances available in the environment.

Kyttä (1995) utilized Heft's taxonomy and also included social interaction as an affordance type, to examine the affordances for children of different types of surroundings in Finland. Kyttä found that the highest number of affordances were perceived in the rural village and the lowest in the city. Kyttä asked children if there was a place where they could do each type of affordance; she was not concerned with the quantitative or qualitative aspects associated with the activity.

Environmental psychologists have not often made explicit the link between the functional properties of the environment and the physical features of the environment, i.e. what physical features comprise the affordances. One study that does address this issue is Woolley and Johns (2001) study of the affordances of Tudor Square in Sheffield. Tudor Square had become very popular with adolescent skateboarders, much to the annoyance of some of the other users of the Square. Focus groups held with the skateboarders revealed that there were three main categories of affordances that made the Square popular with them. Firstly, the physical features such as the kerbs, the steps, the handrails and seats provided opportunities for the skateboarders to perform certain tricks. Secondly, the Square was highly accessible to the skateboarders, being located in the centre of the city and also by the railway station. Thirdly, there were always a lot of skateboarders in Tudor Square. This meant that going there was a sociable experience as there would be others like them present, and help, and help and advice about improving their skateboarding would be freely available. Thus, the presence of other people can play an important role in the functional significance of the environment.

In Gibson's theory the physical environment and the social environment are brought together in order to account for functional significance. Gibson's theory fits with the transactional paradigm in environmental psychology. The transactional perspective sees entities such as events as being composed of actors who are engaged in psychological processes in social and physical contexts (Altman & Rogoff, 1987). Like Gibson, the transactional paradigm sees the person and the context as coexisting and jointly contributing to the meaning and nature of the event.

In this paper, the functional significance of environments for adolescents will be examined. To understand how and for what activities adolescents use environments is important if we are to recognise and even plan for them as a user group.

Adolescent environments

Woolley and John's study illustrates how adolescents' use of environments can lead to conflict. In recent years adolescents' use of public places in town centres and neighbourhoods has been increasingly seen as inappropriate and disruptive. Adults tend to consider adolescents' use of public places as a threat to the personal safety of others and the public order of the street. Adolescents' use of public places has been increasingly regulated through surveillance and intervention by the police (Sahlin, 1991 as cited in Lieberg, 1995; Valentine, 1996; Eubanks Owens, 1999). Adolescents have also increasingly been 'designed out' of public places (Hall, 1994; Eubanks Owens, 1999), whereas Eubanks Owens argues that places for adolescents to hang out and gather should in fact be 'designed into' environments.

Place preference

Much research on adolescents' use of environments has focused upon favourite environments (van Andel, 1990; Korpela, 1992; Lieberg, 1997), place preference (Malinowski & Thurber, 1996) and valued places (Eubanks Owens, 1988, 1994). Examining favoured, valued and preferred places enables the identification of which environments adolescents utilize. As yet the relationship between preference and how often an environment is utilized has not been explored. Both Korpela and Lieberg found that the home environment was a favourite place and this reflects the fact that private spaces were more favoured than public spaces. Some other findings that are consistent amongst these studies are adolescents' preference for shopping malls/commercial areas, areas near the home and green spaces.

Eubanks Owens also examined why environments were valued and found that different environments were valued for different reasons. More specifically, parks, commercial areas and school were valued as they afforded being with other people. Although Eubanks Owens does not specifically use the word affordances, her analysis essentially involves matching the need of the adolescent with the amount of support available in the environment for that specific need.

In conclusion, these studies of favourite, preferred and valued environments illustrate the adolescent's preference for the home, areas near the home (the neighbourhood), commercial areas and parks. In the current study these areas are considered under the environmental headings of the home, neighbourhood, and the town centre. Along with the school, these environments are considered key adolescent environments. More recently research has become focused upon what activities adolescents' use environments for, than with preference. The two activities of social interaction and retreat have emerged as being important motives in adolescents' use of environments.

Social interaction and retreat

In recent years researchers have seen adolescents' use of environments as being driven by developmental needs (Coleman, 1979; Noack & Silbereisen, 1988; Schiavo, 1988; Lieberg, 1995, 1997). Noack and Silbereisen (1988) contrasted use of the home and public environment over two years for adolescents in different states of partnership development. Three types of adolescents were identified; *novices*—had no partner and no aspiration for a partner, *searchers*—no partner but would like a partner, *fulfilled*—had a partner and wanted a partner. They found that 'novices' tended to spend their leisure time in the home, 'searchers' tended to leave the home environment and increasingly use public environments and 'fulfilled' adolescents consistently preferred public places. Thus, partnership development effects adolescents' use of environments.

Coleman (1979) believed that adolescents focus on heterosexual relationships in organized activity settings, peer-relationships in casual leisure settings and independence in commercial leisure settings. Hendry *et al.* (1993) found that adolescents did make this transition from organized to casual to commercial leisure settings and that this transition started at around 11–12 years of age. Hendry *et al.* also found that use of casual leisure settings such as the neighbourhood started to decline at 16 years. Schiavo (1988) also found a decline in use of the neighbourhood with increasing age in adolescence. The neighbourhood was evaluated less positively and utilized less frequently by older adolescents than by younger adolescents and pre-adolescents; older adolescents also had few activity or social ties to the neighbourhood. Schiavo concluded by stating that older adolescents have a developmental need to move beyond the neighbourhood. These findings suggest that we would expect to observe more

adolescents in casual settings such as the neighbourhood and town centre in early and mid-adolescence (13–16 years) than in late adolescence (17–20 years).

Schiavo, Hendry *et al.* and Noack & Silbereisen's studies both suggest that there are age differences in adolescents' use of environments. van Vliet (1983) studied the home range of city and suburban adolescents and found an age difference only for suburban adolescents. He also found that suburban females had a more restricted home range than suburban males. There is also evidence that parents' exercise greater control over their daughters' leisure than they do over their sons' (Mauldin & Meeks, 1990; Cotterell, 1993; Deem, 1996). Thus, when considering adolescents' use of environments in this paper, we might expect to find both age and gender differences in environmental use.

Lieberg (1995, 1997) drew upon Goffman's (1963) work on behaviour in public places to examine the affordances of the neighbourhood and city centre for adolescents. Goffman uses the metaphor of public places as theatres where individuals can be seen like actors on the stage. The stage can be divided up into backstage and frontstage. The neighbourhood acts as a backstage environment for adolescents and the city centre as frontstage. In the city, adolescents are in front of an audience and it is here that they want to show themselves off and try out different behaviours. The neighbourhood is where adolescents retreat to when they have had enough of being on show in the city centre.

This dichotomy is further developed in Lieberg's discussion of how adolescents appropriate their local environment. In his three year study of Swedish adolescents, Lieberg identified two activities that adolescents appropriated places for; these activities were social interaction and retreat. Places of interaction had two purposes, firstly they enable the adolescent to withdraw from the adult world to be with their peers and secondly they enable the adolescent to encounter the adult world through social involvement in city centres. Places of retreat are used for avoiding other adolescents and peers. Lieberg believes that interaction and retreat are two of the main developmental needs in adolescence. Lieberg found that the neighbourhood offered good opportunities for places of retreat but not for interaction; conversely the city centre afforded interaction activities.

The need for social interaction appears to characterise adolescents' use of environments and especially public environments such as the town centre. Strong support for the relationship between adolescent environments and the need for social interaction also comes from studies of adolescents' use of shopping malls (Anthony, 1985; Lewis, 1989; Hopkins, 1991). These studies found that shopping malls afford being with others and opportunities to interact with others. Lewis and Anthony go so far as to describe shopping malls as a third ground between the home and the school. Social interaction also characterized adolescents' use of a new leisure environment (Cotterell, 1991) and Blatchford (1998) found the school to be an important context for social interaction.

Lieberg is also not alone in suggesting that adolescents need a place of retreat. Korpela (1992, Korpela & Hartig, 1996) found that the environment is used by both adolescents and adults as a strategy for creating and maintaining one's self. More specifically environments are used to regulate unpleasant and pleasant feelings, to maintain a coherent self-concept and to maintain a favourable level of self-esteem. Environments that support these behaviours are called restorative environments. Korpela studied adolescents favourite places in terms of these self-regulation behaviours and found that favourite places were often sought out and utilized for these behaviours. More specifically, clearing one's mind and relaxing were associated with the adolescent's bedroom and the countryside and freedom of expression was associated with all the favourite places named. Further support for the need for places of retreat comes from Woolley *et al.* (1999) who found that the town centre afforded 11–12-year-olds places for quiet reflection.

Whilst there is strong support for adolescents' environmental use being characterized by social interaction and retreat, the relationship between these behaviours and specific environments is unclear. Previous studies have not examined the relationship between these four key adolescent environments systematically. Instead, studies have been limited to one or two environments or one type of place e.g. leisure settings, either within or across environments. This has resulted in important questions about adolescent environments remaining unanswered. For example, do all environments afford both social interaction and retreat? Which environment is preferred for retreat and which for social interaction? How often is each of these environments used for social interaction and retreat?

The aim of this study was to develop a set of scales that would measure the affordances of the home, neighbourhood, school and town centre environments in terms of the affordances for two key

developmental needs; the need for social interaction and the need for retreat. The main research questions addressed in this paper are:

(1) What are the similarities and differences between the affordances of the environments?
(2) How often are the environments utilized for the affordances?
(3) Are there any age or gender differences in the perception of affordances and how often the environments are used for the affordances?

Method

Preliminary studies

The affordances for social interaction and retreat behaviours were derived from two studies; a pilot study and focus group discussions about the affordances of the home, neighbourhood, school and town centre.

Pilot study. A sample of 411 adolescents aged between 11 and 15 (249 females, 162 males) rated the neighbourhood and town centre environments on how many places there were for 40 different affordances. These affordances were derived from a review of the literature and related to affordances for privacy, social interaction, retreating from others and having freedom. The ratings for the neighbourhood and town centre were analysed separately using Principal Components Analysis (PCA). Affordances with component loadings of over 0·6 were selected. For the neighbourhood two components were extracted. The first component related to freedom and accounted for 47·9% of the variance ($\alpha = 0{\cdot}95$, $n = 291$). The second component related to social interaction with other adolescents and accounted for 5·8% of the variance ($\alpha = 0{\cdot}85$, $n = 355$). For the town centre three components were extracted. The first component related to social interaction with other adolescents and accounted for 35·2% of the variance ($\alpha = 0{\cdot}92$, $n = 338$). The second component related to retreat behaviours and accounted for 7·1% of the variance ($\alpha = 0{\cdot}80$, $n = 338$). The third component related to using the town centre as an escape and accounted for 5·9% of the variance ($\alpha = 0{\cdot}74$, $n = 358$).

From the original list of 40 affordances, 29 affordances were used in a scale for either or both the neighbourhood and the town centre; these 29 affordances were selected for use in the main study. The affordances that were excluded at this stage mainly related to privacy.

Focus groups. Six single gender focus groups were held with groups of adolescents from Years 9, 10 and 11 (13–16 years of age). Focus groups were held to assess whether any important affordances had not been included in the pilot questionnaire and also to consider adolescents' use of the home and school environments which had not been examined in the questionnaire. In these focus groups the adolescents talked about their use of the home, neighbourhood, school and town centre and more specifically what kinds of behaviours these environments did and didn't support. For the neighbourhood, school and town centre environments, few affordances were discussed that were not already encompassed by the scales derived in the pilot study. For the home environment new affordances were identified and these related to the home as a secure environment for the adolescent. Overall six new affordances were derived from the focus group discussions.

As a result of the pilot study and the focus groups 34 affordances of the environment were derived for use in the study. The 34 affordances are shown in Table 1.

Participants and procedure

The participants were sampled from one school in Guildford. The participants were all sampled from the same school for two reasons. Firstly, a large number of participants were required to rate the 34 affordances, in order to examine differences between groups, such as age and gender, and also to enable principal components analysis to be carried out. Secondly, sampling from the same school meant that participants were rating the same town centre and school environments and only their neighbourhood and home environments differed.

Guildford is located 30 miles south-east of London, has a population of approximately 130,000 and is an affluent area. The school was a grant maintained comprehensive located in central Guildford. The school has a catchment area of approximately three miles therefore all participants lived in Guildford and the surrounding area. The school has a good academic record and teaches pupils aged from 11 to 18 years. The participants were 539 adolescents (323 females, 216 males) from school years 7–11. A similar number of participants were sampled from each school year and participants of differing academic abilities were sampled.

TABLE 1

Structural coefficients for the principal components analyses of the affordances of the home, neighbourhood, school and town centre

Component → Affordance ↓	Neighbourhood –Interact	Neighbourhood –Retreat	Town Centre– Interact	Town Centre– Retreat	School– Interact	School– Retreat	Home– Retreat/ Friends	Home– Secure
Avoid people	0·046	**0·836**	−0·136	0·732	−0·141	**0·770**	0·571	0·148
Be active	**0·656**	0·034	**0·702**	0·051	0·223	0·571	0·307	0·430
Be alone	0·439	0·403	0·078	**0·838**	−0·179	**0·785**	**0·658**	0·056
Be entertained	0·198	0·383	**0·741**	0·043	0·199	0·518	0·237	0·436
Be free from the expectations of your family	**0·754**	0·097	**0·841**	−0·106	**0·802**	−0·161	**0·642**	0·051
Be free from the expectations of your friends	−0·155	**0·878**	0·165	0·567	0·010	0·562	0·061	**0·743**
Be free from the pressures of your friends	0·416	0·102	0·161	**0·636**	0·398	0·472	0·136	0·582
Be free from the pressures of your parents	0·289	0·575	**0·801**	0·026	**0·851**	−0·239	**0·671**	0·079
Be free to be yourself	0·462	0·386	**0·773**	0·064	0·593	0·107	0·107	**0·687**
Be happy	0·516	0·297	**0·860**	−0·151	**0·663**	0·133	0·016	**0·758**
Be in a place where I feel I belong	0·358	0·473	0·544	0·208	**0·614**	0·227	0·039	**0·763**
Be in an area that belongs to teenagers	0·303	0·433	0·470	0·229	0·739	0·027	**0·722**	0·044
Be in an area that is mainly used by teenagers	**0·714**	0·086	0·071	0·583	0·151	0·563	0·576	0·219
Be in control of the environment	0·579	0·171	0·031	**0·738**	0·006	**0·768**	**0·626**	0·135
Be in your own space	0·224	0·505	**0·782**	−0·094	0·506	0·184	0·315	0·469
Be noisy	0·374	0·412	−0·107	**0·770**	0·028	**0·788**	**0·649**	0·109
Be on your own to think	0·244	0·568	0·041	**0·650**	0·095	0·561	0·518	0·345
Be peaceful	0·194	0·590	**0·605**	0·138	**0·658**	0·057	**0·692**	0·187
Be with close friends	**0·851**	0·016	0·496	0·228	**0·789**	0·037	**0·600**	0·196
Be with similar people	**0·814**	0·010	**0·866**	0·094	**0·736**	0·76	0·184	**0·659**
Be yourself	**0·714**	0·090	**0·869**	−0·266	**0·612**	0·264	0·253	**0·633**
Enjoy yourself	**0·688**	0·135	0·309	0·446	0·581	0·238	−0·006	**0·745**
Feel secure	0·322	0·490	0·020	**0·780**	0·103	**0·692**	0·144	0·563
Get away from your friends	−0·150	**0·941**	**0·720**	0·001	**0·834**	−0·320	**0·786**	−0·141
Get away from your parents	0·751	0·032	0·092	**0·714**	0·033	**0·676**	−0·244	**0·677**
Get away from your peers	0·025	**0·817**	0·512	0·152	**0·648**	0·022	**0·783**	−0·163
Hang around	**0·852**	0·044	**0·805**	0·069	**0·785**	0·076	0·517	0·258
Have freedom of expression	**0·960**	0·093	0·423	0·278	**0·684**	0·251	0·436	0·333
Have privacy with your best friend/s	**0·743**	0·096	0·084	**0·618**	0·277	0·589	**0·783**	0·033
Have space to be upset in	0·529	0·270	0·028	**0·682**	0·169	**0·674**	**0·700**	0·046
Meet up with friends	0·471	0·457	**0·736**	0·160	**0·674**	0·206	0·116	0·029
Meet new people	**0·882**	0·086	0·535	0·255	**0·799**	0·065	n/a	n/a
Relax	0·144	**0·697**	0·378	0·085	0·474	0·388	0·206	0·537
Try out new behaviours	**0·853**	0·098	0·244	0·240	0·415	0·347	**0·712**	0·098
Percent of Variance	53·6	5·6	38·8	11·1	43·5	9·7	41·5	8·0

The questionnaire required the participants to rate how many places there were in the environment for each of the affordances and also to rate how often they used that environment for that affordance using a three-point Likert scale (1 = hardly ever, 2 = sometimes, 3 = often). Participants also had to rank the environments in order of preference. As the questionnaire was repetitive, the order in which participants completed the ratings for the four environments was counterbalanced.

The questionnaire was completed by the participants in their 20-minute registration class every morning. There were no time constraints upon the subject to complete the questionnaire and it was worked upon every day until completed. The questionnaire would have taken approximately 45 minutes to complete. All the questionnaires were completed within one month of being handed out.

Some of the questionnaires returned were not fully completed. This was anticipated as work on the questionnaire was unsupervised. All questionnaires whether fully or partially completed were entered into the analysis to ensure that the analysis was not biased. Missing data was left as missing; mean or median scores were not entered in place of the missing data.

Analysis

Principal components analysis with direct oblimin rotation was the main method of analysis. In recent years the use of the Kaiser–Guttman rule (as cited in Tabachnick & Fidell, 1996) when deciding how many components to extract has become less popular. Instead, a number of principal components analyses were carried out extracting a different number of variables each time. The solution which had the best simple structure and accounted for a high proportion of the variance was selected (Tabachnick & Fidell, 1996). Affordances with component loadings over 0·6 were selected. The reliability of the components was examined and component scores computed for reliable scales. Component scores were computed by adding up the ratings for each of the items in the scale.

Results

Scales to measure the affordances of the home, neighbourhood, school and town centre

The principal components analyses on the 34 affordances for the neighbourhood, town centre and school each resulted in similar components being extracted. For each of these environments two components were extracted, the first of which related to affordances for social interaction and freedom and the second of which related to affordances for retreat. For the neighbourhood the components were named Neighbourhood–Interact (variance = 53·6%, $\alpha = 0{\cdot}95$, $n = 341$) and Neighbourhood–Retreat (variance = 5·6%, $\alpha = 0{\cdot}90$, $n = 356$); for the town centre the components were named Town Centre–Interact (variance = 38·8%, $\alpha = 0{\cdot}94$, $n = 443$) and Town Centre–Retreat (variance = 11·1%, $\alpha = 0{\cdot}89$, $n = 460$); for the school the components were named School–Interact (variance = 43·5%, $\alpha = 0{\cdot}93$, $n = 262$) and School–Retreat (variance = 9·7%, $\alpha = 0{\cdot}88$, $n = 276$). The structural coefficients for these components are shown in Table 1.

The principal components analysis on the 33 affordances for the home resulted in two components being extracted, which accounted for 49·5% of the variance (Component I = 41·5% and Component II = 8%). Component I was concerned with retreating behaviours that could also involve close friends and Component II was concerned the sense of security afforded by the home. Component I was named Home–Retreat/Friends ($\alpha = 0{\cdot}91$, $n = 341$) and Component II was named Home–Secure ($\alpha = 0{\cdot}88$, $n = 344$). The structural coefficients for these components are also shown in Table 1.

The results of the principal components analyses show that the neighbourhood, town centre and school support similar affordances and that these are different from the affordances of the home. The home does not support the same kind of social interaction as the neighbourhood, school and town centre. In fact, being with friends in the home is associated with retreating activities.

Due to the similarity in the principal components analysis results for the neighbourhood, school and town centre environments a further principal components analysis was conducted to establish scales that would measure the affordances in all three environments. This would enable comparisons to be made between the three environments. The number of places perceived for each of the 34 affordances in the neighbourhood, school and town centre were combined and then analysed. As the previous analyses had resulted in two components being extracted, two components were requested from the analysis. Two components were successfully extracted which accounted for 64·5% of the variance (Component I = 56% and Component II = 8·5%). Component I was concerned with social interaction and named INTERACT ($\alpha = 0{\cdot}97$, $n = 158$) and

TABLE 2
Structural coefficients for the INTERACT and RETREAT scales

Component → Affordance ↓	Interact	Retreat
Avoid people	0·160	**0·911**
Be active	**0·689**	0·146
Be alone	−0·066	**0·911**
Be entertained	0·520	0·249
Be free from the expectations of your family	**0·867**	−0·158
Be free from the expectations of your friends	0·003	**0·749**
Be free from the pressures of your friends	0·433	0·483
Be free from the pressures of your parents	**0·875**	−0·071
Be free to be yourself	**0·801**	0·023
Be happy	**0·904**	−0·078
Be in a place where I feel I belong	**0·754**	0·113
Be in an area that belongs to teenagers	0·572	0·248
Be in an area that is mainly used by teenagers	**0·639**	0·123
Be in control of the environment	−0·013	**0·718**
Be in your own space	0·242	**0·640**
Be noisy	**0·869**	0·086
Be on your own to think	0·043	**0·807**
Be peaceful	0·113	**0·725**
Be with close friends	**0·604**	0·311
Be with similar people	0·574	0·328
Be yourself	**0·896**	−0·080
Enjoy yourself	**0·957**	−0·201
Feel secure	0·448	0·167
Get away from your friends	0·080	**0·799**
Get away from your parents	**0·772**	−0·039
Get away from your peers	0·038	**0·777**
Hang around	**0·875**	0·019
Have freedom of expression	**0·736**	0·190
Have privacy with your best friend/s	0·358	0·575
Have space to be upset in	0·426	0·510
Meet new people	**0·748**	0·128
Meet up with friends	**0·752**	0·186
Relax	0·425	0·445
Try out new behaviours	0·329	0·294
Percent of Variance	56·0	8·5

Component II was concerned with retreat and was named RETREAT ($\alpha = 0{\cdot}93$, $n = 165$). The structural coefficients for these components are shown in Table 2. Component scores were then computed for these scales for the neighbourhood, the school and the town centre by adding up the individual ratings of how many places there were in the environment for the affordances that made up the scale. How often the neighbourhood, school and town centre were used was computed by adding up the individual ratings of how often the environment was used for the affordances that made up the scale.

TABLE 3
Median scores and range for the INTERACT scale

Scale and environment	Median score	Scale range
INTERACT–Town Centre	68·0	1–382
INTERACT–School	51·0	7–337
INTERACT–Neighbourhood	47·5	0–348

INTERACT scale results. Table 3 shows the median component scores for the INTERACT scale for the neighbourhood, school and town centre. The median value is given as the data is positively skewed; participants were asked to indicate how many places there were for each of the affordances and ratings were characterized by low numbers.

Table 3 shows that the ranges of the INTERACT scale scores are similar between the three environments. However, there are significant differences between the INTERACT scores ($\chi^2 = 59{\cdot}23$, df. = 2, $n = 158$, $p < 0{\cdot}0001$). The median INTERACT scale score for the town centre is significantly higher than that of the neighbourhood ($Z = -10{\cdot}06$, $n = 298$, $p < 0{\cdot}0001$) and the school ($Z = -5{\cdot}58$, $n = 214$, $p < 0{\cdot}0001$) and the school score is significantly higher than that for the neighbourhood ($Z = -2{\cdot}81$, $n = 169$, $p < 0{\cdot}01$). Thus, the three environments differ significantly in their INTERACT affordances scale scores. There was no significant difference between how often the neighbourhood, school and town centre were used for social interaction ($\chi^2 = 4{\cdot}10$, df. = 2, $n = 147$, $p > 0{\cdot}05$). Thus, although the environments differed in the number of places they provided for social interaction, there was no difference in how often they were utilized. Although there were no significant differences between the environments in how often they were used, there were relationships within environments between scale scores and use. Positive correlations were found for the town centre ($r = 0{\cdot}320$, $n = 414$, $p < 0{\cdot}0001$) and the neighbourhood ($r = 0{\cdot}231$, $n = 287$, $p < 0{\cdot}0001$) between INTERACT scores and use.

Figure 1 shows the median INTERACT scale score for each school year group. There were significant differences in scale scores between the year groups for the school ($\chi^2 = 22{\cdot}12$, df. = 4, $n = 262$, $p < 0{\cdot}0001$) and the town centre ($\chi^2 = 27{\cdot}65$, df. = 4, $n = 431$, $p < 0{\cdot}0001$). For the school, participants from Year 9 have significantly higher scores than participants from Year 8 ($U = 784{\cdot}5$, $Z = -3{\cdot}82$, $n = 110$,

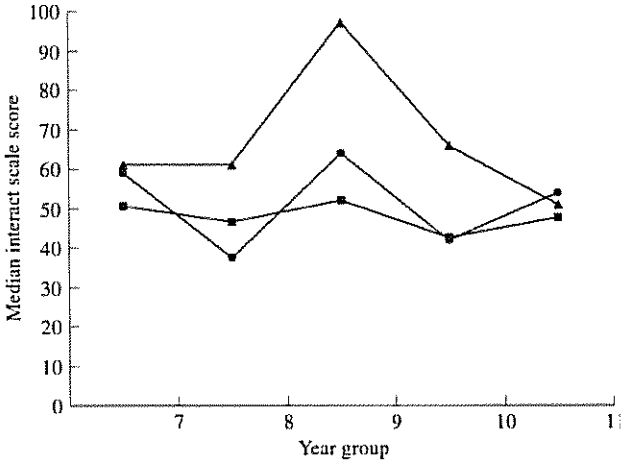

FIGURE 1. Median INTERACT scale scores for each school year. Neighbourhood (-■-), School (-●-), Town Centre (-▲-).

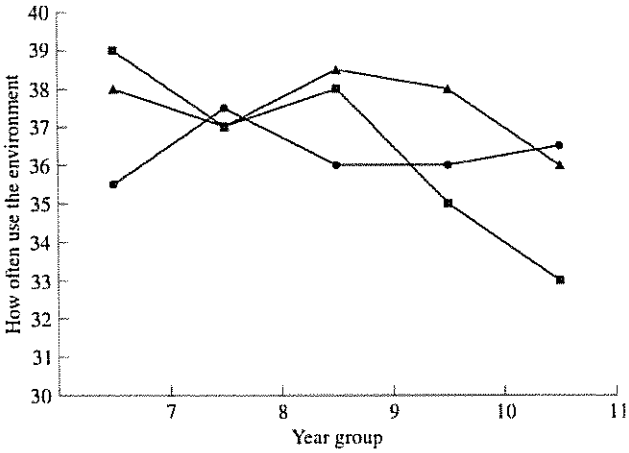

FIGURE 2. How often each school year use the environments for social interaction. Neighbourhood (-■-), School (-●-), Town Centre (-▲-).

$p<0{\cdot}0001$)[2] and Year 10 ($U=1221{\cdot}5$, $Z=-3{\cdot}75$, $n=127$, $p<0{\cdot}0001$). For the town centre, participants from Year 9 have significantly higher scores than participants from Year 8 ($U=3812{\cdot}5$, $Z=-3{\cdot}75$, $n=209$, $p<0{\cdot}0001$), Year 10 ($U=4463{\cdot}5$, $n=221$, $Z=-345$, $p<0{\cdot}001$) and Year 11 ($U=1332$, $Z=-4{\cdot}75$, $n=156$, $p<0{\cdot}0001$). For all environments the relationship between year group and the perception of affordances for social interaction is not linear. Instead, the results suggest that for the school and the town centre the perception of affordances for interaction peak at 13–14 years of age.

Males perceived significantly more places than females for interaction in the neighbourhood ($U=10854$, $Z=-2{\cdot}30$, $n=329$, $p<0{\cdot}05$) and the school ($U=6172$, $Z=-2{\cdot}52$, $n=250$, $p<0{\cdot}01$). Interestingly, there were no gender differences in scores for the town centre.

TABLE 4
Median scores and range for the RETREAT scale

Scale and environment	Median score	Scale range
RETREAT-Neighbourhood	20	0–200
RETREAT-Town Centre	18	0–147
RETREAT-School	15	0–175

Figure 2 shows how often the environments were used for social interaction for each year group. There were year differences in how often the neighbourhood was used ($\chi^2=12{\cdot}62$, df. $=4$, $n=316$, $p<0{\cdot}005$). Use of the neighbourhood for social interaction declines with age and participants in Year 11 use the neighbourhood significantly less than participants in Year 7 ($U=795$, $Z=-2{\cdot}99$, $n=102$, $p<0{\cdot}005$).

RETREAT scale results. Table 4 shows the median component scores for the RETREAT scale for the neighbourhood, school and town centre. There are significant differences between the RETREAT scores ($\chi^2=11{\cdot}45$, df. $=2$, $n=165$, $p<0{\cdot}01$). The median RETREAT scale score for the neighbourhood is significantly higher than that for the town centre ($Z=-4{\cdot}07$, $n=309$, $p<0{\cdot}0001$) and the school ($Z=-3{\cdot}73$, $n=179$, $p<0{\cdot}0001$) and the town centre score is significantly higher than the school score ($Z=-3{\cdot}27$, $n=226$, $p<0{\cdot}0001$). Thus, the three environments differ significantly in the number of places they provide for RETREAT affordance. A comparison of Tables 3 and 4 shows that there were considerably more affordances for social interaction in the neighbourhood, town centre and school than there were for retreat.

There was also a significant difference between how often the environments were used for retreating ($\chi^2=28{\cdot}35$, df. $=2$, $n=153$, $p<0{\cdot}0001$). The town centre was used less often than the neighbourhood ($Z=-9{\cdot}07$, $n=304$, $p<0{\cdot}0001$) and the school ($Z=-3{\cdot}51$, $n=218$, $p<0{\cdot}0001$). Thus, although the town centre had significantly fewer places than the neighbourhood and more places than the school, it was used significantly less often for retreat behaviours. The RETREAT scale scores were positively related to use of the neighbourhood ($r=0{\cdot}249$, $n=300$, $p<0{\cdot}0001$), the school ($r=0{\cdot}223$, $n=224$, $p<0{\cdot}0001$) and the town centre ($r=0{\cdot}223$, $n=437$, $p<0{\cdot}0001$).

Figure 3 shows the median RETREAT scale score for each school year group. For the school, Year 11 participants had a significantly lower score than Year 10 participants, ($\chi^2=9{\cdot}59$, df. $=4$, $n=276$, $p<0{\cdot}001$, $U=1331$, $Z=-2{\cdot}93$, $n=124$, $p<0{\cdot}005$). This

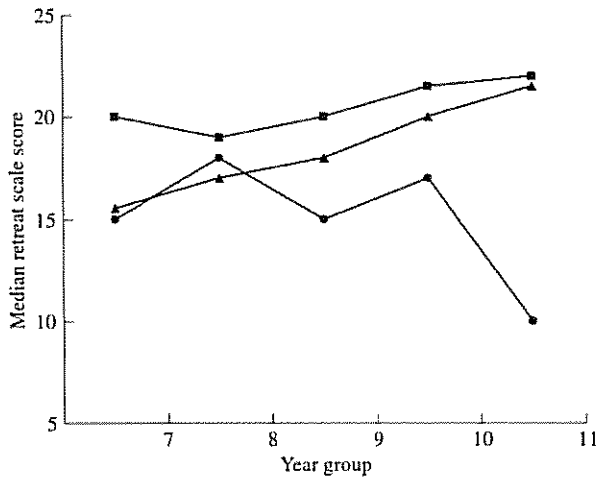

FIGURE 3. Median RETREAT scale scores for each year group. Neighbourhood (-■-), School (-●-), Town Centre (-▲-).

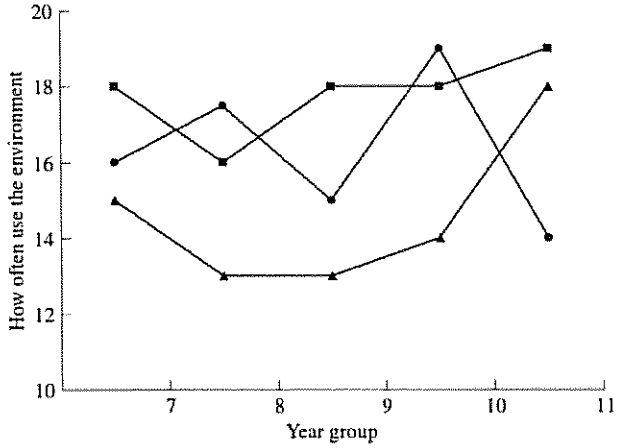

FIGURE 4. How often each school year use the environments for retreating. Neighbourhood (-■-), School (-●-), Town Centre (-▲-).

difference between the two highest years may reflect a developmental desire for more places for retreat in the final year of school.

Males perceived significantly more places than females for retreat in the neighbourhood ($U = 11435{\cdot}5$, $Z = -2{\cdot}33$, $n = 336$, $p < 0{\cdot}05$), the school ($U = 6191$, $Z = -3{\cdot}55$, $n = 264$, $p < 0{\cdot}0001$), and the town centre ($U = 13975$, $Z = -5{\cdot}58$, $n = 418$, $p < 0{\cdot}0001$).

Figure 4 shows how often the environments were used for retreating for each year group. There were significant differences between the year groups for use of the school ($\chi^2 = 26{\cdot}76$, df. $= 4$, $n = 265$, $p < 0{\cdot}0001$) and the town centre ($\chi^2 = 33{\cdot}10$, df. $= 4$, $n = 486$, $p < 0{\cdot}0001$). Year 7 used the town centre more often than Year 8 ($U = 3544{\cdot}5$, $Z = -2{\cdot}76$, $n = 196$, $p < 0{\cdot}005$) and Year 9 ($U = 366{\cdot}5$, $Z = -2{\cdot}79$, $n = 200$, $p < 0{\cdot}005$) and Year 11 used the town centre more often than Year 8 ($U = 1333$, $Z = -5{\cdot}02$, $n = 163$, $p < 0{\cdot}0001$), Year 9 ($U = 1379$, $Z = -5{\cdot}14$, $n = 167$, $p < 0{\cdot}0001$) and Year 10 ($U = 1822{\cdot}5$, $Z = -3{\cdot}56$, $n = 169$, $p < 0{\cdot}0001$). For the school, Year 10 used the school more often than Year 9 ($U = 1212{\cdot}5$, $Z = -3{\cdot}52$, $n = 124$, $p < 0{\cdot}0001$) and Year 11 ($U = 1012$, $Z = -4{\cdot}88$, $n = 128$, $p < 0{\cdot}0001$). Males used the town centre significantly more than females for the retreat behaviours ($U = 19852$, $Z = -3{\cdot}49$, $n = 444$, $p < 0{\cdot}0001$).

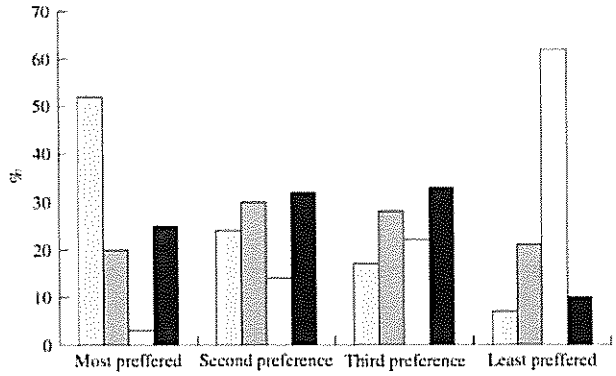

FIGURE 5. Preference for the environments. □ Town centre, ▨ Neighbourhood, □ School, ■ Home.

Preference for the environments

Figure 5 shows that half of the participants (52%) rated the town centre as their most preferred environment and a quarter (23%) rated it as their second preferred environment. This indicates the overwhelming popularity of the town centre as an adolescent environment. In contrast the school is the least preferred of the four environments for nearly two-thirds of respondents (62%). Preferences for the home and neighbourhood environments are more evenly distributed with preference varying fairly equally across the four ranks of preference.

Preference and interaction results. There was no significant relationship between preference for an environment and the INTERACT scale scores for that environment. There was a relationship between preference and how often the neighbourhood ($\chi^2 = 23{\cdot}49$, df. $= 3$, $n = 210$, $p < 0{\cdot}0001$) and the town centre were used ($\chi^2 = 13{\cdot}09$, df. $= 3$, $n = 268$, $p < 0{\cdot}01$). Participants who rated the neighbourhood as their least favourite environment used the neighbourhood significantly less for social interaction than those who rated the neighbourhood as their most preferred ($U = 359$, $Z = -4{\cdot}57$, $n = 83$, $p < 0{\cdot}0001$), their second preferred ($U = 778$, $Z = -3{\cdot}52$, $n = 104$, $p < 0{\cdot}0001$) and their third

preferred environment ($U = 933$, $Z = -3{\cdot}01$, $n = 109$, $p < 0{\cdot}01$). Participants who rated the town centre as their most preferred environment used the town centre significantly more often for social interaction than participants who rated the town centre as their least preferred environment ($U = 908$, $Z = -2{\cdot}80$, $n = 168$, $p < 0{\cdot}01$).

Preference and retreat results. For the school environment there was a significant relationship between preference and RETREAT scale scores ($\chi^2 = 8{\cdot}65$, df. = 3, $n = 200$, $p < 0{\cdot}05$). Participants who rated the school as their least preferred environment had a significantly lower score than participants who rated the school as their second preferred environment ($U = 1095{\cdot}5$, $Z = -2{\cdot}76$, $n = 150$, $p < 0{\cdot}01$). There was also a significant relationship between preference and how often the school was used for retreating ($\chi^2 = 8{\cdot}47$, df. = 3, $n = 190$, $p < 0{\cdot}01$). Participants who rated the school as their second preferred environment used the school more often for retreating than participants who rated the school as their third preferred environment ($U = 274{\cdot}5$, $Z = -3{\cdot}07$, $n = 66$, $p < 0{\cdot}01$).

Scales for the home environment

The median score for the Home–Retreat/Friends scale was 28. There was a positive correlation between the perception of affordances for the Home–retreat/Friends scale and how often the home was used ($r = 0{\cdot}211$, $n = 302$, $p < 0{\cdot}0001$). There was a significant difference in how often each year group used the home ($\chi^2 = 13{\cdot}65$, df. = 4, $n = 344$, $p < 0{\cdot}01$). Participants in Year 9 used the home more often than participants in Year 8 ($U = 2184{\cdot}5$, $Z = -3{\cdot}03$, $n = 156$, $p < 0{\cdot}005$) and Year 10 ($U = 2155{\cdot}5$, $Z = -3{\cdot}36$, $n = 158$, $p < 0{\cdot}005$). Males also used the home more often than females ($U = 11038{\cdot}5$, $Z = -2{\cdot}50$, $n = 334$, $p < 0{\cdot}05$). There was no significant relationship between scale score and preference or how often the home was used and preference.

The median score for the Home–Secure scale was 19. There was a positive correlation between the perception of affordances for the Home–Secure scale and how often the home was used ($r = 0{\cdot}127$, $n = 301$, $p < 0{\cdot}05$). There was also a significant difference in Home–Secure scale scores between Year groups ($\chi^2 = 12{\cdot}10$, df. = 4, $n = 345$, $p < 0{\cdot}05$). Participants in Year 7 used the home significantly more than participants in Year 8 ($U = 1443{\cdot}5$, $Z = -3{\cdot}49$, $N = 134$, $p < 0{\cdot}0001$). There were no gender differences in Home–Secure scale scores and there was no significant relationship between scale score and preference or how often the home was used and preference.

Relationships between the scales for the home, neighbourhood, school and town centre

In order to clarify the relationship between how often the environments were used for each of the behaviours multidimensional scaling (MDS-Kruskal and Wish, 1978) was employed. The home environment was included in this analysis so the relationship between the other scales and the home scales could be assessed. MDS measures the similarities between variables using Euclidean distance and plots the relationships between them. The closer the variables on the plot the more similar they are (see Figure 6).

A two-dimensional solution was found for the data (Stress = 0·0320, RSQ = 0·996). Use of the neighbourhood and town centre for social interaction are highly related as are use of the neighbourhood and town centre for retreating. The school is separate from the neighbourhood and town centre suggesting that use of the school for social interaction and retreating is different from that in the neighbourhood and town centre. This could reflect the amount of time adolescents spend in the school environment and also the fact that the school is an institutional environment whereas the neighbourhood and town centre are not.

Retreating in the home is located equi-distant between retreating in the neighbourhood and town centre and interacting in the neighbourhood and town centre. Thus, use of the home for retreating is different to use of the neighbourhood and town centre for retreating. The location of retreating in the home also reflects the fact that retreating in the

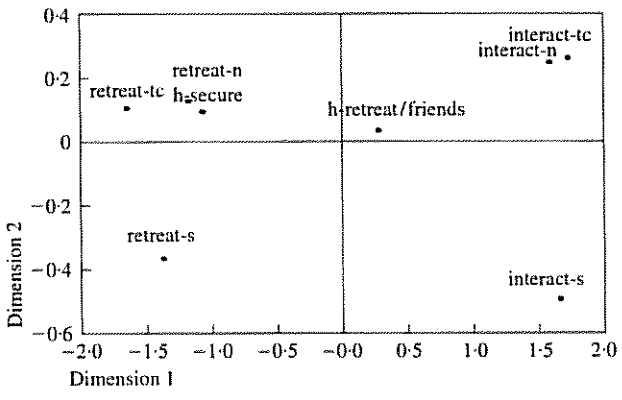

FIGURE 6. Multidimensional scaling plot for how often the four environments were used.

home is associated with being with close friends, whereas retreating in the neighbourhood and town centre is associated with being alone. Conversely, security in the home is located near retreating in the neighbourhood and town centre and all three of these scales are concerned with being alone.

Discussion

Through the use of Gibson's theory of affordances this study advances previous studies of adolescent environments by systematically examining the function of the home, neighbourhood, school and town centre in terms of their affordances for two basic developmental needs—social interaction and retreat.

The principal finding of this study is that the neighbourhood, school and town centre can all support both social interaction and retreat behaviours. The town centre provides significantly more places for interaction than the neighbourhood and school but there was not a significant difference in how often these environments were used for interaction. The neighbourhood provides significantly more places for retreat than the school and town centre and the town centre was used less often than the neighbourhood and school. The home environment does not support interaction behaviours; it provides instead affordances for two different types of retreat—retreat involving close friends and retreat involving security-seeking. One reason for the different results for the home is that the home is a closed and indoor environment whereas the neighbourhood, school and town centre environments are predominantly open and outdoor environments. The home is also shared with the family and this could explain why it does not afford social interaction; social interaction is associated with freedom and the presence of the family inhibits this.

In contrast to Lieberg (1995, 1997) who found that the town centre was associated with social interaction and the neighbourhood with retreat, the current study found that both environments afforded social interaction and retreat. There is some support for Lieberg's findings; the neighbourhood had the most affordances for retreat and was used significantly more for retreat than the town centre. Whereas the current study sampled participants from different neighbourhoods, Lieberg sampled participants from only one neighbourhood. Thus, the current study provides a more representative study of the affordances of the neighbourhood than that offered by Lieberg. However, there was no difference between the neighbourhood and town centre in their use for social interaction.

For the neighbourhood, school and town centre males perceived more affordances for retreat and also for social interaction in the school and town centre. However, there was only a gender difference in how often the town centre was used for retreat which suggests that although females perceived fewer affordances for social interaction and retreat, they do not utilize the environments less than males. Overall there was little support for females' use of the environments being restricted in comparison to males. This finding challenges those of van Vliet (1983) and others who have found females' use of the environment to be more restricted than males. Obviously, there could be gender differences in the use of other environments such as a friend's home or in what activities other than social interaction and retreat the environments are used for; but there are no gender differences in how often the principal adolescent environments are used for the key developmental needs of social interaction and retreat.

The perception of affordances for social interaction in the school and town centre peaks in Year 9 (13–14 years). This could reflect a heightened concern with social interaction at this age. Overall, there was only slight support for the decline in the use of the neighbourhood with age suggested by Hendry *et al.* (1993) and Schiavo (1988). Use of the neighbourhood for interaction decreased with age and the oldest participants (Year 11) used the neighbourhood significantly less for interaction than the youngest participants (Year 7). There was no decrease in use of the neighbourhood for retreat and therefore the neighbourhood retains its importance for retreat behaviours. Overall, the neighbourhood was used more by the older adolescents than previous literature has suggested.

Whilst there was no clear relationship between preference for an environment and the perception of affordances, there was a relationship between preference and how often the environment was used. Those who least preferred the neighbourhood and town centre environments used those environments least for social interaction. A similar result was not found for the school and home and this could be because adolescents have less choice about their use of these environments. For environments where there is a choice about use, preference effects use.

This study has concentrated upon the affordances provided by other people in the environment. Gibson felt these to be the richest type of affordance

and this study has shown that the presence and absence of others is very much a motivation in adolescents' use of the environment. For example, it is unlikely that the town centre would be such a preferred environment for adolescents and utilized so frequently if it were not for the presence of others. Gibson does not make it clear as to whether he saw other people as 'objects' in the environment like any other (albeit 'the richest type of affordance') or as mediators in the perceptual process, i.e. the presence or absence of others alters the observer's perception of the affordances. The findings of this study suggest that people are mediators in the perceptual process. The affordances available to an individual change with the presence or absence of other people.

This study has not concerned itself with examining which features of the environment result in the environment affording social interaction and retreat. It would obviously be useful in the future to identify which specific physical and social features afford social interaction and retreat. This would inform urban planning, design and management for this age group. Future research could also concern itself with determining how different types of towns and cities compare on the affordances for social interaction and retreat. Lieberg's study in a city suburb in Sweden found, for example, that only retreat was associated with the neighbourhood. Is this a cultural difference compared with Guildford in the U.K. or is it a function of the fact that Lieberg only examined one neighbourhood, whereas the Guildford study investigated several? It would also be interesting to identify whether different types of areas such as rural, suburban and urban areas differ in the provision of affordances for adolescents. Kyttä (1995) found rural environments to be the richest environment for children, but whereas a rural environment could be extremely rich in affordances for retreat it is unlikely that it would be the richest environment for social interaction. We might also expect urban areas to exhibit the opposite pattern and to be rich in affordances for social interaction and not for retreat. If it were found that some types of environments were lacking in affordances it would be valuable to examine how the developmental need for social interaction and retreat could be more adequately fulfilled.

Notes

(1) (Year 7 = 11–12 years, Year 8 = 12–13 years, Year 9 = 13–14 years, Year 10 = 14–15 years, Year 11 = 15–16 years).

(2) For all year group comparisons in this paper Bonferroni's correction was used (0·05/10 = 0·005).

References

Altman, I. & Rogoff, B. (1987). World views in psychology: Trait, Interactional, Organismic and Transactional perspectives. In D. Stokols & I. Altman, (Eds), *Handbook of Environmental Psychology*, Volume 1. New York: Wiley, pp. 1–40.

Anthony, K. H. (1985). The shopping mall: A teenage hangout. *Adolescence*, **20**, 307–312.

Barker, R. G. & Wright, H. F. (1951). *One Boy's Day: A Specimen Record of Behavior*. New York: Harper.

Blatchford, P. (1998). *Social Life in Schools*. London: Falmer Press.

Bruce, V. & Green, P. R. (1993). *Visual Perception: Physiology, Psychology and Ecology*, 2nd Edition. Hove: Lawrence Erlbaum Associates.

Coleman, J. C. (1979). *The School Years*. London: Methuen.

Cotterell, J. (1991). The emergence of adolescent territories in a large urban leisure environment. *Journal of Environmental Psychology*, **11**, 25–41.

Cotterell, J. (1993). Do macro-level changes in the leisure environment alter leisure constraints on adolescent girls? *Journal of Environmental Psychology*, **13**, 125–136.

Deem, R. (1996). *All Work and No Play*. Milton Keynes: Open University Press.

Eubanks Owens, P. (1988). Natural landscapes, gathering places and prospect refuges: Characteristics of outdoor places valued by teens. *Children's Environments Quarterly*, **5**, 17–24.

Eubanks Owens, P. (1994). Valued outdoor places: A study of teen places in Sunshine, Australia. In R. M. Feldman, G. Hardie & D. G. Saile, (Eds), *Power by Design*. Chicago: The Environmental Design Research Association, pp. 62–66.

Eubanks Owens, P. (1999). No teens allowed: The exclusion of adolescents from public spaces. *Bulletin of People-Environment Studies*, **14**, 21–24.

Gibson, E. J. (1991). The Ecological Approach: A foundation for environmental psychology. In R. M. Downs, L. S. Liben & D. S. Palermo, (Eds), *Visions of Aesthetics, the Environment & Development: The Legacy of Joachim F. Wohlwill*. New Jersey: Lawrence Erlbaum Associates, pp. 87–108.

Gibson, E. J. & Walk R. D. (1960). The 'Visual Cliff'. *Scientific American*, **202**, 64–71.

Gibson, E. J., Riccio, G., Schumuckler, M. A., Stoffregen, T. A., Rosenberg, D. & Tamorina, J. (1987). Detection of the traversability of surfaces by crawling and walking infants. *Journal of Experimental Psychology: Human Perception and Performance*, **13**, 533–544.

Gibson, J. J. (1966). *The Senses Considered as Perceptual Systems*. Boston: Houghton Mifflin.

Gibson, J. J. (1979). *The Ecological Approach to Visual Perception*. Boston: Houghton Mifflin.

Goffman, E. (1963). *Behavior in Public Places*. New York: Free Press.

Hall, L. (1994). Teenagers in suburbia: A case study in a California suburb. In R. M. Feldman, G. Hardie & D. G. Saile, (Eds), *Power by Design*. Chicago: The Environmental Design Research Association, pp. 57–62.

Hart, R. (1979). *Children's Experience of Place.* New York: Irvington Publishers Inc.

Heft, H. (1988). Affordances of children's environments: A functional approach to environmental description. *Children's Environments Quarterly,* **5,** 29–37.

Hendry, L. B., Shucksmith, J., Love, J. G. & Glendinning, A. (1993). *Young People's Leisure and Lifestyles.* London: Routledge.

Hopkins, J. S. P. (1991). West Edmonton Mall as a centre for social interaction. *The Canadian Geographer,* **35,** 268–279.

Korpela, K. (1992). Adolescents' favourite places and environmental self-regulation. *Journal of Environmental Psychology,* **12,** 249–258.

Korpela, K. & Hartig, T. (1996). Restorative qualities of favourite places. *Journal of Environmental Psychology,* **16,** 221–233.

Kruskal, J. B. & Wish, M. (1978). *Multidimensional Scaling.* Newbury Park: Sage Publications.

Kyttä, M. (1995). The affordances of urban, small town and rural environments for children. Paper presented at the '*Building Identities-Gender Perspectives on Children and Urban Space Conference*' in Amsterdam 11–13 April 1995.

Lewis, G. H. (1989). Rats and bunnies: Core kids in an American mall. *Adolescence,* **24,** 881–889.

Lieberg, M. (1995). Teenagers and public space. *Communication Research,* **22,** 720–744.

Lieberg, M. (1997). Youth in their local environment. In R. Camstra, (Ed.), *Growing Up In a Changing Urban Landscape.* Assen, Netherlands: van Gorum and Co, pp. 90–108.

Malinowski, J. C. & Thurber, C. A. (1996). Developmental shifts in the place preferences of boys aged 8–16 years. *Journal of Environmental Psychology,* **16,** 45–54.

Mark, L. S. (1987). Eyeheight-scaled information about affordances: A study of sitting and stair climbing. *Journal of Experimental Psychology: Human Perception and Performance,* **13,** 161–170.

Mauldin, T. & Meeks, C. B. (1990). Sex differences in children's time use. Sex *Roles,* **22,** 537–554.

Moore, R. C. (1986). *Childhood's Domain: Play and Place in Child Development.* London: Croom Helm.

Noack, P. & Silbereisen, R. K. (1988). Adolescent development and choice of leisure settings. *Children's Environments Quarterly,* **5,** 25–33.

Schiavo, R. S. (1988). Age differences in the assessment and use of a suburban neighbourhood among children and adolescents. *Children's Environments Quarterly,* **5,** 4–9.

Spencer, C. & Woolley, H. (2000). Children and the city: A summary of recent environmental psychology research. *Child: Care, Health and Development,* **26,** 181–197.

Tabachnick, B. G. & Fidell, L. S. (1996). *Using Multivariate Statistics 3rd Edition.* New York: Harper Collins.

Valentine, G. (1996). Children should be seen and not heard: The production and transgression of adults' public space. *Urban Geography,* **17,** 205–220.

van Andel, J. (1990). Places children like, dislike and fear. *Children's Environments Quarterly,* **7,** 24–31.

van Vliet, W. (1983). Exploring the fourth environment. An examination of the home range of city and suburban teenagers. *Environment and Behavior,* **15,** 567–588.

Warren, W. H. (1984) Perceiving affordances: visual guidance in stair climbing. *Journal of Experimental Psychology: Human Perception and Performance,* **10,** 683–703.

Woolley, H. & Johns, R. (2001). Skateboarding: The city as playground. *Journal of Urban Design,* **6,** 211–230.

Woolley, H., Spencer, C. P., Dunn, J. & Rowley, G. (1999). The child as citizen. *Journal of Urban Design,* **4,** 255–282.