ABSTRACT

Following Deng’s policy of reform (1978) and subsequent “opening up” of China, polices of resettlement have gone hand in hand with rapid urban growth. From the process of regeneration of old cities, to the large scale planning and construction of new cities, the numbers of people affected by these transformations is unquestionably significant. However through cultural, political and research limitations, it is often difficult to measure the impact at a human scale. With Urban Growth Boundary (UGB) regulations acting as a limitation to potential new development plots, coupled with increased demands for new properties from an expanding middle class demographic, both developers and local government continue to earmark existing urban areas for demolition, relocation and redevelopment (Wu Pan, 2017).

This paper takes the central district of the second tier level city of Changsha, China as its core focus, and investigates the socio/spatial impact this ongoing process of regeneration has on these relocated communities. In taking a bifurcated approach, two principle levels of investigation are established. Firstly from a social perspective, data for time, location, , pre and post demolition areas, and total area for new allocated plots is considered between 2007 and 2017. Secondly from a spatial perspective, the position of areas to be relocated before and after were plotted on the axial map of the city to give measures for integration and connectivity. Additionally at a micro scale, three areas of demolition were studied in greater detail, with questionnaires of residents providing a more qualitative understanding of the impact this process of relocation has on a social level.

Research is ongoing, however initial analysis would indicate that although relocated communities may benefit from an improvement in the quality of housing, initially these communities often appear to be in less integrated areas of the city. However increased accessibility to an improved public transport system may also look to counter this imbalance, and over time connectivity to the urban network at a global measure is increased. Local accessibility remains constant as micro businesses re-emerge to serve these resettled communities. Arguably for residents affected by relocation, their long-distance travel, community-scale activities and social activities have changed accordingly.

In conclusion, urban renewal will continue to remove low-quality urban construction from the city center to meet the demand for new developments, however the social impact of displacement remains hard to measure as one hand existing social networks established though a spatial community are broken, new links are established. Urban planners should remain aware of the long term effect these policies and market demands may have at a social level, as these relocated communities continue to evolve and define their own paths of transformation.

KEYWORDS

Urban Regeneration, Residential Displacement, Relocation, Space Syntax, China
1. INTRODUCTION

1.1 Literature Review

Following Deng’s policy of reform (1978) and subsequent “opening up” of China, polices of resettlement have gone hand in hand with rapid urban growth. From the process of regeneration of old cities, to the large scale planning and construction of new cities, the numbers of people affected by these transformations is unquestionably significant. From 2005 onwards, local government often adopted a top-down approach to new residential developments, with residents of housing earmarked for demolition and reconstruction required to move from their existing accommodation by either accepting alternative housing or financial compensation. In accordance to the land use requirements set out by local urban planning directives, developers were now able to redevelop the land flexibly according to their requirements and market demands. Developers could accept residents' requirements for spatial reconstruction and upgrade their functions according to market positioning to meet the needs and development of self-generated enterprises.

Falling into three main categories, existing research suggests that there are numerous disadvantages as a result of “economic old district reconstruction” within China, for example: blocking the cultural memory or cultural context of the city, destroying the social network of the old district, and facing the double risks of "hollowing out" and "gentrification" in the central district.(Tao xidong,2015). The first focuses on the land interaction between the government and residents, that is, demolition and resettlement activities. It mainly collects the data of urban demolition and resettlement within a certain period of time, then analyzes the evolution of social environment and the occurrence of deprivation spatial reconstruction (wang yi,2016; Song weixuan,2013);

The second category, considers the development of land, planning and development strategies, and the nature of the relationship between the developers and the government (Tang Xiaohong, 2014), (Tian Li, 2015);

The final category focuses on the balance of interests between developers and residents in the old district, reconstruction of material space and functional replacement . Zhangjiagang city being an example of urban residential space structure research in the process of urbanization (Ai min, 2004) and in Taiwan (Zhang, 2014), Nanjing (Xu, 2011), where space syntax analysis methodology is used extensively.

1.2 Overview of research objectives

To begin to consider the socio/spatial impact this ongoing process of regeneration has on relocated communities, this study takes the provincial city of Changsha, Hunan, China, as its area of focus. As typical with many second tier cities, it has witnessed unparalleled urban expansion over the last two decades. Being strategically located along the Xiang Jiang River that connects with the Yangtze river to the north of the Provence, has provided the city both historical and geographical significance.

Following the pattern of ongoing urban planning and newly built road infrastructure, it is possible to divide the city into three distinct rings (Fig. 1.1). The inner most ring defines the central downtown area of Changsha city, and contains the majority of the old city architecture. Beyond this, the second ring contains the JinXia district, LuGu District, Xing Ma District, and other major urban development and construction sites. The third ring is defined by the course of second ring road and sees ongoing urban development along its periphery. Within the last decade, extensive large scale urban demolition and renewal has mainly been focused within the central downtown district, with the impact of these urban policies mainly affecting residents within this first ring. However for the purpose of this paper, and to provide a broad range of comparison, areas of demolition, regeneration and relocation have been identified and considered within all three areas.
2. DATASETS AND METHODOLOGY

2.1 Research question and data

The research looks to focus on three principle areas of interest: firstly to identify the time characteristics of urban renewal by mapping the evolution process of urban demolition between 2007 and 2017. To then measure the distinct spatial phenomena of this process, what are the differences between the residential space before and after renewal/reconstruction are considered. Finally to begin to understand the impact of urban renewal at a social level by asking what changes have occurred within the social environment of residents who have been affected by the strategy of relocation.

Evidence was drawn from a number of different databases: The first database being between 2007-2017 year, where 133 areas were recorded for urban demolition. Urban road network and land use data provided a comparison for measures of integration and connectivity. The third source identifies 25 new commercial housing communities and 51 resettlement residential area, including area and date over the 10 year period from 2007. (Fig. 2)
2.2 research methodology

The study of spatial syntax on urban spatial structure is one of the most mature and classical fields in its application. (Yu Lu, 2017) This paper adopts a bifurcated approach. At macro level, the time, place, area before and after demolition and the total area of the newly allocated land plots from 2007 to 2017 were first considered from a statistical perspective. Then, to analyze the social and spatial distribution of demolition activities from 2007 to 2017. Secondly, from spatial perspective, the regional position before and after urban relocation is drawn on the urban axial diagram and analyzes the land use change before and after. Thirdly, from social perspective, measures the integration and connectivity by GIS and spatial syntactic software. In addition to establish a connection between macro level analysis and micro level research, this paper carries out more detailed studies on the three resettlement areas, and through the questionnaire survey of residents, provides a qualitative understanding of the impact of the demolition process on the social level.

3. THE TIME CHARACTERISTICS OF URBAN RENEWAL AND RESIDENTIAL EVOLUTION IN INNER CITY OF CHANGSHA

To considers space and social characteristics of urban renewal and residential evolution in inner city of Changsha from 2007 to 2017, a comparative analysis method is established, using factor analysis and time series analysis for time attribute comparison. In order to provide comparative data at a macro scale, figures for the quantity and total area of demolished and new-built residential area is drawn upon. Table 1. illustrates the time and area of 133 demolished residential communities in inner city of Changsha from 2007 to 2017. The graph shows the fluctuation and the falling trend of demolished residential communities. Demolition activities reach a peak in 2008, where both the quantity and area of demolition projects reached the highest in 11 years. Before 2010, frequency of land demolition projects in Changsha remained above 10 per year on average, with a high overall demolition intensity. However, the project area of land demolition in Changsha gradually declined after 2013. From 2007 to 2010, demolition activities in Changsha were frequent and on large scale. On average, 1.5 plots of land were updated every month, average area of the updated plots was about 8.2 hectares. From 2011 to 2013, the demolition frequency slowly retreated to 1.0 plot per month and the average area of demolition projects increased to 10.08 hectares. Until 2014, demolition activities slowly decreased, on an average of two months there was a demolition project of an area of 4.79 hectares.

During the same time period from 2007 to 2017, the overall trend in the change of number and area of new-built and resettlement communities with the inner city remained comparatively equal to the number and area of demolished communities. As illustrated in Table 2, there was a noticeable development of resettlement communities in 2007 and 2008. With an average of 20 new resettlement communities being built each year. The number of resettlement communities reached to a peak of 22 in 2007. However, due to the change in China's resettlement policies, the number of new resettlement communities came to an abrupt end in 2014. From 2005 to 2014, land units were mainly physical settlements, i.e. constructing resettlement residential areas near the demolished residential areas. However, the state council in June 2015 made an explicit request to "Actively promote the monetization of resettlement projects" ①. From then on, almost no new resettlement residential
buildings were built in inner city of Changsha. From 2007 to 2017, the number of commercial housing projects maintained a low value of 5 buildings per year. Over time, serious land shortage within the inner city lead to a marked decrease in the number of new-built residential communities, reaching zero in 2017.

Table 1: 2007-2017 Changsha urban district demolition plot area and demolition project changes

Table 2: From 2007 to 2017, the area and changes of newly built and resettled communities will be changed

4. THE SPATIAL CHARACTERISTICS OF URBAN RENEWAL AND RESIDENTIAL EVOLUTION IN INNER CITY OF CHANGSHA

GIS is utilised to compare and analyze the spatial distribution and aggregation of urban demolition and new-built residence between 2007 and 2017, as well as the comparative analysis of land use in same time period.

Peng gai——An actively promote the monetization of resettlement projects. Before 2015, the government mainly used resettlement in kind as compensation. After 2015, the government mainly adopted monetary compensation
Over the past ten years, the spatial characteristics of urban renewal and residential evolution in inner city of Changsha have followed a similar trend to those of most cities in China. The location of residential areas earmarked for demolition is mainly within the established urban core and urban core areas under development, while resettlement and new-built residential areas are mainly distributed in the outer ring of inner city. As illustrated in fig. 3 and 4, from 2007 to 2017, demolition activity mainly occurred in two areas, downtown area of Hedong Wuyi avenue, and north of Yuelu avenue, along the Laodong west road.

Table 3: Density analysis diagram of demolition points
Table 4: Density analysis diagram of new residential buildings

As for the nature of land use, since the control regulations of 2007 have not been fully implemented, only the general regulations of 2004 and 2014 could be used for comparison. With the urban
development on the west part of Changsha city, the total urban planning area increased accordingly, and Wangcheng district in the northwest was included in the civic district part of Changsha. The spatial structure also changed from the original uni-centre of Hedong Wuyi road to the multi-centre of Hexi and Hedong. In addition, according to the changes in the land use properties of 133 demolition plots and 76 new built residential areas, the most desirable feature of the changes in the land use properties is that the land use of inner urban areas presents a more mixed and overall intensive development mode. Of the 133 demolition plots, 35 have changed the nature of land use. As shown in Table 5, some basic service facilities (S) and industrial land (M) have been changed to public green space, non-construction land (G) and cultural education land (A). The overall volume ratio, building density and building height have remained basically unchanged. However, in the 76 newly built residential points in Table 6, many basic service facilities (S), public green space and non-construction land (G) and commercial services (B) were changed to residential land (R), and the indicators of urban development intensity represented by volume ratio, building density and building height were all increased. Therefore, it can be suggested that urban renewal tends to improve urban quality. And quality of housing resettlement tends to increase the intensity of urban development and the overall environment.

Table 5: Changes in land use properties of 133 demolition plots
Table 6: Changes of land use nature in 76 newly built residential areas

5. THE SOCIAL CHARACTERISTICS OF URBAN RENEWAL AND RESIDENTIAL EVOLUTION IN INNER CITY OF CHANGSHA

Social network refers to the formal and informal social interactions between people, including direct and indirect relationships formed through sharing of material environment and culture (Yang Jianqiang, 1999). Social attribute analysis utilizes spatial an accessibility index to measure the value of social attribute. The spatial accessibility value of demolished and newly-built resettlement residence is obtained through Geographic Information System (GIS), comparison of overall and local integration degree of each residence in 2007 and 2017 reflects the residential evolution and transformation in residents social relationships in addition to long and short-range social activities.

5.1 Global integration degree analysis of demolished and new-built residential areas (axis model)

The global integration degree of the axis model predicts the accessibility of vehicular traffic on an urban scale. The comparison of fig 5 and 6 reveals a significant increase in roads with higher accessibility in inner city of Changsha, extending from Hedong municipal government to Hexi university region. However, due to the expansion of the inner urban area in Changsha, the average accessibility of roads gradually decreased from 0.938 to 0.920, and the variance dropped from 0.199 to 0.177. When substituting the average integration degree of the residential area by its nearest axis integration degree, results showed that the global integration degree of all the demolished residential areas in 2007 was 0.980. and the global integration degree of all the new-built residential areas in 2017 was 0.908. Suggesting that from 2007 to 2017, social displacement of residents in inner city of Changsha took place from a higher urban integration area towards a lower urban integration area. It is also arguable that the current large-scale, stereotype old communities redevelopment often neglects the protection of social network and relationships of urban residential society and community. As a result, several long-term existing social networks and relationships within communities are broken and lost overtime.
5.2 Local integration degree analysis of demolished and new-built residential areas (line segment model, R=400)

The line segment model is a spatial relationship model with meters as its measuring unit. Compared to the axis model, it is more suitable for micro-scale research. The local integration degree with a radius of 400 meters can estimate the accessibility of an area by foot (5 minutes). Contrast of fig 7 and 8 shows a dramatic increase in the areas with high local integration in 2017. Especially in Kaifu district government area in the North, Yuelu district, university and Municipal government area in Hexi. However, due to the expansion of inner city and the construction of new roads, both the average integration degree (R=400) and variance slide from 75.464 and 47.8302 in 2007, to 71.143 and 45.631 in 2017. When substituting the average local integration degree of the residential area by its nearest line segment integration degree, results showed a mite difference. Local integration degree of demolished residential area in 2007 was 54.12 and the local integration degree of new-built residential area in 2017 was 54.85.

Hence, it can be concluded that the local integration degree of living environment of residents remained stable at a medium level both before and after social displacement. Therefore, the impact of demolition activities on street scale activities is not as obvious as that on macro urban scale.

5.3 Connection degree analysis between demolished and new-built residential areas (line segment model)

The connection value represents the number of spaces directly intersecting with an empty space or a section of road in the system. It represents the number of adjacent spaces that a person can see when standing in space. In an actual space system, the high or low connection value reflects the spatial penetration quality. The line segment model calculation results show that in 2007 the average connectivity and variance of the road network in inner city of Changsha was 4.001 and 1.185 respectively. The numbers gradually dropped to 3.983 and 1.184 in 2017. When substituting the average connection degree of the residential area by its nearest line segment connection degree, results showed that in 2007 the connection degree of demolished residential area was 3.432. In 2017, the connection degree of new-built residential area was 3.842.
Therefore, it can be inferred that the affected residents' social relations are still maintained by participating in some social activities that remain convenient.

6. FIELD RESEARCH AND TO MEASURE

In order to facilitate a greater understanding of the socio/spatial impact of resettlement policies upon affected residents within the inner city of Changsh, a number of resettlement areas were selected within the city to carry out more qualitative research through a handout questionnaire survey. (see Appendix
1. The field research selected three resettlement areas as case studies, Huo Yan, Hou Hu and Wu Xing village community, all located within the highlighted city boundary. Questionnaires comprised of four main question sections, personal information, residential situation, spatial information and overall evaluation, with data from 76 valid questionnaires being used for analysis. Survey photos are as follows:

Figure 11: The entrance of the Wu Xing village community
Figure 12: Commercial pictures of the bottom floor of Hou Hu community
Figure 13: Photos of commercial and residential houses in Huo Yan community

The collected data from the questionnaire looked to provide a comparative overview of the resettlement areas. Data revealed that there were almost equal number of male and female living in the resettlement areas and were mainly middle aged (25 - 50 years). Almost half of the surveyed residents agreed that their current housing quality has improved. In terms of social displacement, three resettlement communities showed different data. Residents from demolition plots near the resettlement area accounted for 45.45% in the newly built Wu Xing village community, 38.18% in the newly built HouHu community, and 20% in the community questionnaire of Huo Yan community. It can be inferred that over time, the original resettled residents in the community were mostly replaced by residents from other areas of Changsha and the surrounding areas of city. (Table 7).

![Image of Analysis of the major locational sources of residents in three surveyed residential areas]

Table 7: Analysis of major locational sources of residents in three surveyed residential areas

6.1 Empirical research on residents’ global activity

Section 3 of the questionnaire first considered the city-level activity situation by asking the residents what kind of transportation means individuals used to travel to work and to school, as well as the journey duration. Assuming that the unit time of walking is 1 unit distance, the subway is 2 units distance, the bus is 3 units distance, the taxi is 4 units distance, and the private car is 5 units, the commuting distance to work can be converted to an accumulative value: 92.2 before relocation, 95.5 after relocation; Regarding commuting distance; it was 28.1 before relocation and 47.5 after relocation. Combined with paragraph 5.1, it can be shown that the increase of working and commuting distance...
to school is consistent with the trend of the decrease of the overall integration degree of the demolished residential areas and newly built residential areas in the axis model.

6.2 Empirical research on residents' local activity

Next the status of community-level activities was measured by inquiring residents' medical attendance and time, as well as their business status before and after the relocation is highlighted. Adopting the same conversion ratio used to give a value for different modes of transportation, the commuting distance for medical treatment can be obtained: 118.2 before relocation and 89.5 after relocation. According to the residents' choice of medical treatment in table 8, 65.4% of individuals choose clinics and hospitals near the community. Suggesting that it is the popularization and improvement of the configuration of medical infrastructure service facilities in the newly built resettlement communities, rather than the improvement of urban accessibility, being a reason for the significant reduction of the commuting distance for medical treatment after the demolition. As seen from the comparison of business conditions before and after residential relocation in the questionnaire, it can be inferred that the community-level business operation is more optimistic than the analysis of the local integration degree (R=400) of the line segment model of demolished residential areas and newly built residential areas. As highlighted in paragraph 5.2, the residential environment optimization of the settlement community constructed under the condition of slight improvement of community-level accessibility promotes the community level local business enterprises.

![Comparative analysis of housing quality and business status before and after relocation](image)

Table 8: Comparative analysis of housing quality and business status before and after relocation

<table>
<thead>
<tr>
<th>Level</th>
<th>Before Relocation</th>
<th>After Relocation</th>
<th>Improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>City hospital</td>
<td>18.2%</td>
<td>89.5%</td>
<td>71.3%</td>
</tr>
<tr>
<td>Provincial hospital</td>
<td>24.6%</td>
<td>54.1%</td>
<td>39.5%</td>
</tr>
<tr>
<td>The municipal hospital</td>
<td>35.8%</td>
<td>42.8%</td>
<td>7.0%</td>
</tr>
<tr>
<td>Community clinic</td>
<td>15.8%</td>
<td>30.6%</td>
<td>14.8%</td>
</tr>
<tr>
<td>Residential peripheral hospital</td>
<td>5.9%</td>
<td>5.9%</td>
<td>0%</td>
</tr>
</tbody>
</table>

6.3 Empirical research on residents' social activities

The fourth part is the evaluation of the impact of relocation activities on individual social activities. The questionnaire results show that about a third of respondents think they can still keep in touch with their original neighbours and friends. The main way to keep in touch is through meeting in person and using the ubiquitous social media platform We Chat, with significant less use of the phone to make calls. There is a notable difference in the results of the survey on the number of people who keep in touch. About half of the residents think they can keep in touch with a group of old friends, about half of the residents think it is 1-2 people, and a small number of residents think it is 3-5 people. More than half of these former friends were family members, about a third were friends and neighbours, and very
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few were colleagues. Combined with Table 9, it can be seen that residents can easily maintain their original social relations by participating in social activities after being affected by urban renewal.

![Diagram of residents' original social relations and connections]

Table 9: Analysis of residents’ original social relations and connections

7. DISCUSSION

Due to the scope of the research question, and limitations with accessibility to data, the final result of the paper are still at an ongoing research stage. However, it is evident that the new communities continue to go through stages of spatial evolution from the process of relocation and social displacement.

Field research data shows that the development process of resettlement communities follows a certain pattern. During its initial stage, when a resettlement community is newly constructed, the overall urban integration is usually low. However, over time, the majority of individuals from the original village (local residents) move out of the resettlement community, being replaced by low-income students and migrant workers who then come rent in this area. Later, with the expansion and development of the city and the improvement of underground and transportation facilities, resettlement community gradually reaches a mature stage, seeing its urban spatial position gradually transformed from the peripheral of the city to “closer” to the centre of the city. The overall urban integration degree also increases significantly, attracting both the government and developers to redefine and develop it again. For example, Hunan Huoyan residence, located next to the Gaoqiao grand bazaar, was redefined and developed as a wholesale tea market.

8. CONCLUSIONS

This paper first looked to measure the process of transformation for the inner city of Changsha between 2007 and 2017. It then compares specific areas of urban space morphology before and after urban renewal, analyzing the changes of land use property and distribution level of demolished and new-built residential communities. Finally, it discusses the impact and changes in the socio-spatial relationships of residents caused by relocation and social displacement.
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Socio-spatial relationships are complex and are influenced by multiple factors, such as policy, economy and culture. Hence, although the paper adapts Geographic Information System (GIS) quantitative analysis method, the data collected only reflects the level of impact of demolition and resettlement of residential areas on socio-spatial relationships of residents from 2007 to 2017. From a sequence of positive to negative impact, compared to old demolished residential areas, the new-built and resettlement residential areas caused an increase in the overall urban spatial penetration value, and urban global integration level dropped gradually. Although evidence would suggest that the overall quality of housing in resettlement residential communities have improved, initially these communities are often located in less integrated parts of the city. Street level activity remained almost unaffected, as local accessibility remains the same as micro-enterprises reappear to serve these resettled communities. However over time with the ongoing improvement of the global accessibility of public transportation system, the degree of connection with the urban network has increased, maintaining the continuation of the social relationship between residents and citizens. Hence, with the formation of new social networks, the affected residents remains socially connected to their old network of neighbours, friends and family. Finally as these relocated communities continue to evolve, and follow new paths of transformation, it is difficult to predict a final outcome for the original planning strategies.

APPENDIX 1

The Questionnaire

Hello! We are students of the Hunan University School of Architecture and we are assisting the Hunan Provincial Architectural Design Institute with a new research project. We are investigation urban planning policies of urban demolition and relocation, between the period of 2007-2017, and the impact these may have upon your daily life. The data collected will help give a better understanding of these polices, and hopefully how to improve future developments. We hope to get your support. Thank you very much!

Part one: personal information

1. Your age:
   a. under 18 b. 18-25 c. 25-50 d. 50 and above
2. Your gender:
   Male b. female
3. When did you leave your previous residence and move here?

Part two: the housing situation

4. Which area did you come from?
   A. kaifu district b. tianxin district c. yuelu district d. yuhua district e. furong district f. wangcheng district g. liuyang city h. ningxiang city I
5. Changes in housing quality after your relocation?
   A is of much higher quality (5 points) B is a little better than before (4 points) C is in the same condition as before (3 points) D is in worse condition than before (2 points) E becomes very poor (1 point)

Part three: spatial information

6. What kind of transportation do you usually use before moving?
   (1) transportation: A walk B bus C private car D taxi E subway
   How long will it take?
   (2) traffic time:
7. What kind of transportation do you usually use for your work after relocation?
   (1) transportation: A walk B bus C private car D taxi E subway
   How long will it take?
   (2) traffic time:
8. What kind of transportation did your children usually use to read before moving?
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(1) transportation: A walk B bus C private car D taxi E school bus
How long will it take?
(2) traffic time:
9. What kind of transportation do you usually use for children to read after you move?
(1) transportation: A walk B bus C private car D taxi E school bus
How long will it take?
(2) traffic time:
10. What kind of transportation did your family usually use for medical treatment before moving?
(1) transportation: A walk B bus C private car D taxi E subway
How long will it take?
(2) traffic time:
11. What is the general transportation for your family to seek medical treatment after your relocation?
(1) transportation: A walk B bus C private car D taxi E subway
How long will it take?
(2) traffic time
(3) where do you and your family usually go for medical treatment?
A nearby clinic B nearby hospital C municipal hospital D provincial big hospital

Part four : evaluation

12. Has your business been affected after your relocation?
(1) previous business status: A good (5 points) B good (4 points) C average (3 points) D bad (2 points)
E bad (1 point)
(2) current business status: A good (5 points) B good (4 points) C average (3 points) D bad (2 points)
E bad (1 point)
(1) do you keep in touch with your former neighbors and friends?
A. can keep in touch b. generally c. hard to keep in touch
(2) what is your usual method of communication?
A. meet b. call c. social media: WeChat
How many people do you know who used to live here?
a. A group of people (5 points)b. 3-5 people (3 points)c.1 or 2 people (1 point)
(2) what are they mainly?
a. family member b. colleague c. friend

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