

**RESIDENTIAL SEGREGATION IN POST-APARTHEID VREDENBURG:
THE ROLE OF RACIAL PREFERENCE**

HENDRIK STEPHANUS JANSE VAN RENSBURG



Thesis presented in partial fulfilment of the requirements for the degree of Master of Arts in Geography and Environmental Studies at the University of Stellenbosch.

Supervisor: Dr PH de Necker

April 2003

DECLARATION

I, the undersigned, hereby declare that the work contained in this thesis is my own original work and that I have not previously in its entirety or in part submitted it at any university for a degree.

ABSTRACT

South Africa has a long history of divided towns and cities. The grave inefficiencies and inequalities that developed between the racial communities during these periods must now be redressed in post-apartheid South Africa by integrating and unifying the physical and social structures of the country's urban settlements. In spite of the positive general trends in race relations and attitudes towards residential integration, South African towns and cities generally remain hyper-segregated. This could be an indication that White attitudes pertain only to the principles of integration, but that they do not actually want to live in integrated neighbourhoods themselves.

The aim of this study is to assess the influence of racial preference in the dismantling or continuation of segregation in the South African town of Vredenburg during the post-apartheid era. This is done by determining the influence that the population group composition of a neighbourhood has on the desirability of living in that neighbourhood when accounting for varying levels of crime and neighbourhood deterioration. A factorial survey questionnaire was used to gather the data, which were then analysed by way of multiple regression analyses.

The results of the analyses indicate that the sampled residents of Vredenburg are generally not influenced by the population group composition of the neighbourhood. However, the more unsafe the neighbourhood, the more litter that is strewn about, the lower the housing quality and the more unfriendly the neighbours, the less respondents liked the neighbourhood. The results also indicate that members of the upper socio-economic class are more critical of their neighbourhoods and tend to evaluate them according to stricter criteria than the lower socio-economic classes do.

The findings suggest that the racial composition of a neighbourhood per se does not significantly affect the attitudes of Vredenburg's residents towards a neighbourhood. Rather, high levels of crime and residential environmental deterioration are the factors that strongly affect both White and non-White people's views of a neighbourhood.

Higher levels of crime and environmental deterioration are commonly associated with the lower socio-economic class. In the case of Vredenburg, vast socio-economic differences exist between the White and non-White residents of the town. These differences are not likely to change considerably in the short term. The continuation of these class differences will most likely be the cause of continued segregation in Vredenburg.

Keywords: Apartheid city, Centralisation, Concentration, Evenness, Exposure, Factorial survey, Hyper-segregation, Integration, Multiple regression analysis, Neighbourhood characteristics, Racial preference, Segregation, Segregation indices.

OPSOMMING

Suid-Afrika het 'n lang geskiedenis van verdeelde stedelike gebiede. Die erge ongelykhede en oneffektiewe strukture wat tussen die verskillende rassegroepe binne die stedelike gebiede ontstaan het, moet reggestel word in die post-apartheid era. Dit moet gedoen word deur die verdeelde fisiese en sosiale strukture van Suid-Afrika se stedelike gebiede te integreer. Ondanks die algemene positiewe neiging in rasseverhoudings en houdings teenoor residensiële integrasie, bly Suid-Afrikaanse stedelike gebiede steeds hiper-gesegregerd. Dit kan 'n teken daarvan wees dat Blankes se ingesteldheid slegs positief is teenoor die beginsel van integrasie maar dat hulle nie self in geïntegreerde woonbuurte wil bly nie.

Die doel van die studie is om die invloed van rassevoorkeur te bepaal in die aftakeling of voortsetting van segregasie in Vredenburg, Suid-Afrika, gedurende die post-apartheidsera. Dit word gedoen deur die invloed van bevolkingsgroepsamestelling op die begeerte om in daardie buurt te woon te bepaal, in ag genome die invloed van verskillende vlakke van misdaad en omgewingsverval binne daardie woonbuurt. 'n Faktoriale opnamevraelys is gebruik om data in te samel. Die data is daarna ontleed deur middel van veelvuldige regressie-analises.

Die resultate van die analises toon dat die inwoners van Vredenburg, wie aan die steekproef deelgeneem het, in die algemeen nie beïnvloed is deur die bevolkingsgroepsamestelling van 'n woonbuurt nie. Daarteenoor het die deelnemers minder gehou van woonbuurte wat meer onveilig is, waarin meer rommel gestrooi is, waarvan die behuisingskwaliteit laer en die bure meer onvriendelik is. Die resultate toon ook dat lede van die hoë sosio-ekonomiese klas meer krities is oor woonbuurte en geneig is om dié areas volgens strengere kriteria te evalueer as die laer sosio-ekonomiese groepe.

Die bevindings dui aan dat die rassesamestelling van 'n woonbuurt per se nie die ingesteldheid van die dorp se inwoners beduidend beïnvloed nie. Dit is eerder hoë vlakke van misdaad en residensiële omgewingsverval wat beide Bruin en Blanke inwoners se opvattinge oor 'n buurt beduidend beïnvloed.

Hoër vlakke van misdaad en omgewingsverval word gewoonlik met die laer sosio-ekonomiese klas geassosieer. In Vredenburg se geval bestaan daar groot sosio-ekonomiese verskille tussen die Blanke en nie-Blanke inwoners van die dorp. Dit is onwaarskynlik dat hierdie verskille in die korttermyn beduidend sal verander. Voortgesette klasverskille sal waarskynlik die oorsaak wees van volgehoue segregasie in Vredenburg.

Trefwoorde: Apartheidstad, Blootstelling, Egaligheid, Faktoriale opname, Hiper-segregasie, Integrasie, Konsentrasie, Meervoudige regressie-analise, Rassevoorkeur, Segregasie, Segregasie-indekse, Sentralisasie, Woonbuurtkaraktereienskappe.

ACKNOWLEDGEMENTS

I thank the many people who contributed to my study, directly or indirectly, in a large or small way. In particular, I wish to thank and acknowledge the following persons and organisations:

- My Father in Heaven, for His endless mercy and for granting me opportunities.
- My wife, Karin, for her longsuffering, support and encouragement.
- My supervisor, Dr Pieter de Necker, for his valuable contributions in bettering my thesis and failure to give up on me.
- The external examiner, Dr André Horn, also for his valuable contributions in bettering my thesis.
- My colleagues, André and Hennie, to whom I turned many a time for advice.
- Ms Ariane Neethling, without whom I would never have been able to properly decipher all the statistics.
- The library personnel at the Military Academy, especially Ms Elsa van Nieuwenhuysen, for tracking down sources and promptly attending to my requests.
- Dr Edwin Hees, for checking and editing the language of my thesis.
- The South African Military Academy, for use of their equipment, facilities and transport during my study.
- The Saldanha Bay Municipality, for allowing me use of their cadastral data.

CONTENTS

Declaration	ii
Abstract	iii
Opsomming	v
Acknowledgements	vii
Tables	xi
Inserts	xi
Figures	xii
Acronyms	xiii
CHAPTER 1: INTEGRATING SOUTH AFRICAN TOWNS	1
1.1 RACIALLY SEGREGATED NEIGHBOURHOODS IN SOUTH AFRICAN TOWNS AND CITIES	1
1.2 PROBLEM FORMULATION AND AIM: THE ROLE OF PREFERENCE IN RACIAL RESIDENTIAL SEGREGATION	4
1.3 CONCEPTUALISING RACIAL RESIDENTIAL INTEGRATION AND SEGREGATION	5
1.3.1 Racial Segregation	5
1.3.2 Racial Integration and Transition	7
1.4 RESEARCH THEMES WITHIN THE RACIAL RESIDENTIAL SEGREGATION-INTEGRATION FIELD	8
1.4.1 International Context	9
1.4.2 South African Context	10
1.4.3 Causes of Segregation	12
1.5 VREDENBURG AS CASE STUDY	13
1.6 RESEARCH METHODOLOGY	14
1.6.1 Data-Collection Instrument: A Factorial Survey	14
1.6.1.1 The Factorial Survey Questionnaire	16
1.6.1.2 Creating the Questionnaire	18

1.6.2	Sampling and Data Collection Methods	19
1.6.2.1	A Stratified Random Sample of Households in Vredenburg	19
1.6.2.2	Representativeness of the Sample and Vignette Contents	20
1.6.2.3	Drop-off and Collect Method	25
1.6.2.4	Structured Interviews	25
1.6.3	Data Analysis Procedure: Multiple Regression Analysis	26
1.7	RESEARCH AGENDA	30
 CHAPTER 2: THE URBAN SETTING		 33
2.1	NATIONAL CONTEXT: URBAN SEGREGATION IN SOUTH AFRICA	33
2.2	VREDENBURG IN REGIONAL AND LOCAL CONTEXT	36
2.2.1	Regional Setting	36
2.2.2	Historical Development	41
2.2.3	Urban Profile	43
2.2.4	Socio-Demographic Profile	45
2.3	MEASURING SEGREGATION IN VREDENBURG	50
2.3.1	Evenness	52
2.3.2	Exposure	53
2.3.3	Concentration	55
2.3.4	Centralisation	57
 CHAPTER 3: ANALYSING THE INFLUENCE OF RACIAL PREFERENCES ON NEIGHBOURHOOD EVALUATIONS		 60
3.1	THE ADDITIVE REGRESSION MODEL	60
3.2	THE INTERACTION REGRESSION MODEL	64
3.2.1	Interaction Between RACECOMP and MCLASS	66
3.2.2	Interaction Between RACEBI and UCLASS	67
3.2.3	Interaction Between UCLASS and CRIME	68

CHAPTER 4: CONTINUED SEGREGATION IN VREDENBURG: THE MINOR ROLE OF RACIAL PREFERENCE	71
4.1 SYNTHESIS	71
4.2 EXPECTED FUTURE PATTERNS OF DESEGREGATION IN VREDENBURG	74
4.3 AVENUES FOR RESEARCH	75
REFERENCES	77
PERSONAL COMMUNICATIONS	89
APPENDICES	
A-1 SURVEY QUESTIONNAIRE: PART 1	90
A-2 SURVEY QUESTIONNAIRE: PART 2	91
B COVERING LETTER	92
C SEGREGATION INDEX CALCULATIONS	93
D1 ADDITIVE REGRESSION MODEL RESULTS: Model Summary and Model Correlations	94
D2 ADDITIVE REGRESSION MODEL RESULTS: Model Coefficients	95
E1 INTERACTION REGRESSION MODEL RESULTS: Model Summary and Abbreviations used in the model	96
E2 INTERACTION REGRESSION MODEL RESULTS: Model Correlations	97
E3 INTERACTION REGRESSION MODEL RESULTS: Model Coefficients	98

TABLES

1.1	Opinions about race relations in South Africa since 1994	3
1.2	Definitions of racial residential segregation	6
1.3	Main focus areas and examples of research undertaken within the segregation-integration field	9
1.4	Neighbourhood variables, codes and characteristics used in the factorial survey	17
1.5	Sample and response data per enumeration area of the questionnaire survey of neighbourhood evaluations in Vredenburg	21
1.6	Final response summary of the questionnaire survey of neighbourhood evaluations in Vredenburg	22
1.7	Summary of variables used in the multiple regression analysis	27
1.8	Summary of the changes in the multiple regression analysis with the addition or removal of variables	29
2.1	West Coast District: most recent population counts or estimates	39
2.2	Level of urbanisation per population group, West Coast District 1996	41
2.3	Definitions, measures and scoring of four dimensions of residential segregation	51
2.4	Classification of South African towns in terms of segregation levels, based on D	52

INSERTS

1.1	The factorial survey method in perspective	15
2.1	Dimensions of segregation	50

FIGURES

1.1.	The racial residential segregation-integration continuum	5
1.2.	Combined biographical characteristics of the survey respondents	23
1.3	Combined distribution of neighbourhood characteristics in all evaluated vignettes	24
1.4	The two-stage process of multiple regression analysis to determine the effects of various characteristics on respondents' evaluations of neighbourhoods	28
1.5	Research design for determining the influence of racial composition on neighbourhood evaluations in Vredenburg	32
2.1	Apartheid city structure	35
2.2	The West Coast district	37
2.3	Prosesfontein monument	42
2.4	Spatial layout of Vredenburg	44
2.5	Population group composition of enumeration areas in Vredenburg, 1996	46
2.6	Population group contribution towards income levels in Vredenburg, 1996	47
2.7	Population groups of Vredenburg, 1996	48
2.8	Highest educational qualification achieved by the residents of Vredenburg, 1996	49
2.9	Vredenburg placed on the segregation-integration continuum	58
3.1	Maslow's human needs hierarchy applied to neighbourhood variables	63

ACRONYMS

ACE	Absolute Centralisation Index
CBD	Central business district
CRIME	Crime level
D	Dissimilarity Index
EA	Enumeration area
ENVCLEAN	Environmental cleanliness
GIS	Geographical information system
HOUSQUAL	Housing quality
LCLASS	Lower-class
LOCATION	Neighbourhood location
MCLASS	Middle-class
NAME	Neighbourhood name
RACEBI	Dummy variable where Whites are denoted as zero and non-Whites as 1
RACECOMP	Racial composition
RBXUC	Interaction term: RACEBI with UCLASS
RCO	Relative Concentration Index
RCO*	Adapted Relative Concentration Index
SCORE	Respondents' ratings of vignettes
SOCENV	Social environment
SPSS	Statistical Package for Social Scientists
UCLASS	Upper-class
UDF	Urban Development Framework
URDS	Urban and Rural Development Strategy
WCO14	Numerical designation of the Saldanha Bay Municipality
WCPTC	West Coast Peninsula Transitional Council
$xP*x$	Isolation Index
$xP*y$	Interaction Index
ZCXUC	Interaction term: CRIME with UCLASS
ZRCXMC	Interaction term: RACECOMP with MCLASS

CHAPTER 1: INTEGRATING SOUTH AFRICAN TOWNS

“!KE E: /XARRA I/KE”

(Diverse People Unite – Motto on the South African Coat of Arms)

1.1 RACIALLY SEGREGATED NEIGHBOURHOODS IN SOUTH AFRICAN TOWNS AND CITIES

Post-apartheid South Africa’s national motto reflects the truism that a society’s or a state’s survival is very much dependent on the unity of its population. Despite this fact, South Africa has a long history of divided towns and cities. These divisions can be dated back to colonial rule in the 17th century; they then developed into the segregated settlements in the early 20th century and became apartheid settlements in the middle of the same century (Van der Merwe 1993). The grave inefficiencies and inequalities that developed between the racial communities during these periods must now be redressed in post-apartheid South Africa by integrating and unifying the physical and social structures of the country’s urban settlements (Dewar 1994;1995; Lemon 1997).

The South African government has realised the importance of unified, or rather integrated, urban settlements, and consequently the Ministry in the Office of the President put forward an Urban and Rural Development Strategy (URDS) in 1995. In 1997 the Department of Housing formalised the URDS into an Urban Development Framework (UDF) (Donaldson & Van der Merwe 2000). In brief, the UDF is the framework within which all urban development in South Africa should take place. According to the UDF, all urban development in the country should assist in accomplishing the “Urban Vision” for South African cities and towns as set out in the UDF. This vision spells out eight criteria that should characterise South African urban settlements by the year 2020. The first of these criteria is that South Africa’s urban settlements should be spatially and socio-economically integrated, free of racial and gender discrimination and segregation, enabling people to make residential and employment choices to pursue their ideals (South Africa 1997: 8).

Clearly the South African government, via the UDF, places great importance on integrating of the former segregated and fragmented apartheid cities. Attempting to integrate segregated cities and towns is not unique to South Africa. Hart (1989) points out that human ecology as well as the development of research tools such as segregation indices, social area analysis and factorial ecology have become mainstream items in geographical research, as geographers grapple with the problems associated with social diversity in cities. One of these problems is that of ethnicity and race as they are manifested spatially in segregated neighbourhoods.

St. John & Bates (1990) suggest that survey research in the United States indicates that Whites¹ have become less prejudiced towards Blacks when compared to 30 or 40 years ago. This change is also accompanied by a seemingly more tolerant attitude towards residential integration by the White population. However, St. John & Bates (1990: 47-48) put it that

“...this tolerance pertains more to the general principle of integration than to actual inclinations for whites to live in integrated neighborhoods.... Understanding the apparent aversion of whites to living in racially integrated neighborhoods is central to the issue of overall integration.... For example, residential integration is the key to integration in public schools and to informal interaction among blacks and whites.”

As part of a larger study Donaldson & Van der Merwe (1999: 5) asked residents of Polokwane (formerly called Pietersburg) to express their attitudes towards residential integration. Forty-one per cent of the respondents indicated integration as “acceptable”, with another 32% indicating it as “totally acceptable”. Unfortunately, the study did not provide for a breakdown of the attitudes by race.

The Human Sciences Research Council (2000) reports that, according to their survey, 44% of South Africans are of the opinion that race relations have improved since 1994. Thirty per cent feel that relations have remained the same, while 16% experienced deterioration in

¹ This thesis makes two major racial distinctions, that of White and non-White. The author is aware that these terms might be offensive to some readers, although this is not the intention. However, he urges the reader to view these terms in the light of South African socio-political history, which classified people into such groups. South Africa is still in a process of dismantling apartheid social structures; therefore these terms remain relevant to the study.

racial relations. (See Table 1.1 for a breakdown of opinions by population group). Indians have shown the largest improvement in perceptions of racial relations, namely 62%. On the other hand, Whites have the highest percentage of members experiencing deterioration in racial relations, i.e. 29%.

Table 1.1: Opinions about race relations in South Africa since 1994

Population Group	Improved (%)	Remained the same (%)	Deteriorated (%)	Don't know (%)	Total (%)
Black	45	30	14	12	101
Coloured	43	38	14	5	100
Indian	62	18	17	3	100
White	41	27	29	3	100
Overall	44	30	16	10	100

Source: Human Sciences Research Council (2000)

In spite of the positive general trends in race relations and attitudes towards residential integration, South African towns and cities generally remain extremely segregated. This could be an indication that White attitudes pertain only to the principles of integration, but that they do not actually want to live in integrated neighbourhoods themselves. This attitude may be caused by a perceived rise in levels of crime and a deterioration of the social and physical environments of a racially mixed neighbourhood, rather than due to the racial composition of the neighbourhood per se (St. John & Bates 1990).

This leads to a pertinent question regarding the South African context, namely, to what extent does the racial composition of a neighbourhood affect the desirability of living in that neighbourhood for the different racial groupings in South Africa? The answer to this could shed light on the issue of residential integration in the country.

1.2 PROBLEM FORMULATION AND AIM: THE ROLE OF PREFERENCE IN RACIAL RESIDENTIAL SEGREGATION

Hart (1989: 81) is of the opinion that a model conceptualising residential choice patterns in post-apartheid urban settlements is necessary to understand “how future South Africans of all races are to be propelled to their appointed niches in urban space”. In order to enable the development of such a model, an understanding of the segregatory forces at work in South African cities and towns is needed.

Unfortunately, there is a general lack of studies focusing on the possible causes of residential segregation in post-apartheid South Africa. This is very likely due to the obvious role that the discriminatory policy of apartheid played in leading to racially segregated neighbourhoods in the country. However, the first democratic elections held in 1994 ushered in a new period in South African history, the post-apartheid era. Will racial discrimination continue as the leading causal explanation for segregation in South African cities and towns in the post-apartheid era, or will class differences or racial preferences supersede it? Van der Merwe (1993) speculates that in the post-apartheid city forced apartheid based on race might well be replaced by a spontaneous separation of races in neighbourhoods according to socio-economic status and individual cultural preferences.

The *aim of this study* is to assess the influence of racial preference in the dismantling or continuation of segregation in the South African town of Vredenburg during the post-apartheid era. This will be done by:

- Determining the influence that the racial composition of a neighbourhood has on the desirability of living in that neighbourhood while accounting for varying levels of crime and neighbourhood deterioration.

This knowledge could enable geographers to better understand the processes of residential segregation in Vredenburg and contribute towards creating a model of residential choice patterns, as suggested by Hart (1989).

1.3 CONCEPTUALISING RACIAL RESIDENTIAL INTEGRATION AND SEGREGATION

In the literature regarding race and housing, the concepts of integration and segregation are generally treated as opposite and mutually exclusive conditions. Yinger (1990: 44) plainly states that “Residential integration by race is the converse of segregation...” and Smith (1998: 2) calls integration an “alternative condition” to segregation. These two neighbourhood conditions may thus be viewed as extremities on a continuum (See Figure 1.1). Between these two extremities on the continuum a neighbourhood is classified as being of a transitional nature. Consequently, a neighbourhood with two or more racial groupings living within its boundaries is usually classified as being segregated, integrated or transitional in nature.

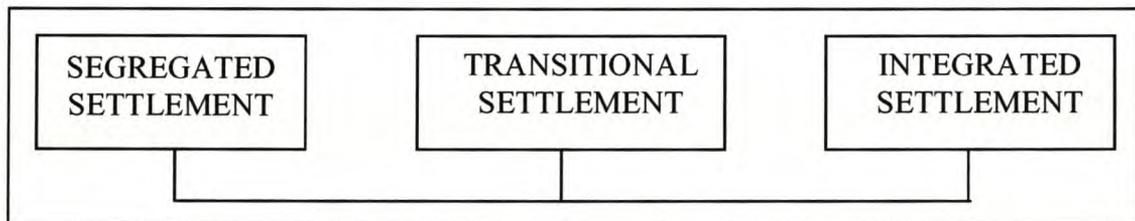


Figure 1.1. The racial residential segregation-integration continuum

1.3.1 Racial Segregation

Table 1.2 contains a selection of definitions of segregation found in the literature relating to segregation. This selection provides a scope of the main concepts commonly encountered within the field of racial residential segregation.

It emerges clearly in Table 1.2 that racial residential segregation encompasses two dimensions, namely a social and a geographical dimension. The social dimension of segregation refers to issues of the nature of interaction among racial groups, such as low frequencies of interaction between people of different racial groups, a dominance-dependency form of interaction between them, as well as a hostile or negative mood and environment in which the interaction takes place. The geographical dimension, on the other hand, refers to the degree to which people of different racial backgrounds live separately from one another, which in turn leads to the uneven distribution of racial

groupings within the urban environment. It is possible for a community to be segregated along one or both of these dimensions.

Table 1.2: Definitions of racial residential segregation

- “In one sense - the sociological - segregation may mean the absence of interaction among social groups. In another sense - the geographic - segregation may mean an unevenness in the distribution of social groups across physical space” (White 1983: 1009).
- Segregation is “...a state of separation between groups of people, that separation having both social and spatial dimensions.” Residential segregation occurs when “...a definable group residentially occupies a space to some degree separate from the rest of the population...” (Boal 1987: 91).
- “At a general level, residential segregation is the degree to which two or more groups live separately from one another, in different parts of the urban environment” (Massey & Denton 1988: 282-283).
- Segregation is a “...tendency for members of different social (in this case, racial and ethnic) groups to live separately from one another, and with other members of their own group. The greater the extent to which members of any group live in areas with other members of the same group, and away from members of other groups, the more segregated the group is said to be” (Farley 1990: 95).
- “...[R]esidential segregation...is the physical separation of the residential locations of different racial groups.... Residential integration by race is the converse of segregation, that is, the extent to which racial groups live together” (Yinger 1990: 44).
- Segregation “...refers to the varying distribution of social groups throughout a metropolitan area...” (Harris 2001: *pers com*).
- “The segregation phenomenon encompasses both the distribution of social groups and the nature of interaction between such groups.... The distributive aspect of segregation reflects the social structure of an urban population as well as the relative spatial distribution of the population. The interactive aspect of segregation refers, amongst others, to the frequency of interaction, level of interaction, environment of interaction, form of interaction and the mode of interaction” (Horn, 2001: 2).

1.3.2 Racial Integration and Transition

Integration, just like segregation, can also occur in one or both of the social and geographical spheres. Definitions of integration can therefore be classified as belonging to either of these dimensions or as being of a general nature.

Gordon (1964: 246) offers a general definition of integration:

“Integration presupposes the elimination of hard and fast barriers in the primary group relations and communal life of various ethnic groups of the nation. It involves easy and fluid mixture of people of diverse racial, religious, and nationality backgrounds in social cliques, families (i.e., intermarriage), private organizations, and intimate friendships.”

Smith (1998) defines integration in the social sphere as pertaining to mutual positive adjustments made by members of different racial groups toward each other. True integration involves positive interpersonal contact, positive primary group interaction, transracial solidarity and the ability for all to interact freely with one another. Kamali (1999) adds that integration is the process of active participation by individuals in the production and reproduction of the social life of their society, through which they gain a sense of belonging and satisfaction within it.

Viewed from the spatial perspective, integration is defined purely on the basis of racial mixing without any consideration of the quality of social life in the area. However, a racially mixed area is not necessarily integrated in nature, because the area could be in a transitional phase with one group succeeding another (Smith 1998). If an area with a mixed racial composition is not stable and maintained over time, but rather becomes segregated again after a time, the area is deemed to have been in a transitional state. In order for a racially mixed area to be viewed as integrated, the racial mixture should be maintained over time and its racial characteristics should be relatively stable (Goering 1986; Smith 1998).

Galster (1998) proposes two conditions that have to be met in order for a neighbourhood to be classified as stably racially integrated. The first is called the *stock condition*, where a

particular range of racial mixture must be present in the neighbourhood. The second is a *flow condition*, where the in- and outflow of households into the neighbourhood must perpetuate stability in the stock condition of the neighbourhood. That is to say, no invasion-succession of racial groups that leads to the re-segregation of the neighbourhood should take place. He further proposes a definition of a stably racially integrated neighbourhood, in that:

- its stock of households must be classified as being racially mixed; and
- the flow of households into and out of the neighbourhood will cause the stock to remain mixed for at least a decade.

The forgoing sections have elaborated on two sets of definitions within the residential segregation-integration field, namely one focussing on segregation and the other on integration. However, it is important to note that both of these sets of definitions describe the same phenomenon, albeit from different perspectives, namely the manner in which heterogeneous people co-reside in urban space.

On the one hand, scholars in the residential segregation-integration field generally treat segregation, in particular racially based segregation, as a negative societal condition. On the other hand, communities that are integrated along the social and the geographical dimension are viewed as idealised spaces. The attention will now turn towards more specific research focus areas within the segregation-integration field.

1.4 RESEARCH THEMES WITHIN THE RACIAL RESIDENTIAL SEGREGATION-INTEGRATION FIELD

Research relating to issues of segregation and integration has taken place in various regions around the world. There is, however, a marked difference in themes surrounding these issues between the South African and international contexts. The following sections summarise these differences.

1.4.1 International Context

Much has been written and researched on the issues surrounding segregation and integration, due to the pervasiveness of segregation and its concomitant social ills. In order to gain a better understanding of the broader theoretical context within which this study takes place, it is useful to classify and categorise previous research within the field. Table 1.3 classifies some of the previous research done in the field.

Table 1.3: Main focus areas and examples of research undertaken within the segregation-integration field

Focus Area	Sources
Measuring segregation and integration by developing indices	Clark 1993; Duncan & Duncan 1955; Horn 2001; Jakubs 1981; James & Taeuber 1985; Landecker 1951; Lieberman & Carter 1982; Massey & Denton 1988; Morrill 1991; Peach 1981; Peach, Robinson & Smith 1981; Smith 1991 & 1998; Stearns & Logan 1986; White 1983 & 1986; Winship 1977; Wong 1997
Characterisation of the segregation and/or integration of specific areas	Alba & Logan 1993; Boal 1981; Chen 1983; Duncan & Duncan 1965; Ellen 2000; Erbe 1975; Farley 1977; Farley & Frey 1994; Goldstein & White 1985; Jackson & Smith 1981; Kantrowitz 1969 & 1979; Logan & Alba 1993; Logan & Schneider 1984; Marshall 1994; Massey 1985; Massey & Denton 1987 & 1989; Miller & Quigley 1990; Pettigrew 1975; Roof, Van Valey & Spain 1976; Roseman, Thieme & Laux 1996; Taeuber & Taeuber 1965; Telles 1995; Uyeki 1990; Van Grunsven 1992; Williams 1964
Segregation in housing	Alba & Logan 1991 & 1992; Bianchi, Farley & Spain 1982; Bickford & Massey 1991; Ford 1972; Galster & Keeney 1993; Jackman & Jackman 1980; Pawson 1988; Rosenbaum 1994 & 1996
Neighbourhood racial succession	Denton & Massey 1991; Ellen 1998; Galster 1990 & 1998; Goering 1978; Lee & Wood 1991; Leven, Little, Nourse & Read 1976; Ottensmann, Good & Gleeson 1990; Polikoff 1986; Schelling 1972; Schwab & Marsh 1980; Smith 1998; White 1984; Wood & Lee 1991
Consequences of segregation	Alba, Logan & Bellair 1994; DeFrances 1996; Massey & Denton 1985; Massey & Denton 1993; Massey & Eggers 1990; Massey, Condran & Denton 1987; Schneider & Logan 1982; South & Deane 1993; Squires, Velez & Taeuber 1991; Van Kempen 1994; Villemez 1980; Wilson 1979
Causes of segregation	Brown 1981; Clark 1986, 1991 & 1992; Darden 1987; Darden 1990; Denton & Massey 1989; Fainstein 1995; Farley 1982 & 1995; Farley, Bianchi & Colasanto 1979; Farley, Schuman, Bianchi, Colasanto & Hatchett 1978; Farley, Steeh, Krysan, Jackson & Reeves 1994; Galster & Keeney 1988; Galster 1988; Helper 1986; Herbert & Johnson 1978; Hwang, Murdock, Parpia & Hamm 1985; Janse van Rensburg 2002; Kain 1986; Logan & Stearns 1981; Marshall & Jiobu 1975; Massey & Bitterman 1985; Massey & Denton 1993; Massey & Mullan 1984; Morrill 1991; Pearce 1979; Roof 1975; Rosenbaum 1992; Telles 1992; Wilson 1989

The *measurement of segregation and integration* has proved to be a fruitful field of research for geographers since the 1950s. Research done in this focus area has mainly centred on the development of indices such as the Duncan's Index of Dissimilarity and the Index of Isolation. There is much debate within this focus area as to which index or group of indices best measures segregation. The second main focus area has been the *application of these indices* to particular geographical areas (Smith 1998). This is done in order to characterise the nature of the segregation-integration, such as the level and spatial pattern of segregation, encountered in those places. A third main focus area centres on *housing issues* such as the influence of race in the allocation of public housing, constraints on minority housing choices, and racial inequality in home ownership. *Neighbourhood racial succession*, the fourth focus area, in turn zooms in on issues relating to the transition of neighbourhoods from having predominantly racial majority group occupancy to racial minority group occupancy. Viewed from an integration perspective, neighbourhood succession is an unsatisfactory situation as it leads to the re-segregation of communities. Consequently, developing an understanding of what creates stable racially integrated neighbourhoods as well as how to define such neighbourhoods has received attention, especially during the last decade. The fifth focus area deals with the *socio-economic consequences of segregation* such as unequal returns on resources, the concentration of poverty and crime, urban disinvestments, redlining, unequal economic opportunities and unequal access to public resources. The last of the main focus areas, the *causes of segregation*, is the field within which this study is located and is discussed in more detail in Section 1.4.3.

1.4.2 South African Context

The main research themes surrounding issues of segregation and integration in the South African urban context differ substantially from those researched in the international arena. This can be ascribed largely to the unique socio-political context within which South African urban settlements have developed. As the condition of desegregation in post-apartheid South Africa gradually becomes more aligned with the rest of the world, the local research themes will most probably also start to mirror those of the international arena.

Studies focusing on the development of urban settlements under apartheid form one of the main research themes encountered in the South African context. This includes work by Christopher (1988; 1989; 1991), Davies (1981), Donaldson & Van der Merwe (2000), Hart (1988), Saff (1991) and Van der Merwe (1993). The development of South African urban structures will be discussed in more detail in Chapter 2.

A second main theme deals with the “grey areas” which existed during the apartheid era. Despite the de jure racial residential exclusivity enforced by apartheid, large numbers of Black people had begun to settle in “Whites only” areas in most major centres in South Africa by the mid-1980s. The racially mixed residential areas which were created by this influx were termed “grey areas” (Maharaj & Mpungose 1994: 20). Racially mixed residential areas, however, had existed before apartheid, such as District Six and Woodstock in Cape Town (Garside 1993), and for the purposes of this study they are also referred to as grey areas. Topics addressed within this theme include the process of greying, the causes and consequences of greying, White reaction to the greying and the socio-economic characteristics of these grey areas. Examples of research undertaken in this thematic field include that of Garside (1993), Hart (1989), Maharaj & Mpungose (1994), Parnell (1988) and Rule (1989).

Desegregation of the apartheid urban settlements forms a third research theme in South African residential segregation research. This research can be divided into two groups. The first encompasses work completed prior to the abolition of the Group Areas Act in 1991. These studies include work by Bernstein & McCarthy (1990), Schlemmer & Stack (1990) and the Urban Foundation (1990), and they were geared at influencing the process of desegregation by debating possible policy alternatives to group areas. As Bernstein & McCarthy (1990: 5) put it:

“...rational policy debate on Group Areas will henceforth have to focus squarely upon processes of integration and desegregation, or else be marginalised from reality.”

The second group completed their work after the repeal of the Group Areas Act. Donaldson (1999), Donaldson & Van der Merwe (1999) and Kotze & Donaldson (1996; 1998) are of the major contributors in this field thus far. Their studies focus chiefly on the

desegregation experienced in the capital city of the Limpopo Province, Polokwane, while Kotze & Donaldson (1998) also paid some attention to the desegregation experienced in Bloemfontein. Bähr & Jürgens (1996) turned their attention to the early desegregation experiences of the Johannesburg inner city, the former Free Settlement Area of Country View, Midrand and some of the informal housing areas of the greater Durban area.

Examples of other research related to segregation and integration in the South African urban context in other themes, include work on the racial composition of specific cities, e.g. Cape Town (Scott, 1955), Durban (Kuper, Watts & Davies 1958) and Pretoria (Van Bergen & Olivier 1983). Christopher (1990) describes the levels of segregation in South Africa during apartheid, while Saff (1993) evaluates the relevance of neighbourhood integration management programmes applied in the United States of America to the South African situation.

As mentioned earlier, there is a general lack of studies focussing on the possible causes of residential segregation in post-apartheid South Africa. However, within the international context theories regarding the causes of segregation have been developed.

1.4.3 Causes of Segregation

There has been much debate and research on the causes of segregation in the international arena (See Table 1.3 on p 9 for examples). In this body of literature Darden (1990) has identified three major theories that explain neighbourhood segregation, namely class theory, discrimination theory and voluntary segregation or preference theory.

In short, according to class theory, racial groups on the one hand are distributed unequally by income, education and occupation. Neighbourhoods, on the other hand, are differentiated in location by quality, cost of housing and other amenities. Racial groups tend to live together in neighbourhoods that fit their socio-economic standing, thereby resulting in residential segregation. By contrast, discrimination theory supposes that non-Whites are denied equal access to housing in White neighbourhoods through a variety of mechanisms. These mechanisms include White refusal to sell or let property to non-Whites, racial steering by real estate brokers, redlining by financial institutions and

discriminatory policies and laws by governmental agencies. Voluntary segregation (also known as racial preference theory), a third contesting theory, promotes the view that racial groups prefer to live in separate neighbourhoods with members of their own race, thus voluntarily segregating themselves (Darden 1990). The focus of this study falls within the ambit of preference theory.

The discussion now turns to a description of the instrument used in assessing the relative influence of the racial composition of a neighbourhood on the evaluation of the desirability of living in that neighbourhood, in order to assess the influence of racial preference in the dismantling or continuation of segregation in post-apartheid Vredenburg. The instrument used was a factorial survey in the town of Vredenburg. The results of the survey were entered into a multiple regression model using the statistical software programme SPSS.

1.5 VREDENBURG AS CASE STUDY

The West Coast town of Vredenburg was selected as a case study to pursue the aim of this research for the following reasons:

- The need to gain an understanding of issues relating to segregation and integration in *smaller* urban settlements in South Africa (Janse van Rensburg 2000a; 2000b);
- Vredenburg's history as a *typical apartheid urban settlement*. The town therefore has many commonalities with other towns and cities in the country in terms of urban structure and levels of segregation;
- Vredenburg is the *highest ranked town* on the urban hierarchy of the West Coast District. It also forms the socio-economic hub of the West Coast peninsula² and is playing a leading role in the development of the West Coast District; and
- The author's *knowledge and experience* of living in the area since 1994. This has enabled him to observe changes in the town during the transition from apartheid.

Vredenburg's national and regional contexts, demographic structure and urban profile are discussed in more detail in Chapter 2.

²A geographical region housing the towns of Paternoster, Saldanha, St Helena Bay and Vredenburg.

1.6 RESEARCH METHODOLOGY

The research methodology consists of three separate yet inter-linked parts. The first is the instrument used to elicit the data, namely the factorial survey. The second, the procedures by which the population were sampled (stratified random sampling) and the data collected (drop-off and collect and structured interviews). The third part of the methodology is the way in which the data were analysed after collection i.e. by way of multiple regression analyses.

1.6.1 Data-Collection Instrument: A Factorial Survey

St. John & Bates's (1990) method forms the basis of this study's research design (see Section 1.7). In their examination of the limited existing research on assessing neighbourhood desirability, St. John & Bates (1990) encountered certain flaws in the design of previous surveys used to collect data (see Insert 1); flaws which can be avoided by adhering to certain principles. Surveys designed to assess the independent effect of racial composition on neighbourhood evaluation should adhere to the following principles (St. John & Bates 1990):

- They must control for the possible confounding effects of crime and deterioration on neighbourhood evaluations in order to isolate the effect of racial composition on such evaluations. Crime and deterioration are dimensions thought to be closely associated with the racial composition of a neighbourhood. Therefore, in order to assess the independent importance of racial composition in neighbourhood evaluation, dimensions of crime and deterioration have to be included in the study.
- They must prevent possible collinearity among the independent variables by requiring respondents to evaluate neighbourhoods representing the full range of combinations between racial composition, crime level and deterioration level.

Studies that do not adhere to these principles run the risk of committing the same errors as the studies mentioned in Insert 1. Both of these principles were applied in drawing up the factorial survey questionnaire.

Insert 1.1: The factorial survey method in perspective*

"A limited amount of research has begun to assess the independent importance of racial composition for neighbourhood evaluation, but for a variety of reasons this research has not been adequate. Stipak and Hensler (1983) linked survey respondents' evaluations of Detroit and Los Angeles neighborhoods to census tract data on racial composition and socioeconomic status. They found that for whites and blacks, the greater the proportion of the census tract population that is black the lower the evaluation of neighborhood quality. This negative effect exists when controlling for tract income and education levels. It suggests that racial composition does have an independent effect on neighborhood evaluation. However, Stipak and Hensler, relying on census tract data to create proxies for neighborhood conditions, were unable to control for the possible confounding effect of crime or to explicitly control for neighborhood characteristics that are signs of deterioration. Simply controlling for neighborhood socioeconomic status is not sufficient to isolate an independent effect of racial composition.

O'Brien and Clough (1982) included measures of personal safety in their study of the effect of neighborhood racial composition on neighborhood evaluation in Akron, Ohio. In addition to obtaining a measure of neighborhood socioeconomic status (average occupational prestige score), they obtained data on personal victimization, perceived neighborhood safety, and perceived helpfulness of others. They found that neighborhood racial composition had a negative effect on neighborhood evaluation when controlling for these variables, supporting the contention that racial composition has an independent effect. However, these measures of crime are problematic for this purpose. The two perceptual variables had much stronger effects on neighborhood evaluation than the effect of personal victimization, which barely reached statistical significance. Research on the fear of crime has demonstrated that frequently there are substantial discrepancies between individual perceptions of safety and objective crime levels (Skogan and Maxfield, 1981). Furthermore, it is apparent that perceptions of safety are influenced by visual signs of physical deterioration and social disorganization (Lewis and Maxfield, 1980). If, as Taub et al. (1984) suggest, whites equate a high concentration of minority population with crime and deterioration, then it is likely the perceptions of neighborhood safety reported by the Akron respondents were strongly influenced by population composition and, in effect, were not truly independent indicators of crime. Thus, from this study it is unclear that racial composition has an independent effect on neighborhood evaluation for whites.

These studies also suffer from a fundamental research design problem. Both of them proceeded by asking residents in major urban areas to evaluate their own neighborhoods. Because there are correlations between racial composition and other neighborhood characteristics in such areas, there is a high level of collinearity among the independent variables used in these studies to predict neighborhood evaluation. A research design adequate to assess the effect of racial composition on neighborhood evaluation requires that respondents evaluate neighborhoods representing the full range of combinations of racial composition and levels of crime and deterioration. For example, an adequate design must include evaluations of high proportion black/high crime neighborhoods, low proportion black/low crime neighborhoods, low proportion black/high crime neighborhoods, and high proportion black/low crime neighborhoods. Clearly, in modern urban settings these neighborhood types are not equally prevalent and, consequently, when white survey respondents are asked to evaluate their own neighborhoods not all of these types are fully represented. The problem becomes larger the more neighborhood characteristics that are to be considered.

Although not dealing explicitly with the issue of interest here, Shlay and DiGregorio (1985) addressed this collinearity problem by applying the factorial survey method of Rossi and Nock (1982) to neighborhoods. This method adds the orthogonality of experimental designs to survey research where it is impossible to randomly assign respondents to experience the conditions of interest, such as different types of neighborhoods. With this method, characteristics of neighborhoods are randomly assigned to vignettes which respondents are asked to evaluate. Because of the random assignment of neighborhood characteristics to vignettes, the characteristics are uncorrelated with each other. Vignettes based on neighborhood characteristics approximate real descriptions of neighborhoods but there is no collinearity among characteristics of vignette neighborhoods as there is among real neighborhood characteristics. Evaluations of vignette neighborhoods make it possible to obtain evidence of the effects of abstract neighborhood characteristics on neighborhood evaluation independent of other characteristics. It is both a drawback and a strength of this method that some randomly produced vignettes have few, if any, real counterparts. Respondents might find it difficult to imagine such vignettes but evaluations of them are essential to obtain assessments of the independent effects of neighborhood characteristics on evaluations.

Shlay and DiGregorio (1985) considered racial composition as a neighborhood characteristic that might influence neighborhood evaluation. They also considered many other characteristics designed to measure neighborhood amenities. Net of these characteristics, racial composition (increasing proportion black or increasing number of black families) was negatively related to neighborhood evaluation among whites. Unfortunately, Shlay and DiGregorio [1985] did not consider crime as a neighborhood characteristic nor did they consider any direct measures of deterioration. Consequently, it is difficult to determine if the negative effect of racial composition on neighborhood evaluation was due to race, per se, or if it was due to other characteristics whites generally associate with race."

(St. John & Bates 1990: 49-51)

*Note: The references quoted by St. John and Bates (1990) have been included in the list of references to this study.

1.6.1.1 The Factorial Survey Questionnaire

A survey was conducted by way of a questionnaire. In the questionnaire respondents were asked to evaluate the desirability of living in each of six neighbourhoods on a scale ranging from 1 (very undesirable) to 7 (very desirable). Each respondent evaluated a unique set of six vignettes. Vignettes were created to represent different fictitious neighbourhoods, although they may approximate real neighbourhoods. Each vignette measured seven neighbourhood characteristics, namely racial composition, crime level, environmental cleanliness, housing quality³, neighbourhood social environment, location and name (see Table 1.4). Of these characteristics, the racial composition of the various neighbourhoods is central to the study.

The racial composition of the fictitious neighbourhoods in the vignettes varied from 100% White to 100% non-White. However, the term 'non-White' was substituted with 'Coloured'⁴ in the questionnaire. This was done to reflect the demographic reality that 93% of Vredenburg's population consists of people classified as being either White or Coloured. The Coloured population was used as the antithesis of the White population as the former are by far the largest population group in Vredenburg, making up 68% of the total population in 1996. The level of crime characterised neighbourhoods with varying probabilities of being assaulted while walking alone at night, as the threat of personal assault is one of the most important determinants of perception of safety in residential areas (St. John & Bates 1990). The deterioration dimension was included in the vignettes by way of two neighbourhood characteristics, namely environmental cleanliness and housing quality. The former required respondents to consider neighbourhoods with various levels of litter lying around and the latter the consideration of neighbourhoods with houses of varying sizes and levels of maintenance. The social environment characteristic required respondents to consider neighbourhoods in which the people varied in terms of their consideration of others. The location characteristic assessed the degree to which distance from the central city influenced neighbourhood evaluation. In the neighbourhood characteristic name, five English and five Afrikaans fictitious neighbourhood names were created. The social class composition of the neighbourhoods was not added as a single distinctive characteristic, because the other dimensions indirectly capture important components of social class composition (St. John & Bates 1990).

³ Environmental cleanliness and housing quality are both measures of deterioration.

⁴ A racial group formed through the miscegenation of the White settlers, their East Indian and Madagascan slaves and the autochthonous Khoisan (Western 1978).

Table 1.4: Neighbourhood variables, codes and characteristics used in the factorial survey

<p>Neighbourhood Variables (in upper case letters), Codes (in brackets) and Characteristics (numbered):</p> <p>RACIAL COMPOSITION (RACECOMP)</p> <ol style="list-style-type: none"> 1. All the people who live there are White. 2. Most of the people who live there are White but some are Coloured. 3. About half of the people who live there are White and about half are Coloured. 4. Most of the people who live there are Coloured but some are White. 5. All the people who live there are Coloured. <p>CRIME LEVEL (CRIME)</p> <ol style="list-style-type: none"> 1. No one has ever been assaulted or bothered by strangers while walking alone at night. 2. There have been a few instances where people have been assaulted or bothered by strangers while walking alone at night. 3. There have been several occasions where people have been assaulted or bothered by strangers while walking alone at night. 4. Very frequently people are assaulted or bothered by strangers while out walking alone at night. <p>ENVIRONMENTAL CLEANLINESS (ENVCLEAN)</p> <ol style="list-style-type: none"> 1. The neighbourhood is very clean and litter free. 2. Occasionally there is some litter scattered in the streets. 3. There is frequently litter scattered in the streets and in the yards. 4. Most people really need to clean up the trash on their property. <p>HOUSING QUALITY (HOUSQUAL)</p> <ol style="list-style-type: none"> 1. The houses are large and well taken care of. 2. The houses are modest in size and well maintained. 3. The houses are modest in size, but not much attention is given to upkeep. 4. The houses are small and not well cared for. <p>SOCIAL ENVIRONMENT (SOCENV)</p> <ol style="list-style-type: none"> 1. The neighbours are very considerate of others. 2. Usually the neighbours are very considerate of others. 3. Some neighbours do not seem to have much respect for others. 4. Most of the neighbours do not seem to care about anyone else. <p>NEIGHBOURHOOD LOCATION (LOCATION)</p> <ol style="list-style-type: none"> 1. Located in the outskirts of Vredenburg. 2. Located in central Vredenburg. <p>NEIGHBOURHOOD NAME (NAME)</p> <ol style="list-style-type: none"> 1. Springbokpark 2. Protea Glenn 3. Eagle Cliffs 4. Melkbosrand 5. Elephant Park 6. Tortoise Grove 7. Swartlandskuur 8. Rhino Park 9. Bolandhoogte 10. Leeupark

Source: Adapted from St. Johns & Bates (1990)

Also included in the survey were questions pertaining to the biographical data of the respondents. These questions gathered data on respondents' age, gender, race, highest school grade passed, highest tertiary qualification as well as yearly household income. The categories for the last mentioned were obtained from the 1996 census. The 13 categories for income were assigned numerical codes in ascending order from the lowest to the highest income category. The same was done for the two educational variables. The scores obtained by the respondent in each of these variables were combined by means of addition, thereby creating a scale variable denoting socio-economic status. The scale ranged from 2 to 28 with three categories. These categories are lower-class (2-10), middle-class (11-20) and upper-class (21-28). An additional biographical variable was the respondent's place of residence, i.e. whether the respondent was living in a former White or non-White residential area. These data were not obtained by way of the questionnaire, but were inferred from the local cadastral data obtained from the local municipality.

1.6.1.2 Creating the Questionnaire⁵

Numerical codes were assigned to each characteristic of a variable, creating a scale for that particular variable on which a neighbourhood may be placed. A single characteristic of each variable was then randomly assigned to each vignette in order to create a variety of types of neighbourhoods and preclude collinearity among the independent variables. The random assignment of characteristics to vignettes was done by using a computerised spreadsheet, namely *Microsoft Excel 2000*. All the characteristics were listed in a spreadsheet and a macro⁶ written to randomly choose one characteristic per variable and list it in a separate column of the spreadsheet, thus creating a single vignette. A second macro was created which replicated the first macro six times every time it was run, thereby creating six random vignettes. The set of six vignettes was then used to create a single questionnaire. The process was repeated to create another set of vignettes for a new questionnaire until the required number of questionnaires were created.

A problem with using vignettes in this way is that it is difficult to quantify some of the neighbourhood dimensions meaningfully. Accordingly, it is impossible to ascertain how

⁵ An example of the questionnaire is supplied in Appendix A-1 and A-2.

⁶ A computer programme used to automate repetitive tasks.

respondents interpret the vignettes presented to them. This, however, is not such a great concern as the primary focus of the study is to determine the effect of racial composition on neighbourhood evaluation independently of other characteristics. It is not essential that the respondents have quantitatively accurate perceptions of the secondary dimensions as long as they have taken them into account. Furthermore, the characteristics of the primary dimension, racial composition, are quantitatively clear (St. John & Bates 1990).

1.6.2 Sampling and Data-Collection⁷ Methods

The data were gathered by two means, firstly the drop-off and collect method and later by way of structured interviews, during October 2001. The respondents were randomly sampled using a geographic information system (GIS) and cadastral data. In the following subsections the sampling process and collection methods are described.

1.6.2.1 A Stratified Random Sample of Households in Vredenburg

A stratified random sample of households was drawn from the Saldanha Bay municipal property roll, which contains a complete list of residences in Vredenburg. The enumeration areas (EAs), which were drawn up by the national government during the 1996 census, were used to stratify the sample. The three most recent residential developments, which did not form part of the 1996 census, were treated as if they each formed an EA.

A GIS, namely *Autodesk World 2.1*, was used to facilitate the stratification process. The boundaries of the EAs were overlaid onto Vredenburg's spatial cadastre. The GIS was instructed to identify each erf that fell inside the boundary of the various EAs (the EAs were drawn up using the spatial cadastre as a template, therefore, each erf in Vredenburg fell entirely into only one of the EAs). The GIS was instructed to select only those erven zoned as residential in nature by the municipal property roll (the property roll also contained erven which were zoned as commercial plots) and assign them to the respective EAs. Each residential erf was assumed to represent a single household. The results of the

⁷ The data collection took place from mid October to mid December 2001.

stratification process were then exported into a spreadsheet, namely Excel (*Microsoft Office 2000*). The spreadsheet was instructed to make a random sample of the residential erven in each EA, proportional to the size⁸ of the EA.

Table 1.5 provides figures relating to the sample sizes as well as the sample and response rates per enumeration area, while Table 1.6 gives a summary of the numbers of questionnaires sent out, returned and used in the study. In all just under 5% of the households of Vredenburg were sampled, while 1,2% of the town's households⁹ responded. The stratification of the random sampling process produced a sample that included the whole range of households, based on socio-economic status, living in Vredenburg. Only formally registered residences were included in the study, thereby excluding the informal settlements of the area.

1.6.2.2 Representativeness of the Sample and Vignette Contents

Figure 1.2 indicates the combined biographical characteristics of the respondents. The mean age of the respondents is 40,6 years with more than 89% of the respondents being between the ages of 25 and 50. The ages of the respondents form a slightly negatively skewed distribution. This is in keeping with a population pyramidal structure expected of a developing country such as South Africa, with a narrow apex of elderly and a broad base of young people. Only about a quarter of the respondents were female, while nearly three quarters were male. This bias towards male respondents can be attributed to the fact that the community is very much a patriarchal society with the man as the head of the household.

Just over a third of respondents were White, while nearly two thirds were non-White. Taking into consideration that only 25% of the total population of Vredenburg are White, the racial composition of the respondents is slightly biased in the direction of the Whites.

⁸ Size in this instance refers to the total number of residential erven in an EA.

⁹ Data constraints necessitated the author to assume that there is one household per residential erf.

Table 1.5: Sample and response data per enumeration area of the questionnaire survey of neighbourhood evaluations in Vredenburg

Enumeration Area	1 st Sample	2 nd Sample	Total Sampled	Total Response	Total Erven	Sample Rate	Response Rate
Witteklip	78	30	108	29	2115	5,1	1,4
1340003	30		30	0	833	3,6	0,0
1340008	1		1	0	35	2,9	0,0
1340083	1		1	0	1	100,0	0,0
1340009	21	1	22	8	556	4,0	1,4
1340010	21	17	38	14	556	6,8	2,5
1340011	3	1	4	0	78	5,1	0,0
1340012	10	4	14	4	259	5,4	1,5
1340013	10	4	14	3	247	5,7	1,2
1340014	10	4	14	3	277	5,1	1,1
1340015	9	4	13	5	239	5,4	2,1
1340016	6	2	8	5	168	4,8	3,0
1340017	4	2	6	1	113	5,3	0,9
1340018	4	2	6	2	114	5,3	1,8
1340028	3	1	4	0	74	5,4	0,0
1340029	2	1	3	0	63	4,8	0,0
1340030	3	1	4	0	73	5,5	0,0
1340031	4	1	5	2	112	4,5	1,8
1340073	6	2	8	4	175	4,6	2,3
1340074	6	2	8	1	153	5,2	0,7
1340075	5	1	6	2	145	4,1	1,4
1340076	8	2	10	3	211	4,7	1,4
1340077	4	1	5	4	113	4,4	3,5
1340078	6	2	8	0	167	4,8	0,0
1340079	4	1	5	1	113	4,4	0,9
1340080	3	1	4	1	78	5,1	1,3
1340081	8	2	10	0	210	4,8	0,0
1340082	4	1	5	2	102	4,9	2,0
1340084	3	1	4	1	92	4,4	1,1
1340085	5	1	6	0	130	4,6	0,0
1340086	5	1	6	0	130	4,6	0,0
1340087	3	1	4	1	82	4,9	1,2
1340088	8	2	10	3	207	4,8	1,5
1340092	4	1	5	0	113	4,4	0,0
1340093	10	3	13	1	251	5,2	0,4
Unidentified				3			
TOTAL	312	100	412	103	8385	4,9	1,2

Table 1.6: Final response summary of the questionnaire survey of neighbourhood evaluations in Vredenburg

<p>Drop-off and collect: Sent out: 312 Returned: 48 Response rate: 5,4%</p>		<p>Structured interviews: Target number: 60 Completed: 66* Response rate: 98,5%**</p>	
Questionnaires returned:			114
Questionnaires discarded:			11
Incomplete biographical data:	3		
Incorrectly completed questionnaires:	3		
On advice from interviewer***:	1		
Due to obvious contradictory ratings:	4		
Questionnaires used:			103
Neighbourhoods evaluated :			616
101 evaluated 6 vignettes each:	606		
2 evaluated 5 vignettes each:	10		
<p>* The researcher sampled 100 possible households to be interviewed, 40 more than the required number. The over-sampling was done purposefully to ensure that if any residents were unwilling to take part in the study, the interviewers could move on to the next sampled household. However, one of the interviewers inadvertently interviewed six extra households from the inflated sample.</p>			
<p>**Based on the fact that the interviewees reported only one refusal to be interviewed.</p>			
<p>*** The interviewer got the impression that the respondent did not understand the questionnaire. On inspection by the researcher it was found that the respondent made obvious contradictory ratings on the questionnaire, thereby substantiating the interviewer's claim.</p>			

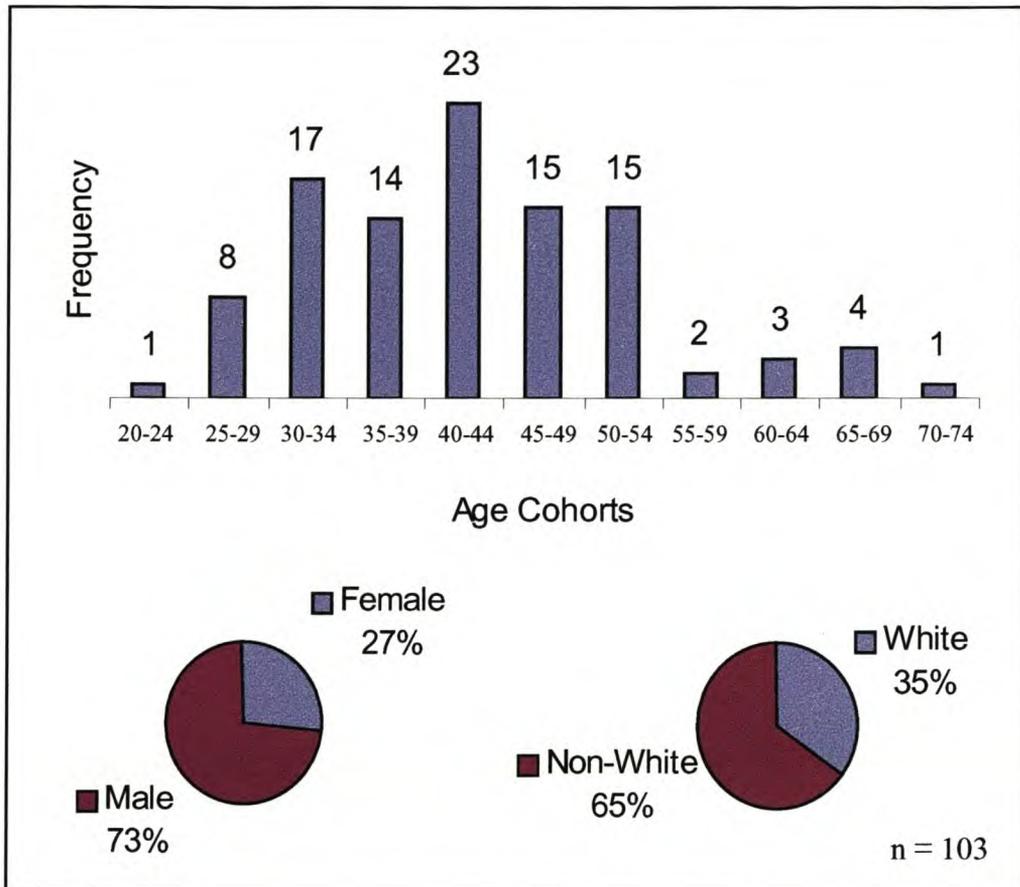


Figure 1.2: Combined biographical characteristics of the survey respondents

This racial overrepresentation can be attributed to two reasons, namely the process by which respondents were selected and the fact that the White response rate was higher than that of the non-White population. The stratified random sampling technique strived to give an even sampling of households in both the former exclusionary White and non-White neighbourhoods of Vredenburg. But, the author had no control over the population group of the inhabitants of the houses and therefore could have inadvertently sampled more White than non-White households. This is not unusual as St. John & Bates (1990) obtained higher response rates from the more educated people in Oklahoma City, speculating that these people are less likely to refuse being interviewed. Given the history of the Vredenburg, non-Whites are generally less educated and less socially advanced than the White residents of the town (see section 2.2.4). This is probably the most significant reason for the lower non-White response rate.

Taking the above facts into consideration, the characteristics of the respondents sampled for the study, are in keeping with those exhibited by the total population of Vredenburg.

This is an indication that the stratified random sampling process followed was successful and that the sample is representative of the universe from which it was drawn.

In order to establish if the questionnaires measured the whole spectrum of neighbourhood characteristics in the randomly created vignettes, it is necessary to analyse the distributions of the contents of the vignettes. The combined distributions of neighbourhood characteristics in all the evaluated vignettes are illustrated in Figure 1.3. The equal spread of neighbourhood characteristics throughout the universe of evaluated vignettes is, firstly, an indication that all the levels of the various neighbourhood characteristics were well represented and, secondly, attests to the randomness of each vignette.

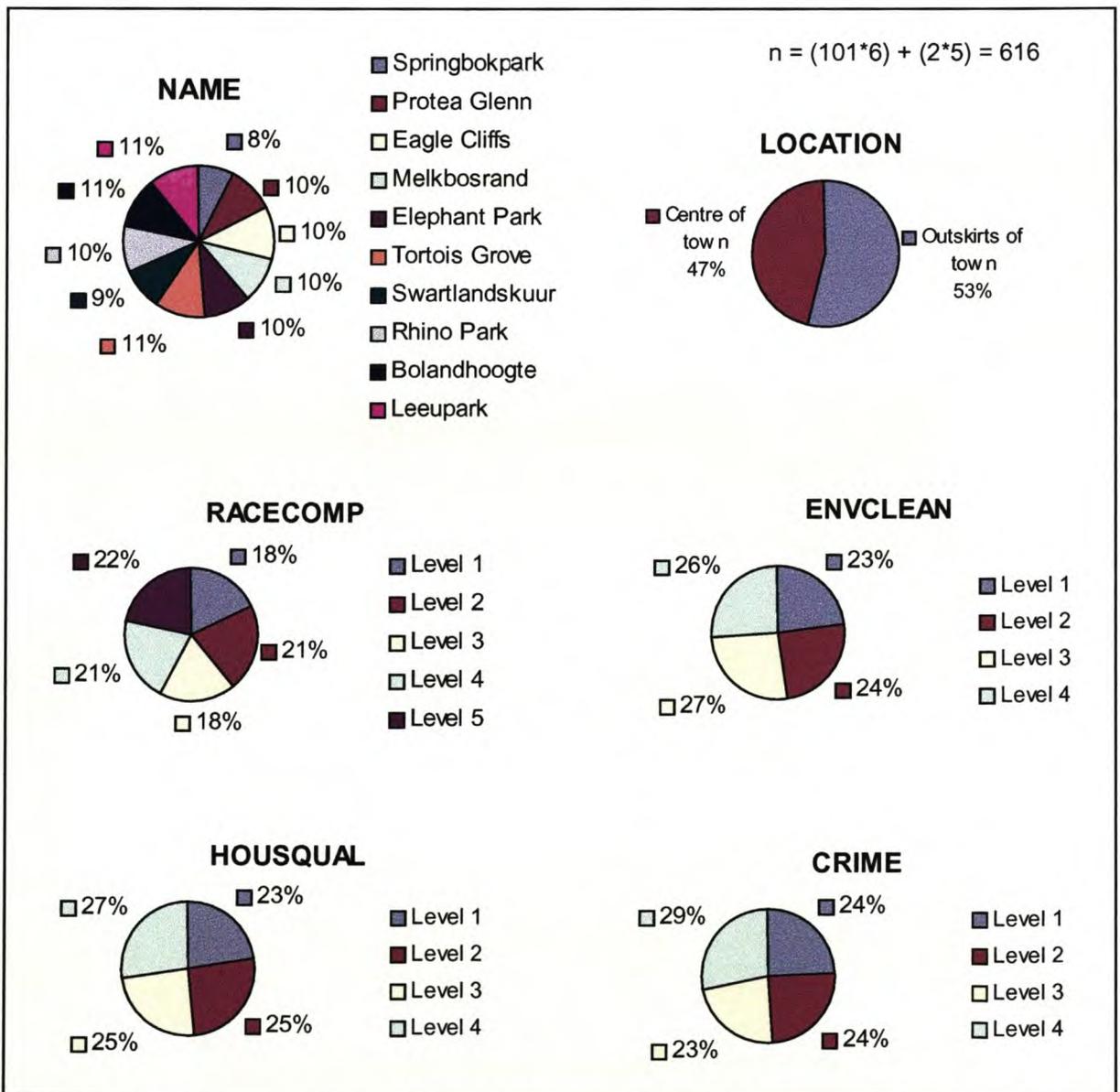


Figure 1.3: Combined distribution of neighbourhood characteristics in all evaluated vignettes

1.6.2.3 Drop-off and Collect Method

The drop-off and collect method involved placing a questionnaire into an envelope that was hand-delivered to each household's home. The author and a helper drove to each sampled residence to drop off a questionnaire. Each questionnaire comprised of two parts; Part 1 consisted of biographical questions, and Part 2 the neighbourhood evaluations that were to be completed (see Appendices A1 and A2). Accompanying each questionnaire was a covering letter, in both English and Afrikaans (see Appendix B), explaining what the survey was about, how, when and by whom the questionnaire was to be completed, as well as what had to be done with it after completion.

The head of each household was asked to complete the questionnaire. They were given three days to fill in the questionnaire, after which completed questionnaires were collected. The respondents were requested in the covering letter to place the completed questionnaires in their post boxes at home by a certain time and date. If they did not have a post-box the questionnaire would be collected at the door on the above-mentioned date.

Initially, the questionnaire itself was only drawn up in Afrikaans, due to the fact that 96% of the town's population are Afrikaans first-language speakers. The English version of the covering letter explained that this was a practical arrangement in order to save on printing costs. Persons preferring an English questionnaire, could request one. This method of collection was not successful as only 15,3% (48) of the households responded. The researcher then turned to structured interviews to collect more data.

1.6.2.4 Structured Interviews

Due to the poor response to the drop-off and collect method, a second stratified random sample was drawn, and structured interviews were conducted to collect the data. This sample excluded the households already sampled in the first round. The interviews used the same questionnaires as used in the first round. Three local residents who knew the area were hired as interviewers and trained to help the researcher administer the questionnaire. As far as possible the interviewers were of the same population group as the respondents.

Each interviewer had a list of addresses of households to be interviewed¹⁰ as well as a set of English and Afrikaans questionnaires. The heads of household were targeted as respondents. Interviewers read the questionnaire out loud to the respondents and filled it in or gave it to the respondents to read and fill in themselves, depending on a respondent's preference. This method was more effective than the drop-off and collect method and secured an almost 100% response rate.

1.6.3 Data Analysis Procedure: Multiple Regression Analysis

Once all the data had been obtained and coded, the neighbourhood desirability scale for each of the vignettes was regressed on each of the neighbourhood characteristics of the corresponding vignette along with the biographical variables. The regression indicated the extent of the effect of the various characteristics on the respondents' evaluation of neighbourhoods.

Twelve independent variables were used in the regression (see Table 1.7). These variables can be grouped into two categories, namely predictor variables and control variables. The predictor variables are those neighbourhood characteristics measured by the vignettes, namely racial composition (RACECOMP), crime (CRIME), environmental cleanliness (ENVCLEAN), housing quality (HOUSQUAL), social environment (SOCENV), location (LOCATION) and name (NAME). RACECOMP, CRIME, ENVCLEAN, SOCENV and HOUSQUAL were all treated as continuous variables. LOCATION was treated as a dichotomous variable. Dummy variables¹¹ were created for NAME, namely Bolandhoogte, Leeupark, Melkbosrand, Springbokpark, Swartlandskuur, Eagle Cliffs, Elephant Park, Protea Glenn, Rhino Park and Tortoise Grove. The first five names are Afrikaans while the latter five are English.

The control variables entered in the model were all demographic variables of the respondents, namely their population grouping (RACEBI), socio-economic status, age (AGE), gender (GENDER) and whether they were located in a former Whites only or non-Whites only neighbourhood (AREA). Dummy variables were created for socio-economic status, namely lower-class (LCLASS), middle-class (MCLASS) and upper-class (UCLASS). RACEBI was treated

¹⁰ The lists contained additional households to interview, should any one of the households in the primary list fail to take part.

¹¹ Dummy variables are numerical variables used in regression analysis to represent subgroups of a sample. Nominal-level variables that are transformed into dummy variables may be treated statistically as interval-level variables (Trochim 2002).

Table 1.7: Summary of variables used in the multiple regression analysis

	Variable Name	Acronym
Predictor Variables	Racial composition	RACECOMP
	Crime	CRIME
	Environmental cleanliness	ENVCLEAN
	Housing quality	HOUSQUAL
	Social environment	SOCENV
	Location	LOCATION
	Name	SPRINGBOKPARK, PROTEA GLENN, EAGLE CLIFFS, MELKBOSRAND, ELEPHANT PARK, TORTOISE GROVE, SWARTLANDSKUUR, RHINO PARK, BOLANDHOOGTE, LEEUPARK
Control Variables	Socio-economic status	LCLASS, MCLASS, UCLASS
	Population group	RACEBI
	Age	AGE
	Gender	GENDER
	Area of residence	AREA

as a dichotomous variable consisting of Whites and non-Whites. In the dichotomous variables Whites, women and people living in former non-Whites only neighbourhoods were each assigned values of zero when entered into the model. Conversely, non-Whites, males and those located in former Whites only neighbourhoods were each assigned values of one.

The multiple regression analysis was performed as a two-stage process using the statistical software programme *SPSS* (see Figure 1.4). During stage one all independent variables were entered and regressed on the dependent variable. Thereafter consecutive regressions were run, each time eliminating the most non-significant independent variable, until a set of variables was left in which all contributed significantly to the change in the dependent variable. RACECOMP is central to the study and was therefore excluded from the elimination process. Table 1.8 indicates the order in which variables were eliminated, the significance level of the eliminated variable as well as its effect on the model. The removal of all the non-significant variables affected a decrease in the R square¹² of the model of only 0,011. The removals make the model more compact and easier to interpret, especially when the interaction terms are added in stage two.

¹² The R square (R^2) value of a regression model indicates how much variance in the dependent variable the model explains. This value may be expressed as a percentage by multiplying it by 100 (Pallant, 2001).

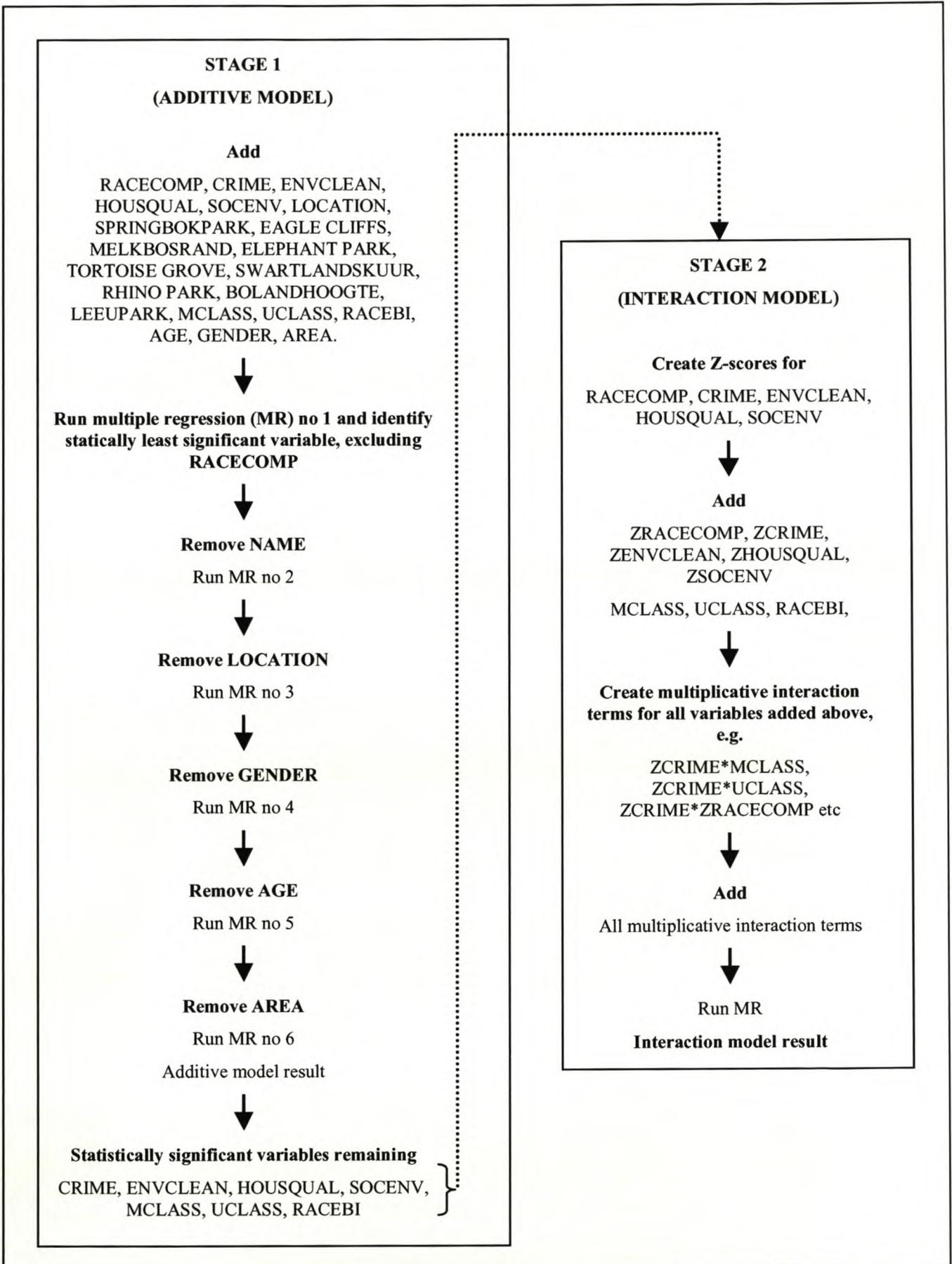


Figure 1.4: The two-stage process of multiple regression analysis to determine the effects of various characteristics on respondents' evaluations of neighbourhoods

Table 1.8: Summary of the changes in the multiple regression with the addition or removal of variables

Order of regressions	R square	Adjusted R square ¹³	Variable removed (-) or added (+)
1	0,334	0,310	+ All
2	0,325	0,311	- Name
3	0,325	0,313	- Location
4	0,325	0,314	- Gender
5	0,324	0,314	- Age
6	0,323	0,314	- Area
7	0,382	0,346	+ Interactions

During stage two of the process only the statistically significant variables identified in stage one as well as RACECOMP were used. Firstly, all continuous predictors were transformed into standardised scores or Z-scores. Preacher (2001) as well as Aiken & West (1991) point out that continuous variables used in regression equations containing interaction effects should be centred. Centring these variables has two major advantages; firstly, it reduces multicollinearity among the predictor variables and, secondly, it gives meaning to otherwise meaningless regression coefficients. An example of the latter is that a particular regression coefficient in an equation using non-centred predictor variables is interpreted as the change in the dependent variable associated with one unit change in a predictor variable, when the other predictors equal zero. This would render the coefficients used in this study meaningless, as none of the continuous predictor variables contained a zero in their ranges. However, when the continuous predictor variables are centred, zero represents each predictor variable's mean, thereby making the coefficients interpretable.

When creating interaction terms in SPSS one must manually create Z-scores for the continuous predictor variables (Preacher, 2001). SPSS computes standardised regression weights without discriminating between predictor variables and product terms (interaction terms) of predictor variables. The effect of this is that SPSS standardises the product of the interaction term instead of standardising the individual variables used to create the interaction term and then multiplying them with one another. This yields significantly

different results, as extensively explained by Friedrich (1982). In this study the Z-scores of all the continuous predictor variables were calculated first and only then were the interaction terms created for all the predictor variables (i.e. continuous and dummy variables). Note that when using this procedure, the unstandardised solutions rendered by SPSS must be interpreted as the standardised (beta) values (Aiken & West 1991; Preacher 2001).

By creating the standardised scores for the continuous variables, these variables were automatically centred. Aiken & West (1991) point out that it is not necessary to centre ordinal variables; therefore all the ordinal predictor variables were entered directly into the regression as dummy variables. Lastly, all the predictor variables and all the interaction terms were entered into the model and regressed on the dependent variable. In traditional standardised regression analysis the intercept b_0 is equal to 0. Due to the adapted standardised approach used in this study, the intercept is given as 3,378. This is not an error. Aiken & West (1991) explain that in the traditional additive standardised solution all variables have a mean of 0, but in the adapted approach the multiplicative interaction term X_1X_2 does not. Due to the fact that X_1 and X_2 were standardised before they were multiplied, their product equals their correlation with one another. If their product equalled zero, it would mean that they were not correlated with one another at all.

It is important to again draw attention to the fact that the main focus of the study, and therefore of the regression analysis, is to determine the influence of neighbourhood racial composition on respondents' ratings of neighbourhoods. Due to the nature of the factorial survey method, the influences of factors secondary to the aim of the study are also revealed.

1.7 RESEARCH AGENDA

The structure of the research is outlined in Figure 1.5. Chapter 1 forms the introduction in which the backdrop to and rationale for the study are discussed, the research problem and

¹³ The more independent variables that are added to the model, the higher the R^2 value will become if the variables entered are correlated with the dependent variable. In order to adjust for this phenomenon, the adjusted R^2 value is introduced, which accounts for the number of variables entered into the model and penalises the model accordingly.

aim are identified and the theoretical framework is outlined. This chapter also sets out the research methodology used in the study.

Chapter 2 discusses the urban context in which the study takes place. Firstly, the national urban context is examined from a historical point of view. The history of urban development in South Africa is the main cause of the extreme levels of segregation present in South Africa. It is therefore necessary to consider this history in order to interpret the spatial patterns of segregation present in Vredenburg today. Secondly, the regional setting, historical development and urban-demographic profile of Vredenburg are set out. Various measures of segregation based on 1996 census data are applied to the town, characterising the segregation present in Vredenburg.

Chapter 3 focuses on describing, analysing and interpreting the data gathered during the survey. The multiple regression models used to analyse the data are discussed, after which each model is applied to the survey data and the results presented. The results are interpreted and the chapter rounded off with a discussion of the expected future patterns of desegregation based on the results from the regression analysis. Chapter 4 concludes the document by providing a summary of the main findings of the study. Possible future research opportunities are also discussed.

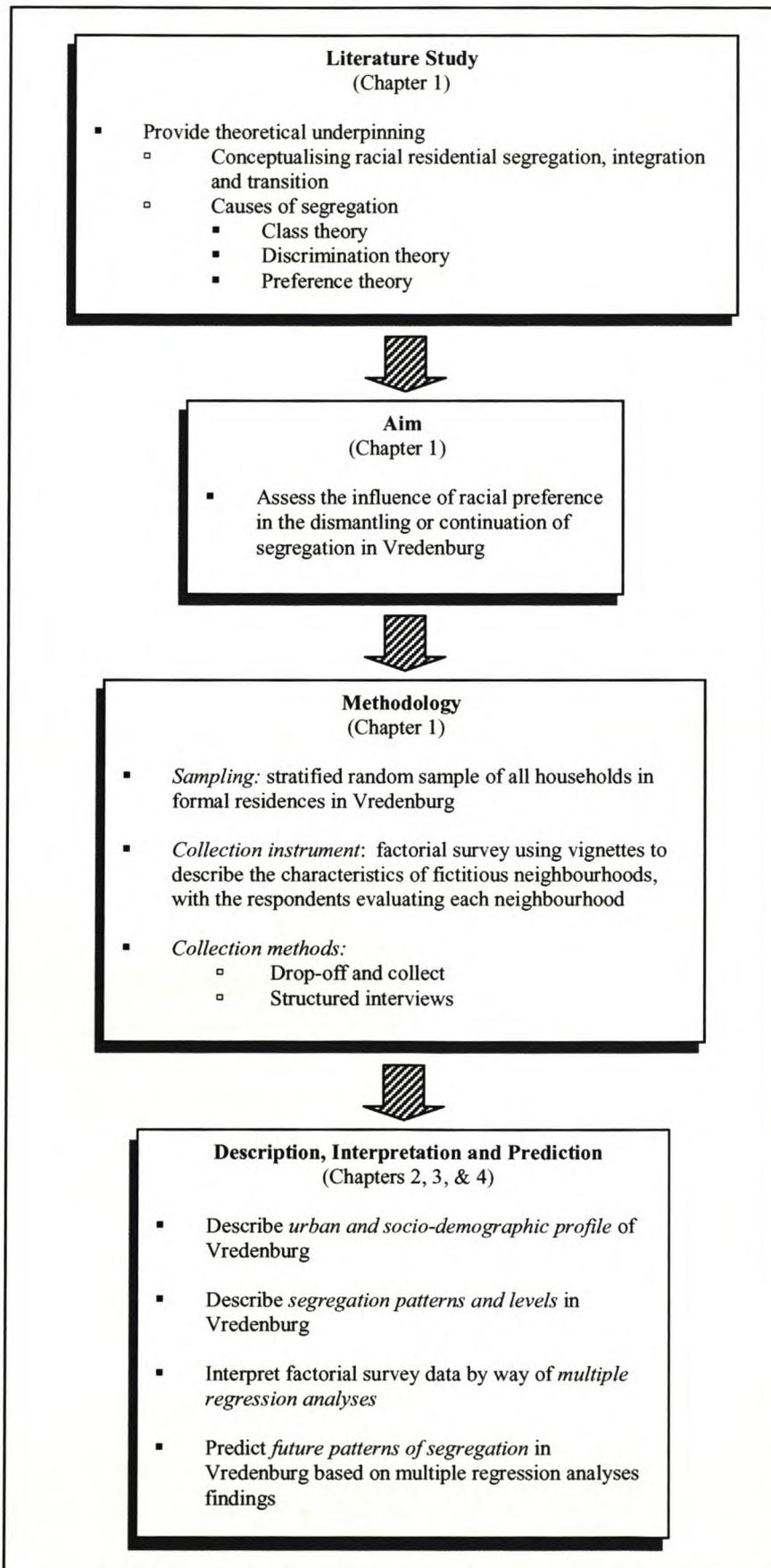


Figure 1.5: Research design for determining the influence of racial composition on neighbourhood evaluations in Vredenburg

CHAPTER 2: THE URBAN SETTING

“The segregation of race and ethnic groups has historically been a central characteristic of social, economic and spatial organization in the South African city” (Davies 1981: 59).

2.1 NATIONAL CONTEXT: URBAN SEGREGATION IN SOUTH AFRICA

South African urban structures are closely related to the country’s political and economic development. As the politico-economy changed and passed through various phases in its evolution, it moulded the urban structure accordingly. These politico-economic phases therefore form distinctive eras in South African urban history. In chronological order these are the colonial era, South Africa at Union and the apartheid as well as the current post-apartheid eras. Racial segregation has been a prominent feature in each of these.

South African towns and cities have a long history of segregation dating back to the latter half of the 17th century. The Dutch settlers were the first to introduce urban settlements to South Africa when they established a mercantile settlement in the Cape in 1652. The colony grew slowly due to immigration and expanded territorially through the dispersal of the “trekboere”¹⁴, who laid the foundation for the development of the “Afrikanervolk”. British colonial rule and permanent settlement followed in the Cape from 1806 onwards, while Natal and the independent Republics of the Transvaal and Orange Free State were already settled by the mid-19th century (Davies 1981).

These settlements were more similar in structure to their North American counterparts than to the European towns of the time, mainly because of their more recent origin. Class differences and spatial segregation characterised these towns. Urban segregation in these towns stemmed from the views of the English governing officials, who regarded non-Whites as unhygienic and perceived them as economic and political threats to British rule (Van der Merwe 1993).

¹⁴ Pastoral farmers

The end of the Anglo-Boer War of 1899-1902 heralded a new era for the South African territories. In 1910 the Afrikaner and British colonisers reached an agreement and established the Union of South Africa, which brought formal colonialism to a close in South Africa (Davies 1981). Urban segregation evolved spontaneously in this era due to the social distance created by the colonial dominance of Whites over non-Whites. The overall impression of the internal structure of these towns and cities can be described as fragmented, with some mixed zones and scattered ethnic enclaves within certain neighbourhoods. The urban settlements of this period were highly, but not completely, segregated (Van der Merwe 1993).

The introduction of a set of laws¹⁵ governing racial interaction in South Africa signalled the beginning of the apartheid era. The Group Areas Act, which was first adopted in 1950 and amended in 1955 by the South African government (Van der Merwe 1993), formed the cornerstone of what was to become known as apartheid – the state-enforced segregation of races. This form of segregation was also to become known as “planned” or “compulsory” segregation (Kuper, Watts & Davies 1958: 13).

Housing and other amenities in the apartheid era were provided to the various racial groups on a separate and highly uneven basis. The overall impression of the internal structure of these settlements was one of decreasing socio-economic status and increasing density towards the periphery. The spatial structure took the form of proportionally divided sectoral patterns, resembling Hoyt’s sectoral model (see Figure 2.1) (Van der Merwe 1993). The access of non-Whites to cities was strictly controlled by influx regulations, which resulted in even more highly structured and divided cities. The inner cities and suburbs were proclaimed “Whites only” areas for business and residential purposes, with Coloureds, Asians and Blacks relegated to different sectors on the periphery. The White components of the city were structured in an orderly fashion according to First World norms, while the non-White components were structured in a disorderly way with regard to facilities and infrastructure. This type of urban settlement was to become known as the *apartheid city* or town (Davies 1981; Van der Merwe 1993).

¹⁵ Influx Control Act No 25 of 1945 Section 10; Mixed Marriages Act No 55 of 1949; Group Areas Act No 41 of 1950; Separate Amenities Act No 49 of 1953 (Hart 1989).

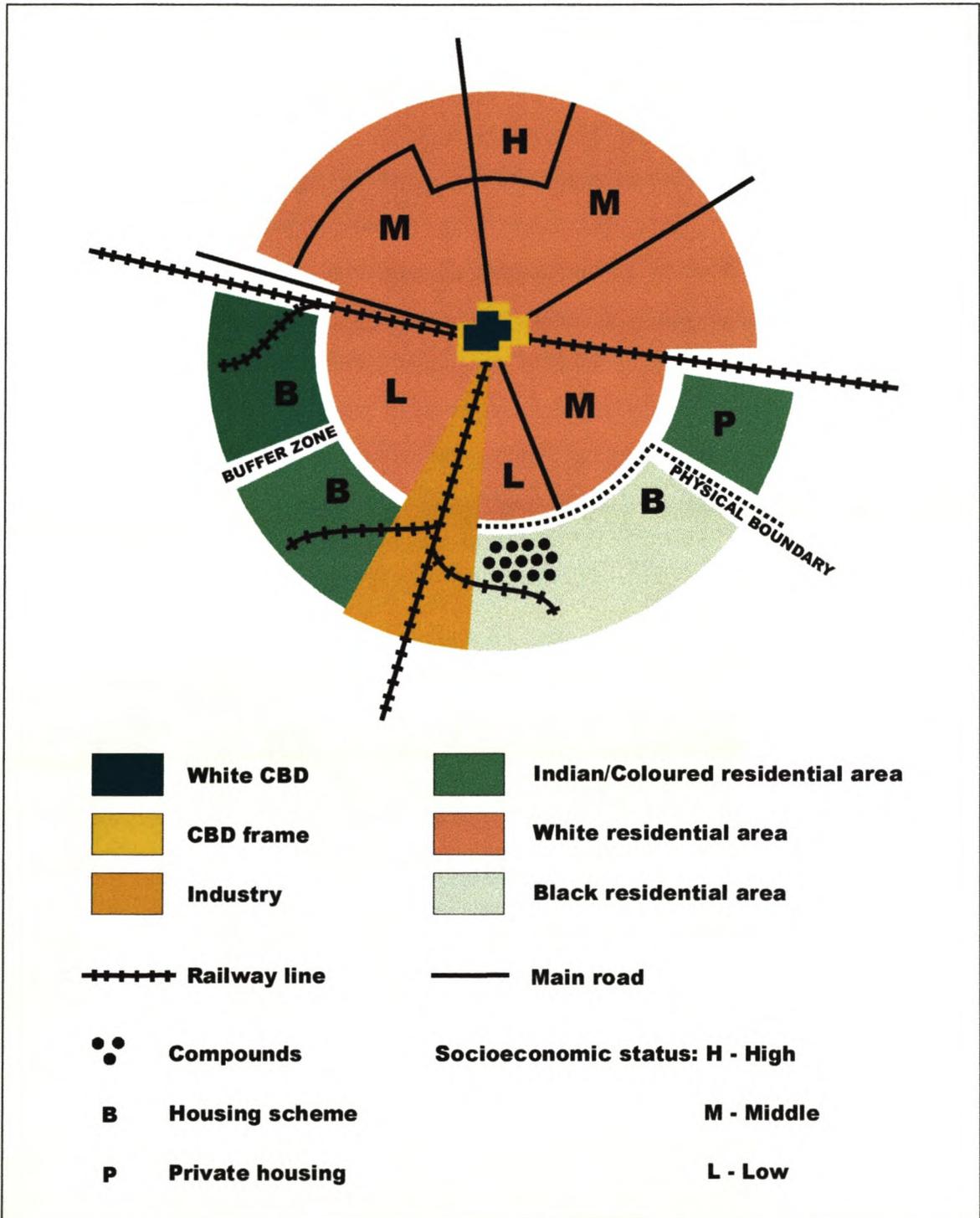


Figure 2.1: Apartheid city structure

Source: Adapted from Van der Merwe (1993)

Rising pressures from within the country as well as international pressure led to the eventual demise of the unjust and inequitable apartheid system in the early 1990s. The abolition of the Group Areas Act in 1991 signalled the end of urban apartheid and with it the introduction of a new chapter in the South African political and urban landscape. The first non-racial democratic elections held in April 1994 were firm evidence of the post-apartheid era in South African history.

The post-apartheid towns and cities are, however, faced with overcoming the problems created by the apartheid structures, both as far as the physical structure and social fabric of South African urban society are concerned. Apartheid may have been removed from the law books, but its spatial imprint is still highly visible. The post-apartheid city is spatially segregated, highly fragmented and dispersed (Donaldson & Van der Merwe 2000), and considerable sacrifices will have to be made within the former White city sectors to achieve integrated cities and raise the living standards of the former non-White sectors (Van der Merwe 1993). Vredenburg was subjected to the forces of apartheid just like all other urban settlements in South Africa, and has been left with the spatial legacy of it. The town now also faces the challenge of integrating its segregated community.

2.2 VREDENBURG IN REGIONAL AND LOCAL CONTEXT

To better comprehend why the relatively inconspicuous town of Vredenburg was selected as a case study, it is necessary to understand the town's role in the development of the West Coast region. The next section attempts to inform the reader of this role.

2.2.1 Regional Setting

Vredenburg is approximately 130km north-west of Cape Town and is situated in the West Coast District of the Western Cape province of South Africa. More specifically, it is located near the geographical centre of the West Coast peninsula (see Figure 2.2).

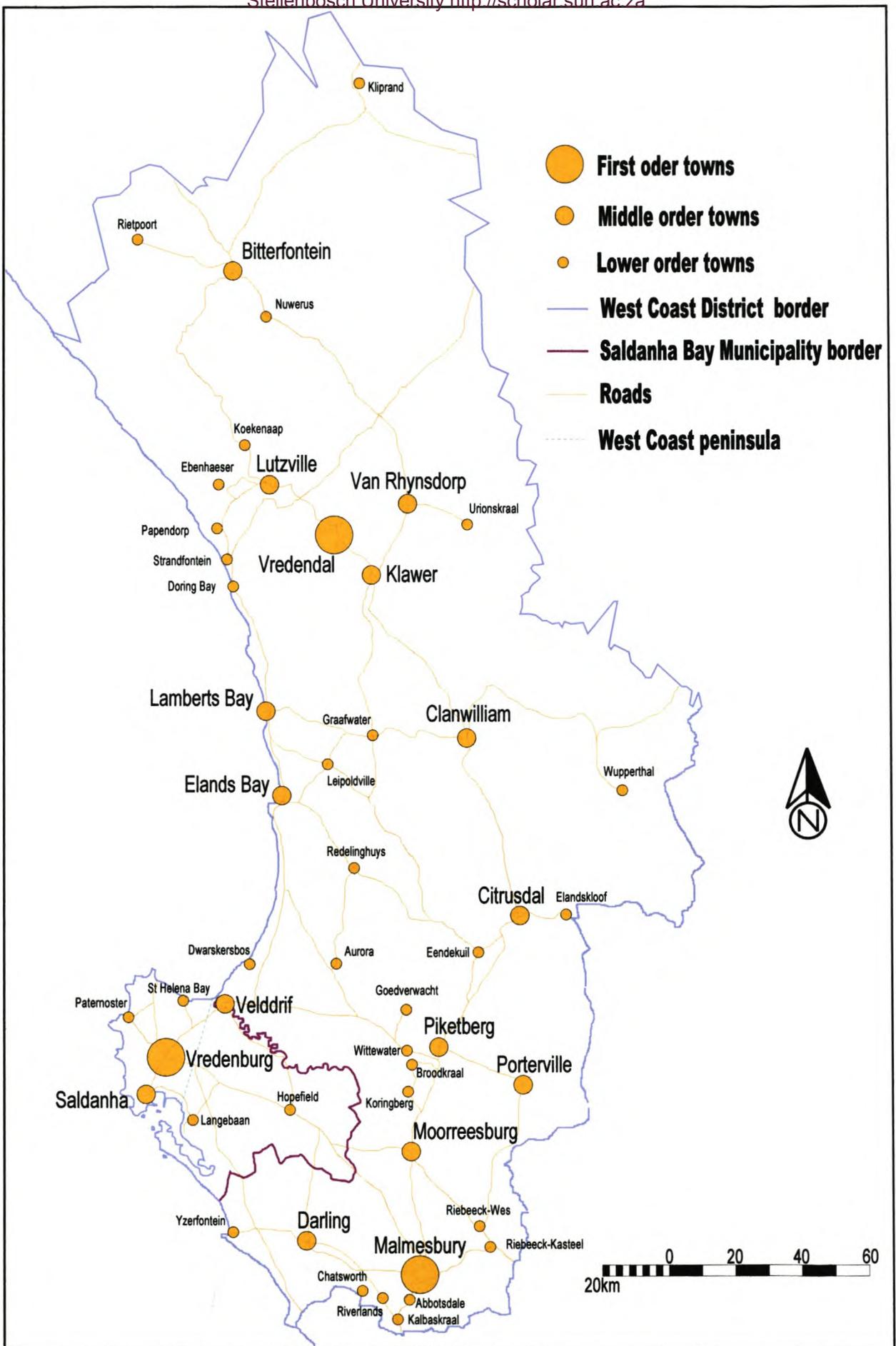


Figure 2.2. The West Coast District

Source: Adapted from West Coast District Council (1999)

Vredenburg plays a significant role in the development of the West Coast peninsula by acting as a central place for the surrounding towns and farmsteads. Its position of significance in the West Coast District is seen in the regional urban hierarchy. Vredenburg holds the top position on the regional hierarchy of towns and is one of three first-order towns, the other two being Malmesbury and Vredendal. The hierarchy was compiled using a combination of the relative levels of social, economic and administrative services rendered in the towns, excluding population size (West Coast District Council 1999). Should population size be taken into consideration in the hierarchy, Vredenburg would remain in the first position as it has the largest urban population in the district (see Table 2.1).

Despite Vredenburg's hierarchical position, the town is relatively unknown outside of the district. Its smaller neighbours, namely Saldanha, Langebaan and Paternoster, overshadow it in terms of media attention. Saldanha is renowned for its harbour and steelworks, while Langebaan and Paternoster have become favourite holiday destinations for Capetonians, who enjoy the unspoilt white beaches, crayfish and abalone on offer at these coastal towns. Nevertheless, while the "landlocked" Vredenburg lacks the lustre and accompanying media and tourist attention of some of its coastal neighbours, it remains the economic powerhouse of the West Coast peninsula and of the West Coast District.

According to the West Coast District Council (1999; 2000), approximately 193 000 (71%) of the total West Coast District's population of 271 000 were urbanised in 2000. Around 70% of the total urban population are settled in the southern quarter¹⁶ of the West Coast District, of which Vredenburg forms a part, thus creating a highly unbalanced urban population distribution in the District. The average annual rate of population increase in the urbanised areas is expected to be 2,7% between 2000 and 2010, thereby increasing the level of urbanisation of the region to 77%. The West Coast District Council (2000) furthermore expects the urban dominance of the southern quarter of the District to increase, with the West Coast peninsula playing the leading role in this dominance.

¹⁶ All the towns situated south of Velddrif, including Velddrif.

Table 2.1: West Coast District: most recent population counts or estimates

PLACE	YEAR	POPULATION
Abbotsdale	1998	1 928
Aurora	1996	467
Bitterfontein	1996	782
Citrusdal	1996	3 990
Clanwilliam	1996	4 819
Chatsworth	1998	1 660
Darling	1999	6 230
Doring Bay	1998	1 350
Ebenhaeser/Papendorp	1999	2 000
Eendekuil	1999	775
Elands Bay	1999	1 152
Goedverwacht	1996	1 385
Graafwater	1998	1 734
Hopefield	1996	4 423
Kalbaskraal	1998	847
Klawer	1996	3 797
Koringberg	1998	446
Lamberts Bay	1996	4 291
Langebaan	1999	3 968
Lutzville/Koekenaap	1998	5 085
Malmesbury	1998	20 722
Moorreesburg	1996	8 386
Nuwerus	1996	578
Paternoster	1999	1 300
Piketberg	1999	8 118
Porterville	1996	4 488
Redelinghuys	1996	381
Riebeeck-Kasteel	1998	2 751
Riebeeck-Wes	1996	2 777
Rietpoort	1996	1 185
Riverlands	1998	1 066
Saldanha	1999	20 590
St Helena Bay	1999	6 820
Stompneus Bay	1999	510
Strandfontein	1996	156
Van Rhynsdorp	1996	4 027
Velddrif/Laaipek	1999	7 200
Vredenburg	1999	25 380
Vredendal	1996	11 745
Wittewater	1996	722
Wupperthal	1998	1 721
Yzerfontein	1996	402
Total		182 154

Source: West Coast District Council (1999)

Over time all the urban settlements of the West Coast peninsula are expected to develop into a single socially and economically integrated complex, which will form by far the largest urban concentration with the most growth momentum in the region. The peninsula already houses 54 600 (28%) of the total urban population of the West Coast region as well as the largest town of the region, namely Vredenburg (West Coast District Council 1999; 2000).

All the urban settlements of the region are currently regarded as *small towns* (towns with a population of approximately 25 000 people or less) within the national urban framework and play vital roles in servicing the surrounding agricultural areas. These towns generally exhibit strong tendencies of sprawl and a lack of physical integration. This can be seen in the facts that:

- New extensions of subsidised housing projects often represent a continuation of the existing apartheid town in its structure and location. New urban developments create opportunities for “physical” structural integration, but these opportunities are not exploited in many instances. The main reasons for this are, firstly, the unwillingness to accept this integration by some of the well-established interest groups; secondly, a lack of know-how from other interest groups in orchestrating such integration; and thirdly, a lack of financial resources. Money is rather spent on building larger and better-quality top-structures¹⁷ than on buying better located but more expensive land, which would contribute towards the structural integration of the towns (West Coast District Council 1999).

- A noticeable urban feature in the coastal areas of the West Coast peninsula and surrounds is that there are vast areas of underdeveloped urban extensions. In 1998 over 15 000 plots (more than 50% of all residential erven in the area) were standing vacant (West Coast District Council 1999).

Table 2.2 indicates the levels of urbanisation of the three main racial groups in the West Coast District as recorded in the 1996 census. In all instances except one, Vredenburg’s level of urbanisation is higher than the national, provincial and regional comparatives, with a total level of urbanisation of more than 95%. Only the Black population group in

¹⁷ For example houses, blocks of flats, garages

Vredenburg has a slightly lower level of urbanisation (92,6%) than the provincial comparative (95%). However, the urbanisation level for Blacks in Vredenburg is more than double the national urbanisation level (43%) for the same group. Hopefield magisterial district has the second highest level of urbanisation in the West Coast District at nearly 71%, lagging more than 24% behind that of Vredenburg. The large gap between Vredenburg and its closest rival in terms of level of urbanisation emphasises the dominance of Vredenburg as an urban area in the region.

Table 2.2: Level of urbanisation per population group, West Coast District 1996

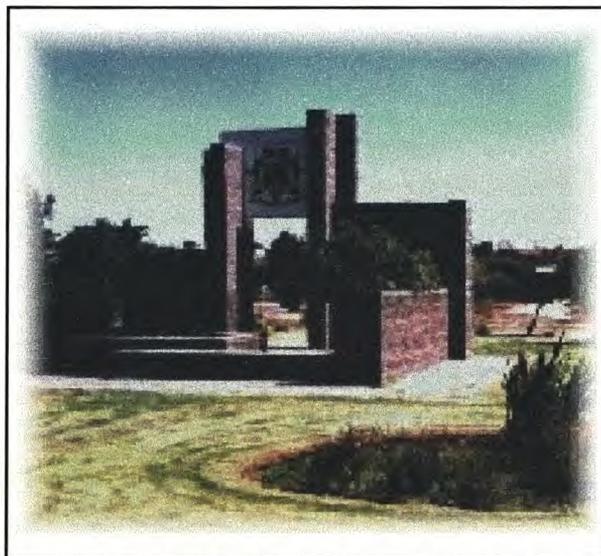
West Coast Magisterial Districts	Black (% Urban)	Coloured (% Urban)	White (% Urban)	Total (% Urban)
Clanwilliam	56,6	46,6	66,8	50,6
Hopefield	48,6	77,3	58,1	70,8
Malmesbury	51,3	60,3	75,7	63,1
Moorreesburg	22,6	58,1	75,6	62,0
Piketberg	50,6	46,9	70,6	52,0
Van Rhynsdorp	53,1	62,5	78,3	65,6
Vredenburg	92,6	95,1	95,9	95,1
Vredendal	59,6	47,2	60,3	50,3
TOTAL	66,7	61,6	75	64,8
Western Cape Province	95	84	93	89
South Africa	43	83	91	54

Source: West Coast District Council (1999)

2.2.2 Historical Development

Vredenburg was established in the mid-1800s on the South African West coast. The town developed as a service centre for the surrounding farms, which were already present in the area as early as 1820. The town officially came into existence in 1862, with the building of a church near the local spring, after which people began to settle there. By 1880 the first public school was built and a post-office was erected in 1886. The agricultural land surrounding the town was not of a very high quality and to make matters worse there was not enough fresh water in the area to sustain further development. These two factors led to a long period during which the town grew very slowly (Vredenburg-Saldanha Municipality 1992).

The Afrikaans name *Vredenburg* literally means “town of peace” although the origin of the town was not as peaceful as the name suggests. The spring near which the church was built was situated on the boundary between the two farms of Heuningklip and Witteklip, owned by Mr W. Baard and Mr C. Loubser respectively. The owners quarrelled so much over the water rights to the spring that it became known as *Twisfontein* or “fountain of strife”. The quarrelling escalated into a lawsuit between the two parties during which time the spring became known as “Prosesfontein”, directly translated as “lawsuit fountain”. The establishment of the church helped to settle the dispute by bringing *vrede* (“peace”) to the area, hence the name Vredenburg. The town council later erected a monument (see Figure 2.3) near the spring to commemorate the settlement of the dispute (Saldanha Bay Municipality 2002).



Source: Saldanha Bay Municipality (2002)

Figure 2.3: Prosesfontein monument

Vredenburg received municipal status in 1932 but amalgamated with the municipality of the nearby town of Saldanha, approximately 11 kilometres away, in 1974. The amalgamated municipality became officially known as the Vredenburg-Saldanha Municipality. During the early 1990s the towns of St Helena Bay, Paternoster, Jacobs Bay and Stompneus Bay were inducted into the Vredenburg-Saldanha Municipality, which then became known as the West Coast Peninsula Transitional Council (WCPTC) (Saldanha Bay Municipality 2002).

In 2000 municipal structures in the whole of South Africa were restructured to create more efficient and equitable local governments. During this process the towns of Langebaan and

Hopefield were inducted into the former WCPTC with the official designation of the new municipality being WCO14 (see Figure 2.2). The newly formed WCO14 was faced with finding a name for itself. After public deliberations it was decided to name the newly formed municipality the Saldanha Bay Municipality, which consists of Vredenburg, Saldanha Bay, Jacobs Bay, St Helena Bay, Stompneus Bay, Paternoster, Langebaan and Hopefield (Saldanha Bay Municipality 2002).

2.2.3 Urban Profile

The spatial imprint left by decades of apartheid is still highly visible in Vredenburg even though more than a decade has passed since the scrapping of the Group Areas Act in 1991. Today the town remains segregated in terms of race and neighbourhood, with the spatial pattern of segregation continuing along the lines of the former apartheid structures.

As can be seen in Figure 2.4, Vredenburg is roughly divided into four sectors by the main roads that pass through the town and extend to the neighbouring towns. The two sectors lying to the west of the main road from Saldanha to Velddrif were the former Whites only areas of Vredenburg, while the south-eastern sector was designated as the non-White area of Vredenburg, named Louwville. The area of Witteklip, better known by its colloquial name, "Hopland", was developed during the latter half of the 1990s. It consists entirely of low-cost housing funded by the Reconstruction and Development Programme of the African National Congress. The much smaller north-eastern sector houses the light and medium industries of the town.

The topography of Vredenburg is such that the two former Whites only sectors, along with the industrial sector, lie on higher, more scenic land, whilst the non-White area was relegated to the valley beneath the granite hills. This alone has created an uptown-downtown effect within the neighbourhoods of Vredenburg and has added to the segregated character of the town.

In keeping with apartheid town planning, the non-White south-eastern sector was physically separated from the rest of the town by large tracts of open land. Scrutiny of Figure 2.4 attests to this fact as large erven are seen all along the Louwville side of the main roads. Much of this land was left open during the apartheid era, creating a buffer between White Vredenburg and non-White Louwville. As the town grew and more

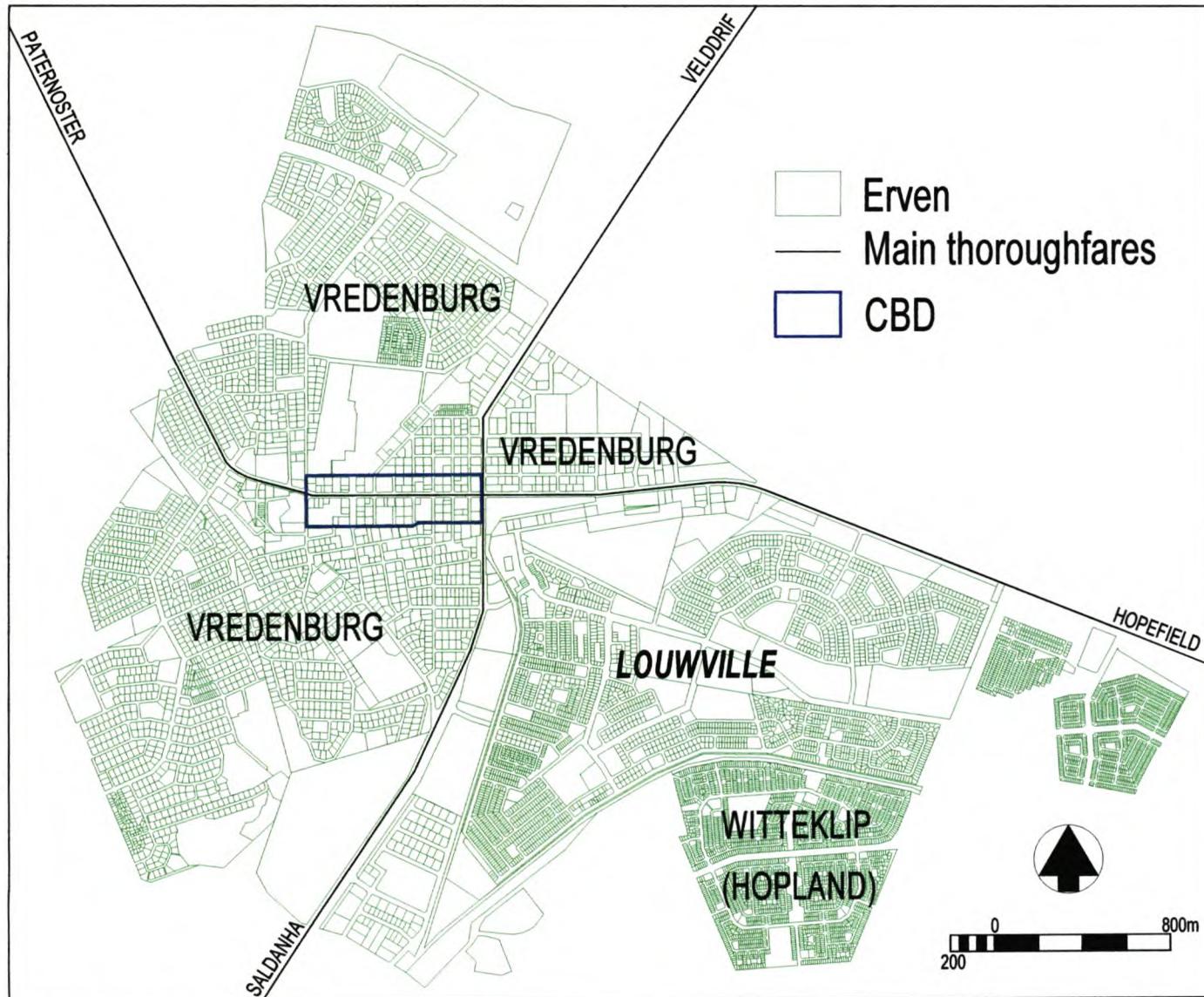


Figure 2.4: Spatial layout of Vredenburg

light industrial space was needed, the buffer area started to fill up. The cluster of relatively large erven lying due east of the Saldanha main road in the Louwville sector bears testimony of this fact, as it is designated as a light industrial zone. Currently, many of the erven in the buffer are still open. There are plans to build a community centre on one of the large open tracts of land just south of the main four-way crossing, which will house inter alia municipal services such as the fire department and a community hall.

The sizes of the erven themselves also reveal a pattern of segregation. The erven of the former White sectors are, generally speaking around 2,4 times larger in area than their counterparts in the former non-White sector. This is due to large disparities in income between the population groups, resulting from White economic domination during the apartheid years. These disparities are discussed in the next section.

Vredenburg's internal structure is typical of an apartheid town, with segregated residential neighbourhoods. Figure 2.5 indicates the pattern and level of segregation present in Vredenburg at the time of the 1996 census. Five years after the abolition of the Group Areas Act in 1991, the levels of racial mixing remained low throughout the town. The eastern and western extremities of the town were nearly completely segregated. The area of contact between these extremes did, however, show signs of non-White in-migration.

2.2.4 Socio-Demographic Profile

Figure 2.6 illustrates the contribution of each population group as a whole, in each of 13 income brackets for Vredenburg, as counted in the 1996 census. What is evident from this diagram is that the White population group had the clear majority of people in the upper monthly income brackets. On the other hand, the Coloured population group dominated the lower six monthly-income brackets. In all, 74% of the people earning in the top seven income brackets were White, with the Coloured population comprising 23%, the Black population 2,5% and the Indian/Asian population 0.5% of the same income brackets. These figures clearly show the White economic domination of the town in the mid-1990s.

According to the 1996 census results (Statistics South Africa 1996), the Coloured population group was by far the largest group in Vredenburg with 13 918 members (68%) (see Figure 2.7). The second largest racial grouping were the Whites with 5 166 (25%), third the

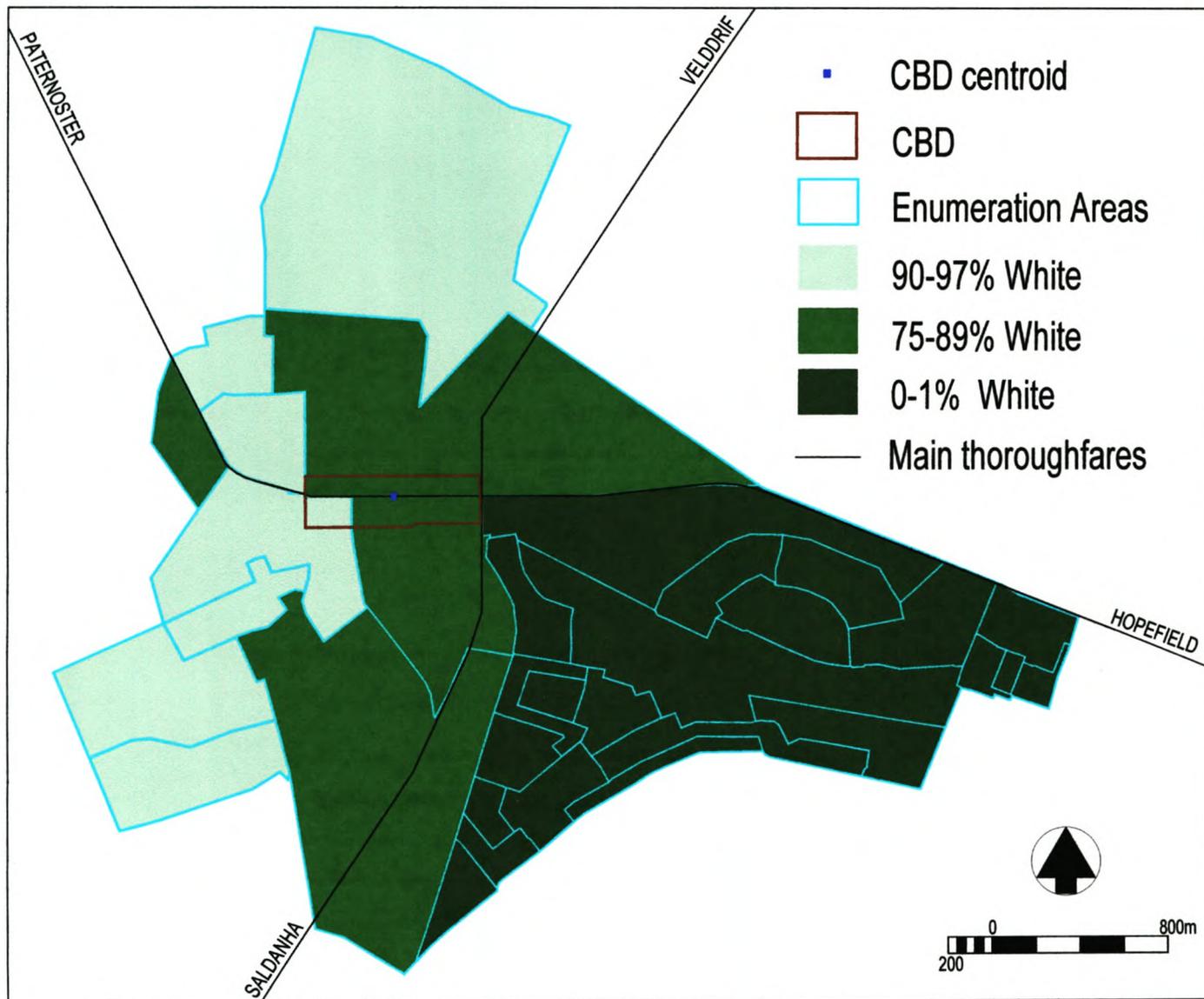
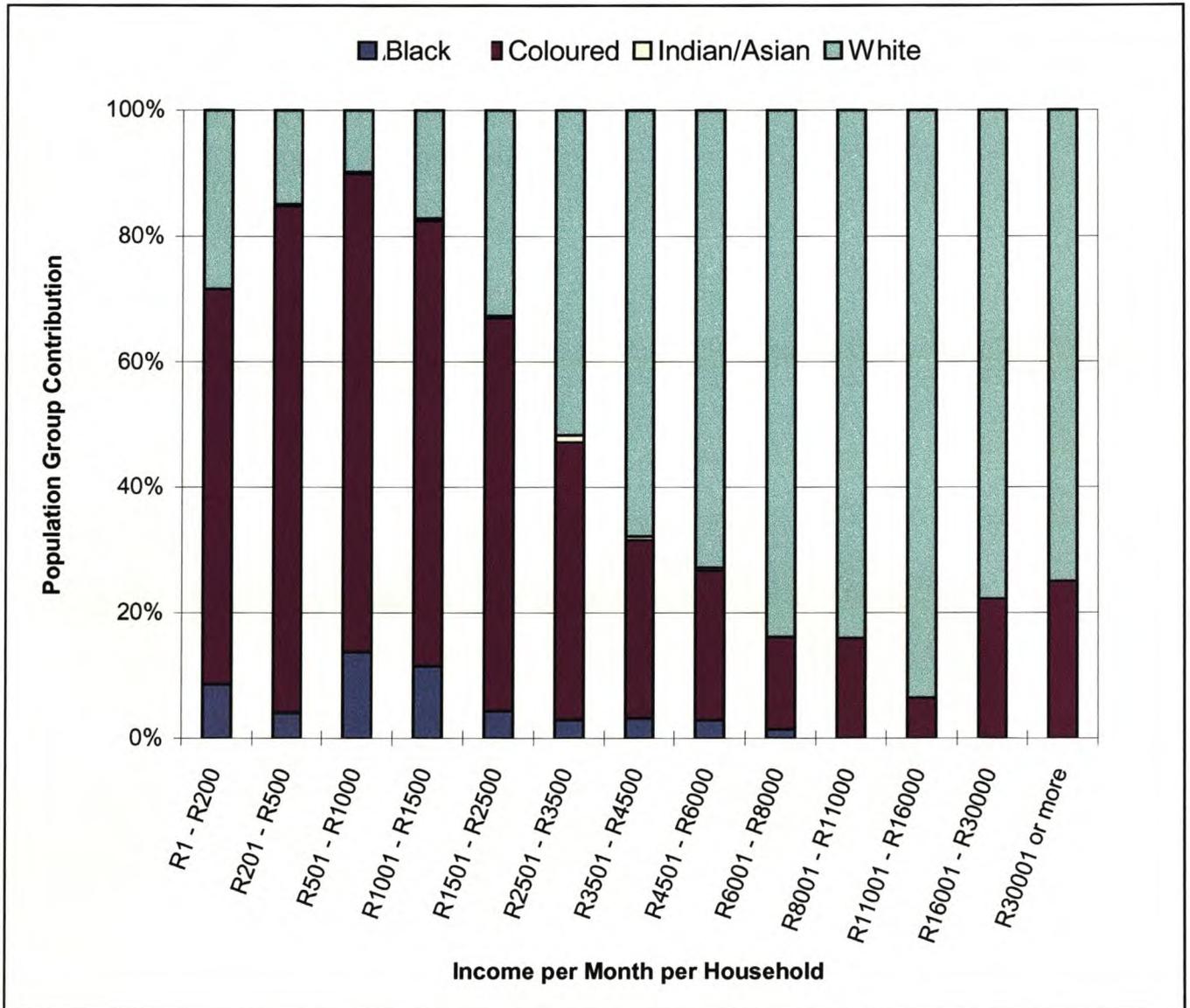


Figure 2.5: Population group composition of enumeration areas in Vredenburg, 1996

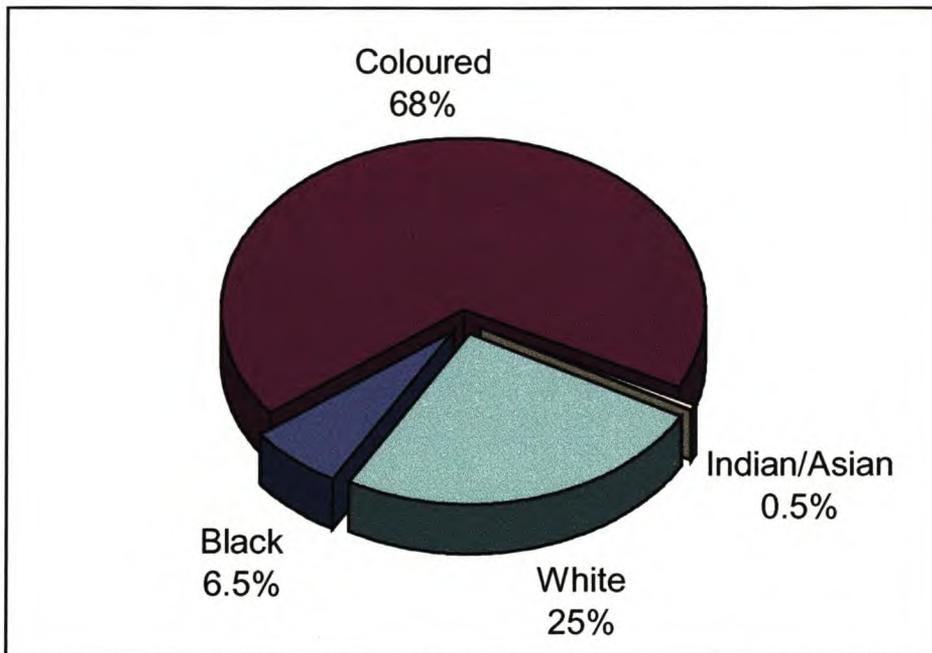
Black population group with 1 298 (6.5%) and lastly the Indian/Asian group with only 98 members (0.5%), making a total of 20 480 people. Municipal estimates in 1999 suggest that the population had increased to 25 380 (West Coast District Council 1999). Although no official census data are available for the current (2002) demographic situation¹⁸, infrastructural growth in the area suggests that Vredenburg’s population numbers have increased since the 1999 estimates were made.



Source: Statistics South Africa (1996)

Figure 2.6: Population group contributions towards income levels in Vredenburg, 1996

¹⁸ The 2001 census results are as yet unavailable.

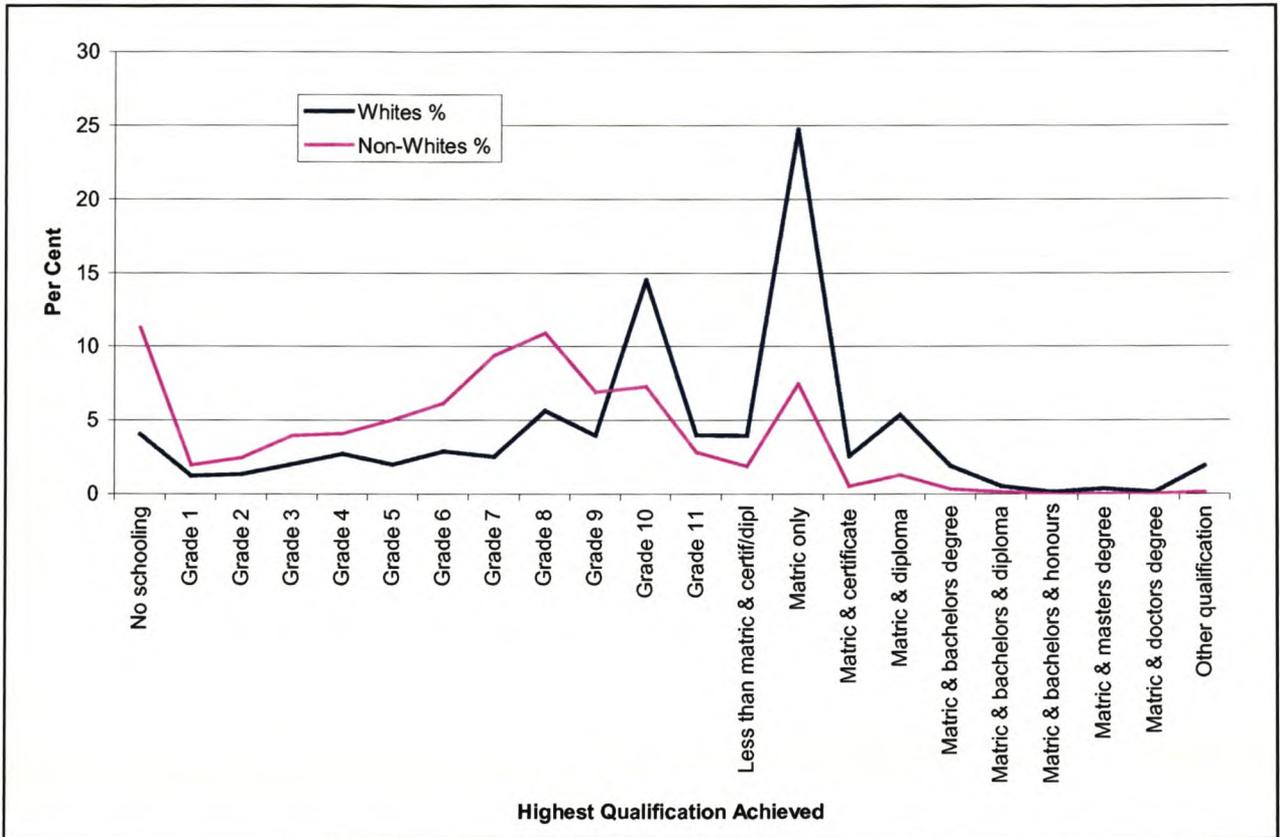


Source: Statistics South Africa (1996)

Figure 2.7: Population groups of Vredenburg, 1996

Combining the data of Figures 2.6 and 2.7 exposes the fact that the White minority population of 25% dominates the upper seven income brackets, by totalling 74% of the people who earn incomes in those brackets. Not only do the Whites dominate the upper income categories of Vredenburg as a whole, but they also dominate each of the upper income brackets individually, as can be seen in Figure 2.6. Conversely, the majority non-White population totalling 75% only make up 26% of those earning incomes in the upper seven brackets.

Figure 2.8 represents the highest educational qualifications achieved by the residents of Vredenburg by 1996. It is evident from Figure 2.8 that Whites are generally higher qualified and/or educated than non-Whites. The reason for this stems directly from the unequal development that took place during the apartheid years. More than double the amount of non-Whites have received no schooling when compared to the Whites. Non-Whites dominate all the categories from grade one to grade nine, while Whites dominate all categories upward from and including grade nine. Whites, therefore, have achieved much higher levels of qualification and education than the non-White residents of Vredenburg.



Source: Statistics South Africa (1996)

Figure 2.8: Highest educational qualification achieved by the residents of Vredenburg, 1996

What is evident from the above discussion is that the White minority in Vredenburg dominates the non-White majority socio-economically. This in itself is evidence of the social distance between these two groups. It has also been mentioned that Vredenburg’s neighbourhoods are segregated in terms of race, stemming from apartheid planning. However, to what extent do Whites and non-Whites live spatially segregated from one another? This question will be dealt with in the next section.

2.3 MEASURING SEGREGATION IN VREDENBURG

Massey & Denton (1988) have undertaken a methodological evaluation of 20 measures of residential segregation. They conceptually classified and explained how each measure is linked to one of five basic dimensions or distributional characteristics of spatial variation.

These dimensions are evenness, exposure, concentration, centralisation and clustering (see Insert 2.1).

Massey & Denton (1988) concluded that segregation should be measured with a variety of indices in order to include the different dimensions of segregation. The dimensions may overlap on an empirical level, but they differ distinctly on a conceptual level.

Insert 2.1: Dimensions of segregation

"At a general level, residential segregation is the degree to which two or more groups live separately from one another, in different parts of the urban environment. This general understanding masks considerable underlying complexity, however, for groups may live apart from one another and be "segregated" in a variety of ways. Minority members may be distributed so that they are overrepresented in some areas and underrepresented in others, varying on the characteristic *evenness*. They may be distributed so that their *exposure* to majority members is limited by virtue of rarely sharing a neighborhood with them. They may be spatially *concentrated* within a very small area, occupying less physical space than majority members. They may be spatially *centralized*, congregating around the urban core, and occupying a more central location than the majority. Finally, areas of minority settlement may be tightly *clustered* to form one large contiguous enclosure, or be scattered widely around the urban area." (Massey & Denton 1988: 282 –283)

Table 2.3 summarises the measures applied to Vredenburg within four dimensions of segregation. The score ranges of each of these measures are given, along with a key to deciphering the meaning of the scores. In each case a value is specified for which an index score is rated as "high". This provides a simple classification mechanism of the scores for each measure. Table 2.4 is a classification by Christopher (2001) of South African towns in terms of segregation levels based only on the Dissimilarity Index (D).

Christopher's (2001) classification provides a means of defining what constitutes a racially mixed neighbourhood in the South African context. However, the classifications offered in Tables 2.3 and 2.4 should not be viewed as absolutes, but should rather be treated as reference points against which scores may be interpreted. It is impossible to devise a generic classification fit for all areas or countries. This is because the social context, in which segregation occurs, differs from country to country or area to area. The social

backdrop of the area or country must, therefore, be considered when interpreting the scores of the segregation measures.

Table 2.3: Definitions, measures and scoring of four dimensions of residential segregation

Segregation Dimension	Measures	Score
Evenness	The Dissimilarity Index (D) is the most widely used measure of evenness. It measures the proportion of members of one group that would have to change their area of residence to achieve perfect integration.	Index range: 0 to 1,0 0 = No segregation 1 = Maximum segregation High = 0,6 +
Exposure	Exposure measures the extent to which groups are exposed only to each other in their areas of residence. Commonly used exposure measures are the Isolation Index (xPx^*) and the Interaction Index (xPy^*).	Index range: 0 to 1,0 xP^*y : 0 = Minimum interaction 1 = Maximum interaction xP^*x : 0 = Minimum isolation 1 = Maximum isolation High = 0,7 +
Centralisation	The Absolute Centralisation Index (ACE) measures the extent to which a group is spatially located near the centre of an urban area.	Index range: -1,0 to +1,0 -1 = Tendency to reside in outlying areas 0 = Uniform distribution 1 = Tendency to reside close to city centre High = 0,8 +
Concentration	The Relative Concentration Index (RCO) and the Adapted Relative Concentration Index (RCO*) measure the amount of physical space occupied by subordinate groups. As segregation increases subordinate groups are increasingly concentrated in smaller areas.	Index range: -1,0 to +1,0 -1 = Concentration of group A exceeds that of group B to the maximum possible extent 0 = Two groups equally concentrated 1 = Concentration of group B exceeds that of group A to the maximum possible extent High = 0,7 +

Source: Callaghan (2001)

Table 2.4: Classification of South African towns in terms of segregation levels, based on D

Type	Index Range (D)
Integrated (mixed)	0-29
Segregated	30-69
Structurally segregated	70-89
Hyper-segregated	90-100

Source: Christopher (2001)

The four dimensions mentioned in Table 2.3 will be analysed in more detail and applied to the town of Vredenburg in the remainder of this section. Appendix C contains the data used in calculating the various segregation indices for Vredenburg.

2.3.1 Evenness

Evenness is the proportional distribution of two or more social groups throughout the areal units of a city in relation to one another. When the areal units each have the same proportion of minority and majority members as the total city area, evenness is maximised and segregation minimised. When no minority and majority members reside alongside one another in the individual areal units, evenness is minimised and segregation maximised. Thus the more unevenly distributed the minority group is, the more segregated it is said to be (Massey & Denton 1988).

The most widely used measure of evenness is Duncan & Duncan's (1955) Dissimilarity Index. It measures departures from evenness by expressing the weighted mean absolute deviation of every unit's minority proportion from the city's total minority proportion as a proportion of its theoretical maximum. The index varies between 0 and 1,0 and represents the proportion of minority members who would have to change their area of residence to achieve an even distribution. Thus a score of 1 indicates total segregation and 0 complete integration (Massey & Denton 1988).

The Dissimilarity Index (D) is expressed as:

$$D = \sum_{i=1}^n \frac{1}{2} \times \frac{t_i |p_i - P|}{TP(1 - P)}$$

t_i = the total population of areal unit I

p_i = the minority proportion of areal unit I

T = the population of the whole city

P = the minority proportion of the whole city

n = areal unit.

The Dissimilarity Index value of Vredenburg, based on the 1996 census results, is 0,96. In other words 96% of the minority White population group would have to move to areas with non-White populations in order to produce an even distribution throughout the area. On this basis Vredenburg can be classified as a hyper-segregated town. At first glance it might appear that the White population group, as the numerical minority, is the excluded group due to the high D value. This is, however, not the case, as the segregation measures of the other dimensions will bear out.

2.3.2 Exposure

Exposure is the degree of potential interaction or contact between minority and majority group members within the areal units of a city. The exposure indices differ from evenness indices in that the former depend on the relative sizes of the groups being compared. Even if minority members are evenly distributed throughout the city, they can still experience little exposure to majority members if the former form a relatively large proportion of the total city population. On the other hand, if the minority population is relatively small in size, they will experience high levels of exposure to the majority group irrespective of their pattern of evenness. Therefore, exposure indices incorporate the relative sizes of the

majority and minority groups when determining the degree of segregation between them (Massey & Denton 1988).

Measures of residential exposure are grouped into interaction and isolation indices. The Interaction Index denoted as xP^*y , measures the extent to which minority group members (X) are exposed to majority group members (Y). The Isolation Index, denoted as xP^*x , measures the extent to which minority group members are exposed only to one another instead of to members of the minority group (Massey & Denton 1988).

The exposure indices are expressed as:

$$xP^*y = \sum_{i=1}^n \left(\frac{x_i}{X} \times \frac{y_i}{t_i} \right) \text{ (Interaction Index)}$$

and

$$xP^*x = \sum_{i=1}^n \left(\frac{x_i}{X} \times \frac{x_i}{t_i} \right) \text{ (Isolation Index)}$$

x_i = the number of minority group members X in area I

y_i = the number of majority group members Y in area I

t_i = the total population of area I

X = the total minority group members X city-wide

Y = the total majority group members Y city-wide.

Both indices vary between 0 and 1,0. The Interaction Index is interpreted as the probability that a member of group X is sharing an area with a member of group Y. Conversely, the Isolation Index is interpreted as the probability of a member of group X sharing an area with another member of group X (Massey & Denton 1988).

In Vredenburg's case xP^*y is 0,09 and xP^*x is 0,91. In other words, there is but a nine per cent probability that a randomly selected White person will be living in an EA in which there is a non-White resident, and a 91 per cent chance that he or she will be living in an all-White EA. Vredenburg thus scores very high on the inter-group Isolation Index and very low on the inter-group Interaction Index.

2.3.3 Concentration

Concentration is the relative physical space occupied by a minority group. The smaller the area a group occupies, the more concentrated they are said to be. A city or town in which the residential areas of the minority population are relatively small in size and few in number are deemed to be segregated. This is because minorities have generally been constrained to a small proportion of the residential surface due to discrimination (Massey & Denton 1988).

The index chosen to represent concentration is the Relative Concentration Index (RCO), as suggested by Massey & Denton (1988), and measures the relative geographical concentration of minority groups. RCO is measured by computing the average amount of geographical space occupied by the minority group in relation to the majority group and then comparing this result to the ratio that would be achieved if the minority group were maximally concentrated and the majority maximally dispersed (Massey & Denton 1989). The index is expressed as:

$$RCO = \frac{\left[\sum_{i=1}^n \frac{x_i a_i}{X} / \sum_{i=1}^n \frac{y_i a_i}{Y} \right]^{-1}}{\left[\sum_{i=1}^{n1} \frac{t_i a_i}{T_1} / \sum_{i=n2}^n \frac{t_i a_i}{T_2} \right]^{-1}}$$

The n areal units are ordered by geographical size from smallest to largest

a_i = the geographic size of areal unit i

$n1$ = the rank of the areal unit where the cumulative total population of areal units equals the minority population of the city, summing from the smallest unit upwards

$n2$ = the rank of the areal unit where the cumulative total population of areal units equals the minority population of the city, summing from the largest unit downwards

X = the total city-wide number of minority group X's members

Y = the total city-wide number of majority group Y 's members

T_1 = the total population living in areal units $i = 1$ to n_1

T_2 = the total population living in areal units n_2 to n

t_i = the total population of areal unit i

x_i = the number of minority group X 's members living in unit i

y_i = the number of majority group Y 's members living in unit i .

The index varies between $-1,0$ and $1,0$. A score of 0 indicates that the two groups are equally concentrated in geographical space. A score of -1 means that the concentration of the majority group Y exceeds that of the minority group X to the maximum extent possible, while a score of $1,0$ indicates the converse (Massey & Denton 1988).

Applying the RCO to Vredenburg presented a problem emanating from peculiar South African circumstances. The index was created on the theoretical premise that minorities are traditionally restricted to a relatively small portion of the total geographic area, therefore not allowing for those peculiar circumstances where the minority group occupies a relatively large share of the total area, as is the case in Vredenburg. In applying the RCO directly to Vredenburg presented a score of $-3,198$, which does not fall within the prescribed limits of the index. The reason for this aberrant score is that the minority White population (25%) resides in an area approximately the same size as that of the majority non-White population (75%), thus giving a small share of the population a very large area of residence.

In order to apply the index in a meaningful way to the South African situation, it was adapted in the following fashion:

$$RCO^* = \frac{\left[\sum_{i=1}^n \frac{y_i a_i}{Y} / \sum_{i=1}^n \frac{x_i a_i}{X} \right] - 1}{\left[\sum_{i=1}^{n_1} \frac{t_i a_i}{T_1} / \sum_{i=n_2}^n \frac{t_i a_i}{T_2} \right] - 1}$$

The RCO^* yielded a score of $0,806$. This RCO^* score means that the majority non-White group exceed the minority White group in terms of concentration. The non-White majority

is therefore very highly concentrated in relation to the minority White population of Vredenburg, indicating segregation.

2.3.4 Centralisation

Centralisation is the extent to which a group is spatially located near the centre of an urban area, or as in this case, near the central business district (CBD). In most developed industrialised countries racial and ethnic minorities concentrate in and around the city centre and live in the old sub-standard housing, abandoned by the wealthier suburbanites (Massey & Denton 1988). In the apartheid towns and cities of South Africa, this has not been the case. Apartheid relegated the non-White majority to the outskirts and left the central city areas as exclusive Whites only zones. Thus living near the city centre was a privilege afforded only to the White population.

The index chosen to represent centralisation is the Absolute Centralisation Index (ACE) as suggested by Massey & Denton (1988). The ACE measures a group's geographical distribution in relation to the CBD and is expressed as:

$$ACE = \left(\sum_{i=1}^n X_{i-1} A_i \right) - \left(\sum_{i=1}^n X_i A_{i-1} \right)$$

The n areal units are ordered by increasing distance¹⁹ from the CBD

X_i = the cumulative proportion of group X 's members in areal unit i

A_i = the cumulative proportion of land area in areal unit i .

The index varies between $-1,0$ and $1,0$. Positive scores indicate a tendency of a group's members to live close to the CBD, while negative scores indicate a tendency of the group to live in the outlying areas of the town or city. A score of 0 shows that a group has a uniform distribution throughout the area. The index score therefore reflects the proportion of the group's members who will have to change place of residence in order to achieve a uniform distribution throughout the whole area (Massey & Denton 1988).

¹⁹ The distance was measured from the centroid of each EA to the centroid of the CBD.

The White population in Vredenburg achieved an ACE score of 0,36 and the non-White group a score of $-0,54$. This indicates a tendency for White members to live closer to the CBD than their non-White counterparts. In other words, 36 per cent of the White population will have to move farther away from the CBD or, conversely, 54 per cent of the non-White population must move closer to the CBD in order to achieve an even distribution. These scores are in keeping with the apartheid city model, where non-Whites are relegated to the periphery of the urban landscape, thus re-affirming the presence of segregation in Vredenburg.

In summarising, the successful application of measures of segregation in each of the dimensions of evenness, exposure, concentration and centralisation, yielded the following picture of segregation in Vredenburg:

- A high proportion (96%) of the minority White population group would have to move to areas with non-White populations in order to produce an even distribution throughout Vredenburg.
- There is only a 9% probability that a randomly selected White person will be living in an EA in which there is a non-White resident, and a 91% chance that he or she will be living in an all-White EA.
- The non-White majority is very highly concentrated in relation to the minority White population, with an adapted Relative Concentration index value of 0,806.
- In keeping with the apartheid city model, non-Whites are relegated to the periphery of the urban landscape, with an Absolute Centralisation index score of $-0,54$.

Taking into consideration the scores obtained in the four dimensions of segregation applied to Vredenburg, the town can be classified as a hyper-segregated. The level of segregation present is in keeping with the structure of the apartheid urban settlements. Figure 2.9 is a graphic depiction of where Vredenburg lies on the segregation-integration continuum.

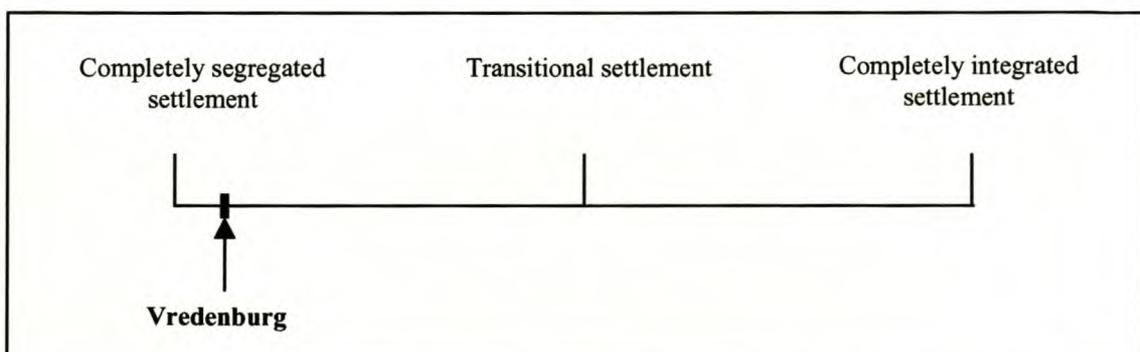


Figure 2.9: Vredenburg placed on the segregation-integration continuum

Clearly, in all four of the spatial dimensions of residential segregation, Vredenburg stands out as a hyper-segregated town. This begs the question how the residents of highly segregated Vredenburg feel about the prospects of residential integration. In the next chapter the residents' attitudes towards neighbourhood integration are described and analysed with the aid of multiple regression models.

CHAPTER 3: ANALYSING THE INFLUENCE OF RACIAL PREFERENCES ON NEIGHBOURHOOD EVALUATIONS

The focus of this chapter is to assess the influence of each of seven neighbourhood dimensions (see Table 1.4) on respondents' evaluations of neighbourhoods. In particular the spotlight falls on the influence of racial composition on neighbourhood evaluations. This is because the study aims to determine the independent influence that the racial composition of a neighbourhood has on the desirability of living in that neighbourhood, while accounting for varying levels of crime and neighbourhood deterioration.

The seven neighbourhood dimensions discussed in Chapter 1 were all treated as independent variables in the analyses. The vignettes evaluated by the respondents, each contained all seven of these variables, each in turn represented by a neighbourhood characteristic (refer to section 1.6.1.1). When evaluating a vignette, a respondent had to account, albeit consciously or subconsciously, for the influence of all seven characteristics of that neighbourhood. The influence of a particular variable on a respondent's evaluation was, therefore, measured in conjunction with six other variables that may add to or detract from the influence of the variable under scrutiny. By doing so, the results more closely exhibit what can be expected in "real world" situations, where decisions or opinions are seldom based on one criterion alone. In addition to the seven independent variables mentioned above, the respondents' biographical detail was also taken into account.

The technique used to analyse the above data is multiple regression. Two separate yet linked multiple regression models were used in the analyses, namely the additive and interaction regression models.

3.1 THE ADDITIVE REGRESSION MODEL

The additive regression model is the simplest and most widely used form of multiple regression. Its functioning is based on the same premise as that of a simple regression with two variables. The major difference being that the additive model contains three or more variables, of which at least one is a dependent variable. The additive model is used to

identify the main effects of each of the independent variables on the dependent variable. In other words, the main effect of an independent variable indicates the amount of change in the dependent variable caused by the presence of the particular independent variable. The amount of change caused by the independent variable represents its relative influence on the dependent variable.

The equation for the additive regression model is

$$Y = b_0 + b_1X_1 + b_2X_2 + \dots + b_nX_n.$$

In this equation b_1, b_2, \dots, b_n are the regression coefficients or slopes of independent variables X_1, X_2, \dots, X_n , with b_0 as the intercept (Aiken & West 1991; Preacher 2001). The regression coefficients (b_1 , etc.) estimate the general trends of change in the dependent variable, Y , across all levels of X_1, \dots, X_n , and represent the main effect of each independent variable. According to Aiken & West (1991) main effects are the constant effects of one variable across all values of another variable(s).

The results of the additive model as applied in this study are set out in Appendices D1 and D2. The R^2 value for the additive model is 0,334. This means that 33,4% of the variance in the dependent variable SCORE²⁰ was explained by the independent variables. Neethling (2002, *pers com*) is of the opinion that an R^2 of higher than 0,3 is very satisfactory when researching human behaviour. The adjusted R^2 of 0,31 indicates that even after compensating for the addition of independent variables, the model still explains 31% of the change in SCORE.

From Appendix D2 it is evident that, of the seven neighbourhood variables measured in the vignettes four, namely crime, environmental cleanliness, quality of housing and the social environment all have strongly negative and statistically significant²¹ effects on how the respondents rated the fictitious neighbourhoods. This means that the more unsafe the neighbourhood, the more litter is strewn about, the lower the housing quality and the more unfriendly the neighbours, the less respondents generally liked the neighbourhood. This is

²⁰ The dependent variable, i.e. respondents' ratings of the various neighbourhoods.

²¹ A variable is considered to be statistically significant when its $p < 0,05$.

not a surprising result and was intuitively expected. What is important to note, however, are the differing degrees to which each of these factors contributes to the equation.

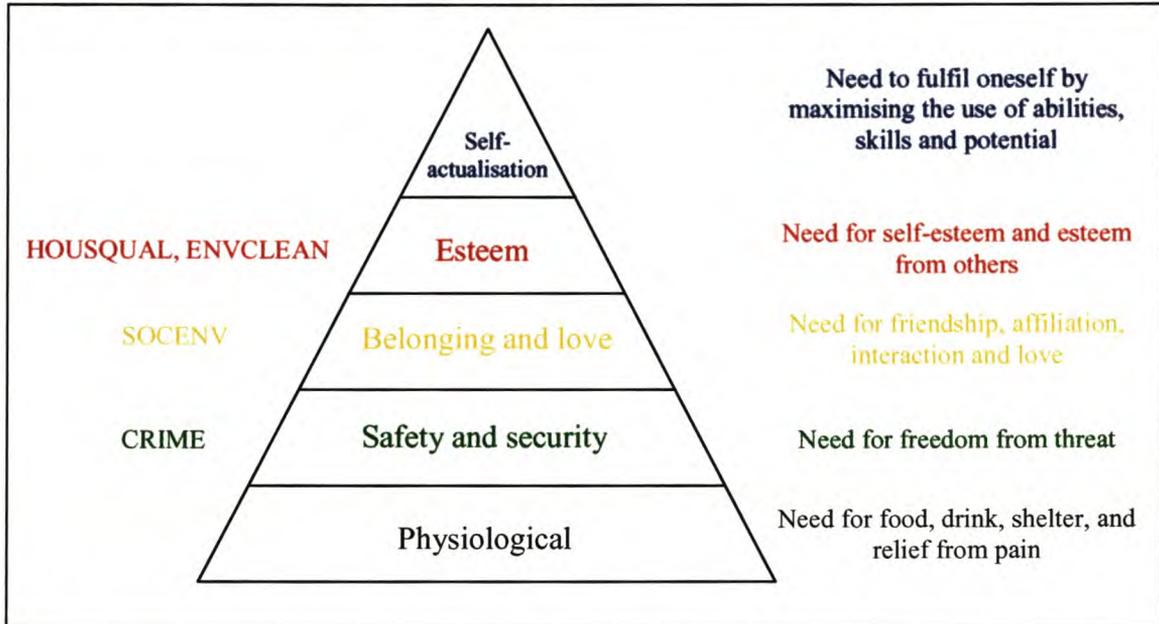
The standardised regression coefficients, or Beta values, also listed in Appendix D2, represent the main effects of the independent variables, by quantifying their influence on the dependent variable, relative to the other variables in the regression. The higher the Beta value the stronger the influence of the independent variable it represents. The positive and negative signs preceding the Beta values indicate the nature and not the strength of the relationship between a particular independent variable and the dependent variables.

For the residents of Vredenburg, the level of crime is the most influential factor affecting their rating of a neighbourhood as shown by the Beta value of $-0,291$ ($p < 0,001$). The second most influential factor is housing quality, with a Beta value of $-0,258$ ($p < 0,001$). The third and fourth positions are occupied by the social environment (B is $-0,195$; $p < 0,001$) and environmental cleanliness (B is $-0,161$; $p < 0,001$) respectively.

Viewed from a motivational theory perspective, the above order fits Abraham Maslow's need hierarchy model (see Figure 3.1) (Louw & Edwards 1993). According to the model, any individual's needs may be classified into one of five levels. The levels are ordered in a pyramidal structure. Starting from the bottom upwards, these levels are physiological (food, water, shelter), safety and security, belonging and love, self-esteem, and self-actualisation. The theory assumes that individuals must satisfactorily realise their needs on a given level before attempting to realise those needs situated on the next higher level (Gibson, Ivancevich & Donnelly 1994).

The standardised regression coefficients indicate that the basic human needs of physical safety and shelter play dominant roles in the people of Vredenburg's assessment of neighbourhoods. Both safety and shelter are second-level needs, which must be met before residents can realise their third-level needs, according to Maslow's theory. Factors such as environmental cleanliness and a healthy social environment are higher-level needs and therefore take a back seat when compared to crime. The two previously mentioned factors do exert a significant influence on people's decision-making, but only once people feel safe, have enough to eat and drink as well as have a house to live in, will they care about

environmental cleanliness and the social environment. Note that although “shelter” is a first-level need in Maslow’s hierarchy, the housing quality factor did not measure the *existence* of a shelter, but rather its *quality*. Housing quality is therefore not perceived as a first-level need, but falls within the higher-level needs, hereby providing a possible explanation of why housing quality plays a less significant role than crime in the respondents’ evaluations of the neighbourhoods.



Source: Created from Gibson, Ivancevich & Donnelly (1994)

Figure 3.1: Maslow’s human needs hierarchy applied to neighbourhood variables.

The variable NAME had no statistically significant effects on the rating of the neighbourhoods. This could be expected as, firstly, the name of a neighbourhood itself does not influence the quality of the living conditions and, secondly, because the names of the neighbourhoods were fictitious, the possibility of connotations with existing neighbourhoods in Vredenburg was negated.

Whether the neighbourhood was located in the centre of the town or on the outskirts, had no statistically significant influence on respondents’ ratings. Perhaps the reason for this is that the respondents used Vredenburg as their frame of reference when considering the locations of the neighbourhoods. There are no suburbs in Vredenburg comparable to metropolitan suburbs, because the physical distances between the neighbourhoods in the centre of town and those located on the outskirts are not as great as in the case of a large city. The result is that the neighbourhoods near the CBD are very much the same in character as those on the outskirts of Vredenburg.

Of the five control variables, only socio-economic status, or more specifically upper-class, has a statistically significant impact. Conversely, the respondents' gender, age, race and area of residence do not make a significant impact on the neighbourhood ratings. The upper-class variable attained a Beta value of $-0,173$ ($p < 0,001$). This strongly negative coefficient indicates that members of the upper socio-economic class are more critical of their neighbourhoods and tend to evaluate them according to stricter criteria than the lower socio-economic classes. St. John & Bates (1990) reason that upper-class members are more aware of status than others and are therefore more sensitive to the status implications of a neighbourhood. This would account for their stricter evaluations of the various neighbourhoods.

In terms of the aim of this study, i.e. determining the influence of racial composition on neighbourhood evaluations, the most important finding revealed by these research results is that the *residents of Vredenburg in general are not strongly influenced by the racial composition of a neighbourhood*. The RACECOMP factor failed to gain statistical significance in influencing respondent's ratings of the neighbourhoods. It means that if a household found a desired house in a neighbourhood which is perceived to be safe, clean and with a healthy social environment, the racial composition of that neighbourhood per se will not govern the household's decision to relocate. The additive regression model on which this finding is based does, however, not indicate possible differences between White and non-White, but aggregates the attitudes of both groups into one. It is therefore necessary to test if there are any differences between these two groups in their assessment of the influence of the racial composition of a neighbourhood. In order to test for these differences an interaction regression model was constructed.

3.2 THE INTERACTION REGRESSION MODEL

Regression models frequently contain interaction terms, otherwise known as cross products or multiplicative interaction terms (Neter, Wasserman & Whitmore 1982). The product of the scores of two or more variables forms an interaction term. Regressions containing interaction terms take into account the net effect of two or more variables. This means that when considered together, the effect of two variables may be more or less than when considered individually (Norušis 1995). By creating interaction terms between all the

statistically significant independent variables identified by the additive model, the analysis tests whether the main effects obtained from the additive model are enhanced or diminished by the presence of interactions amongst the independent variables.

The interaction model used to obtain the results listed in Appendices E1, E2 and E3 is a regression model containing multiplicative interaction terms. The equation for a regression model containing an interaction is

$$Y = b_0 + b_1X_1 + b_2X_2 + b_3X_1X_2.$$

In this equation b_3 is the coefficient of the multiplicative interaction term X_1X_2 . The regression coefficients b_1 and b_2 estimate the particular trends of change in Y with changes in X_1 and X_2 , when X_2 and X_1 respectively are equal to zero (Friedrich 1982). Thus the regression coefficients never represent constant effects of the predictors in the presence of an interaction and are therefore conditional effects, the condition being that all other predictors equal zero (Aiken & West 1991). It is important to note that b_1 and b_2 do not describe additive effects, because they are conditional in nature; nevertheless, b_3 measures interactive effects (Friedrich 1982).

Given the differences in the additive and interaction models, both are applied and interpreted in this study in order to present a fuller picture of respondents' attitudes toward the racial composition of a neighbourhood and the desirability of living there. The interpretation of the interaction model's coefficients is, however, not as straightforward as in the case of the additive model. Two things have to be kept in mind when interpreting the results in Appendices E1, E2 and E3, namely:

- Because of the procedure used in creating the regression model, the coefficients in the unstandardised column must be interpreted and not those in the standardised column.
- The relative influence of an independent variable on the dependent variable is a combination of two regression coefficients when working with a model containing first order interaction terms.

The second point above is clearly illustrated when solving an equation containing an interactive term (X_1X_2) formed by one dichotomous (X_1) and one continuous (X_2) variable.

The dichotomous variable has a value of either one or zero. When X_1 equals zero the equation can be solved and simplified as follows (Friedrich, 1982):

$$\hat{Y} = b_0 + b_1X_1 + b_2X_2 + b_3X_1X_2$$

$$\hat{Y} = b_0 + b_10 + b_2X_2 + b_3X_10X_2$$

$$\hat{Y} = b_0 + b_2X_2.$$

When X_1 equals one the equation is solved and simplified as:

$$\hat{Y} = b_0 + b_1X_1 + b_2X_2 + b_3X_1X_2$$

$$\hat{Y} = b_0 + b_11 + b_2X_2 + b_31X_2$$

$$\hat{Y} = b_0 + b_1 + b_2X_2 + b_3X_2$$

$$\hat{Y} = (b_0 + b_1) + (b_2 + b_3)X_2.$$

Therefore, in the case where the dichotomous variable equals one, the influence of the continuous variable X_2 on the dependent variable is the sum of b_2 and b_3 .

Appendix E3 reveals three meaningful statistically significant interactions, namely:

- ZRCXMC: RACECOMP with MCLASS ($p = 0,003$)
- RBXUC: RACEBI with UCLASS ($p = 0,02$)
- ZCXUC: CRIME with UCLASS ($p = 0,033$).

Both ZRCXMC and ZCXUC each contain a continuous and dichotomous variable, while RBXUC contains two dichotomous variables. These interactions will be examined in more detail below in order to determine their strength. Where appropriate their regression equations will be solved when the dichotomous variables contained within them equal zero and/or one.

3.2.1 Interaction Between RACECOMP and MCLASS

The influence of RACECOMP on the respondents' ratings of neighbourhood vignettes (SCORE) is central to this study. Further investigation of the statistically significant

interaction between the predictor variable RACECOMP and the control variable MCLASS is therefore warranted.

Solving for the interaction ZRCXMC when MCLASS equals 1 yields the result

$$\hat{Y} = b_0 + b_1\text{MCLASS} + b_2\text{RACECOMP} + b_3\text{MCLASS}*\text{RACECOMP}$$

$$\hat{Y} = (b_0 + b_1) + (b_2 + b_3)\text{RACECOMP}$$

and entering the values of b_2 and b_3 into the equation gives the regression coefficient for RACECOMP, viz

$$(b_2 + b_3) = (-0,483) + (0,512)$$

$$(b_2 + b_3) = 0,029.$$

The result indicates that when only the middle-class is considered ($\text{MCLASS} = 1$), a unit change of one in RACECOMP is associated with a change of 0,029 in the rating of the vignette. This points out that the middle-class favours non-White neighbourhoods over White neighbourhoods. Comparing the change of 0,029 in SCORE against the changes brought about by the other independent variables (see Appendix E3) shows that the influence of RACECOMP on the middle-class's ratings of the neighbourhoods is relatively weak. Scrutiny of the demographic data reveals a probable reason for the middle-class's slight affinity for non-White neighbourhoods: 69% of the middle-class is designated as non-White. The upper-class did not show a statistically significant interaction with RACECOMP. This indicates that the racial composition of a neighbourhood per se did not influence their rating of the neighbourhood in a statistically significant way. However, a significant interaction does occur between the UCLASS and RACEBI.

3.2.2 Interaction Between RACEBI and UCLASS

Both UCLASS and RACEBI are control variables and as such their influences on the dependent variable SCORE were measured by the respondents' biographical data accompanying the questionnaires. It is important to note that RACEBI should not be mistaken for the predictor variable central to the study, namely RACECOMP.

In the interaction ZRBXUC, where RACEBI equals 1, the influence of UCLASS on the respondents' ratings of the neighbourhoods, when taking into consideration the effect of RACEBI is $-1,286$ ($b_2 + b_3 = -1,286$). This indicates that when only non-Whites are considered, a change of one in UCLASS is associated with a change of $-0,1286$ in the rating of the vignette. The result shows a very strong negative relationship between the non-White upper-class and non-White neighbourhoods.

A possible explanation for their strong negative feelings towards non-White neighbourhoods may be the reduced prestige and lower status associated with living in such neighbourhoods. This finding should be treated with caution as there were only six non-White respondents who belonged to the upper-class subgroup. Two live in former non-White neighbourhoods, while the other four all live in former Whites only neighbourhoods. A larger sample of this subgroup is needed to obtain more reliable results, although this finding may indicate a situation worth researching further in the future.

When only considering Whites the ZRBXUC interaction equation must be solved with RACEBI equalling 0 i.e.

$$\hat{Y} = b_0 + b_1\text{RACEBI} + b_2\text{UCLASS} + b_3\text{RACEBI}*\text{UCLASS}$$

$$\hat{Y} = b_0 + b_2\text{UCLASS}$$

$$\hat{Y} = b_0 + (-0,401)\text{UCLASS}.$$

When only Whites are considered, a unit change of one in UCLASS is associated with a change of -0.401 in the rating of the vignette. This underscores the notion mentioned earlier that the upper-class is stricter in evaluating neighbourhoods and tends to rate neighbourhoods more negatively than the lower socio-economic classes do. UCLASS not only showed a statistically significant interaction with the control variable RACEBI, but also with another predictor variable, namely CRIME.

3.2.3 Interaction Between UCLASS and CRIME

The last of the three statistically significant interactions uncovered during the regression analyses, is that between the control variable UCLASS and the predictor variable CRIME.

The analysis demonstrates that the upper socio-economic class's rating of a neighbourhood is affected more severely by the presence of crime than is the case for the lower socio-economic groups.

Solving for the interaction ZCXUC when only considering the upper-class (UCLASS = 0) renders a regression coefficient of -0,236 for CRIME, viz

$$\hat{Y} = b_0 + b_1\text{UCLASS} + b_2\text{CRIME} + b_3\text{UCLASS*CRIME}$$

$$\hat{Y} = b_0 + b_2\text{CRIME}$$

$$\hat{Y} = b_0 + (-0,236)\text{CRIME}.$$

When only taking into account the lower socio-economic classes, a change of one in crime is associated with a change of -0,236 in the rating of the neighbourhood. Alternatively, when considering only the upper-class (UCLASS = 1), the regression coefficient for CRIME changes to -0,732.

$$(b_2 + b_3) = (-0,236) + (-0,487)$$

$$(b_2 + b_3) = -0,723.$$

Therefore, when only considering the upper-class, a change of one in CRIME is associated with a -0,723 change in the rating of the neighbourhood. The level of crime present in a neighbourhood is indicated to have a much stronger negative influence on the upper-class's evaluation of a neighbourhood compared to that of the lower socio-economic classes.

There are two reasons why an interaction model was constructed in addition to the additive model, namely:

- The additive regression model did not examine the possibility of differences between White and non-White respondents, in terms of the effect that neighbourhood racial composition might have on neighbourhood evaluations. In order to test for this difference a multiplicative interaction term, ZRCXRB²², was created. However, this interaction term failed to gain statistical significance.

²² Interaction term between the standardised score of RACECOMP and RACEBI.

- The interaction model tested whether the main effects obtained from the additive model are enhanced or diminished by the presence of interactions amongst the independent variables. The analysis revealed, firstly, that the middle-class slightly favours non-White neighbourhoods over White neighbourhoods, secondly, that there is very strong negative relationship between the non-White upper-class and non-White neighbourhoods, and thirdly, that the level of crime present in a neighbourhood has a much stronger negative influence on the upper-class's evaluation of a neighbourhood.

The aim of the analyses performed in this chapter was to quantify and assess the independent relative influence of each of the seven neighbourhood dimensions on respondents' evaluations of neighbourhoods. This was done by entering the data obtained from the factorial survey questionnaires into multiple regression models and then interpreting their results. Of particular importance to the study was the independent relative influence of racial composition on neighbourhood evaluations. In both the additive and interaction regression models, the racial composition of a neighbourhood failed to significantly influence respondents' evaluations of neighbourhoods. In Chapter 4 the results of the study are drawn together in a synthesis, a look is taken at possible future patterns of desegregation in Vredenburg and some avenues of future research are identified.

CHAPTER 4: CONTINUED SEGREGATION IN VREDENBURG: THE MINOR ROLE OF RACIAL PREFERENCE

“...[If] problems like crime and deterioration were no longer associated with neighborhood racial composition, then racial composition would lose most, if not all, of its impact on how neighborhoods are evaluated.” (St. John & Bates 1990: 58)

“How people react to living in different types of sociodemographic neighbourhoods is an important question for urban policy and public housing policy. Political discussions commonly assume that racial prejudice plays an important role in determining locational preferences and promoting white flight.... On the other hand, since the racial and socio-economic compositions of neighbourhoods are usually related, what appears as a reaction to racial composition might actually result from socio-economic preferences.” (Stipak & Hensler 1983: 311)

4.1 SYNTHESIS

South Africa has a long history of divided towns and cities. The grave inefficiencies and inequalities that developed between the racial communities since the arrival of the Dutch colonists in the Cape must now be redressed in post-apartheid South Africa. However, in spite of the positive general trends in race relations and attitudes towards residential integration, South African towns and cities generally remain hyper-segregated. This could be an indication that White attitudes pertain only to the principles of integration, but that they do not actually want to live in integrated neighbourhoods themselves.

The aim of this study was to assess the influence of racial preference in the dismantling or continuation of segregation in the South African town of Vredenburg during the post-apartheid era. This was done by determining the influence that the racial composition of a neighbourhood has on the desirability of living in that neighbourhood while accounting for varying levels of crime and neighbourhood deterioration. By doing so the influence of

neighbourhood racial composition was isolated so that its independent impact on neighbourhood evaluation could be analysed. The West Coast town of Vredenburg was selected as a case study, primarily because of the need to better understand the issues of segregation and integration in smaller urban settlements in South Africa.

A factorial survey questionnaire was used to gather the data. Respondents were chosen by way of a stratified random sampling process. The personal characteristics of the respondents are in line with those exhibited by the total population of Vredenburg. This is an indication that the stratified random sampling process followed was successful and the sample is representative of the universe from which it was drawn. Drop-off and collect and structured interview methods were used to gather the data. The data were analysed using multiple regression.

In terms of the aim of this study, the most salient finding is that neither the White nor the non-White sampled residents of Vredenburg are generally strongly influenced by the racial composition of a neighbourhood. The racial composition factor failed to gain statistical significance as an influence on respondents' ratings of neighbourhoods.

The neighbourhood characteristics crime, environmental cleanliness, quality of housing, and the social environment all showed strongly negative and statistically significant effects on how the respondents rated the fictitious neighbourhoods. This means that the more unsafe the neighbourhood, the more litter is strewn about, the lower the housing quality and the more unfriendly the neighbours, the less respondents in general liked the neighbourhood.

The name and location of a neighbourhood had no statistically significant effect on the rating of the neighbourhood. Neither had the respondents' gender, age, race, and area of residence.

Among the five control variables, only socio-economic status, or more specifically upper-class, had a statistically significant impact on neighbourhood ratings. The upper-class variable had a strongly negative coefficient. This is an indication that members of the upper socio-economic class are more critical of neighbourhoods and tend to evaluate them

according to stricter criteria or apply criteria more strictly than the lower socio-economic classes do.

The influence of racial composition on the middle-class's ratings of the neighbourhoods is weak. However, the data do suggest that the middle-class respondents slightly favour non-White neighbourhoods over White neighbourhoods. This is probably due to the fact that more than two thirds of the middle-class respondents were non-White.

A strong negative relationship exists between the White upper-class and their rating of neighbourhoods. This underscores the notion that the upper-class is stricter in evaluating neighbourhoods and they therefore tend to rate neighbourhoods more critically than the lower socio-economic classes.

The results indicate a very strong negative relationship between the non-White upper-class and non-White neighbourhoods. This finding should be treated with some caution, as there were only six non-White respondents who belonged to the upper-class subgroup.

The level of crime present in a neighbourhood was found to have a much stronger negative influence on the upper-class's evaluation of a neighbourhood than it had on the lower socio-economic classes. Again, this may be attributed to the upper-class's stricter evaluation of the neighbourhoods.

The racial composition of a neighbourhood per se does not significantly affect the attitudes of the town's residents towards a neighbourhood. Rather, increases in crime and residential environmental deterioration are the factors that strongly affect both White and non-White people's views of a neighbourhood.

High levels of crime and environmental deterioration are commonly associated with the lower socio-economic class. Lack of education and inadequate job opportunities force many of the lower-classes into a life of crime. A lack of adequate income also speeds up the rate of deterioration in neighbourhoods. The vast socio-economic differences that currently exist between the White and non-White residents of Vredenburg have been pointed out. These differences are not likely to change considerably in the short term. The continuation of these class differences will therefore most likely be the cause of continued

segregation in Vredenburg. Despite the continued general trend of segregation, some areas in Vredenburg show signs of integration.

4.2 EXPECTED FUTURE PATTERNS OF INTEGRATION IN VREDENBURG

Although the patterns of segregation-integration discussed elsewhere in the text gave a good indication of the situation in 1996, more than half a decade has passed in which racial residential integration may have occurred. The Census 2001 results will hopefully enable one to establish a more up-to-date picture. In the mean time personal observations since 1994 by the author suggest that three areas in Vredenburg are incipient racially integrated neighbourhoods. These areas are all middle-class residential areas, two of which are new developments on the outskirts of the town in the former Whites only zones. The third is an old former Whites only neighbourhood close to the central business district, juxtaposed between the still predominantly White neighbourhoods of the western sectors and the predominantly non-White south-eastern sector. Thus, in the centre of the town where the former Group Areas meet, a racially mixed neighbourhood has formed.

The stability of the integration in each of these three neighbourhoods is uncertain at present. Due to the lack of factual information one can only speculate on the issue of “tipping” and “White flight” in these areas. The tipping-point, as postulated by Schelling (1972), is the maximum number of minority group members accepted by the majority group in a neighbourhood. When this number is exceeded, the majority group members leave the neighbourhood in rapid succession, tipping the racial mix of the neighbourhood in favour of the minority group. This rapid out-migration of majority group members is called flight. The flight of the majority opens up the neighbourhood to further in-migration by the majority, leading in turn to the creation of a segregated minority neighbourhood.

Limited White flight occurred from the centre of town in the first five or so years after 1993. Many non-White households moved into the neighbourhood, but a large contingent of White residents remained. This area is still in a process of transformation and Schelling’s (1972) tipping-point may yet be reached, causing an exodus of Whites from the area in the future.

Evidence in the United States of America indicates that stable racially integrated neighbourhoods tend to form more easily in new residential developments than in older, well-established neighbourhoods. Marshall (1994: 11) argues:

“New neighborhoods are a clean slate. Families of all types can move in without facing an established neighborhood pattern of race or ethnicity. Even the economic homogeneity of newer suburbs works in their favor. A black resident probably has children the same age, a similar-paying job, and the same problems with his lawn as his white neighbors.”

The South African example of the patterns of desegregation in Pietersburg (now Polokwane) lends credibility to this view. Of all the residential areas in Pietersburg in which desegregation had occurred by 1993, the second most desegregated area was a new neighbourhood (Kotze & Donaldson 1996). Based on the above evidence it is safe to speculate that the two new residential areas in Vredenburg that have already become racially mixed stand a good chance of developing into stable racially integrated neighbourhoods.

4.3 AVENUES FOR RESEARCH

There are various research opportunities that flow from this study, a number of which are listed below.

- There is a need to monitor general segregation levels in Vredenburg. As soon as the Census 2001 results are made available, the patterns of segregation based on the 2001 results may be compared to those of the 1996 results. This would give an indication of the type, level and geographical pattern of change in segregation.
- There is also a need to monitor changes in segregation of those neighbourhoods that currently show signs of integration. How stable is the integration in these neighbourhoods? Will these neighbourhoods remain stably racially integrated? If so, what factors underlie this stability?

- Are non-Whites in the upper-class really prejudiced against lower-class non-White neighbourhoods as the findings of this study suggest?
- Has social integration taken place in those neighbourhoods in which racial mixing has occurred?
- Can the research instrument (factorial survey) be developed further in order to improve its ease of use and predictive power within the field of the assessment of racial preference?
- And there is the challenge of creating a model of residential choice patterns for South Africa.

Tackling these questions will shed more light on the processes of segregation and integration in Vredenburg. Valuable lessons can be learnt from this small town's experience with integration that may contribute towards creating a model of residential choice patterns for the residents of the region and the country.

[Words: 19 650]

REFERENCES

- Aiken LS & West SG 1991. *Multiple Regression: Testing and Interpreting Interactions*. Newbury Park: Sage Publications.
- Alba RD & Logan JR 1991. Variations on Two Themes: Racial and Ethnic Patterns in the Attainment of Suburban Residence. *Demography* 28, 3: 431-453.
- Alba RD & Logan JR 1992. Assimilation and Stratification in the Homeownership Patterns of Racial and Ethnic Groups. *International Migration Review* 26, 4: 1314-1340.
- Alba RD & Logan JR 1993. Minority Proximity to Whites in Suburbs: An Individual-Level Analysis of Segregation. *American Journal of Sociology* 98, 6: 1388-1427.
- Alba RD Logan JR & Bellair PE 1994. Living with Crime: The Implications of Racial/Ethnic Differences in Suburban Location. *Social Forces* 73, 2: 395-434.
- Bähr J & Jürgens U 1996. Ethnic Change in Late-Apartheid South African Cities. In Roseman CC, Thieme G & Laux HD (eds). *EthniCity: Geographic Perspectives on Ethnic Change in Modern Cities*.), pp 223-281. Lanham, MD: Rowman & Littlefield Publishers.
- Bernstein A & McCarthy J (eds.) 1990. *Opening the Cities: Comparative Perspectives on Desegregation*. Indicator Project South Africa. Centre for Social and Development Studies. Durban: University of Natal.
- Bianchi SM, Farley R & Spain D 1982. Racial Inequalities in Housing: An Examination of Recent Trends. *Demography* 19, 1: 37-51.
- Bickford A & Massey D S 1991. Segregation in the Second Ghetto: Racial and Ethnic Segregation in American Public Housing, 1977. *Social Forces* 69, 4: 1011-1036.
- Boal FW 1981. Ethnic Residential Segregation, Ethnic Mixing and Resource Conflict: A Study in Belfast, Northern Ireland. In Peach C, Robinson V & Smith S (eds), *Ethnic Segregation in Cities*, pp 235-251. London: Croom Helm.
- Boal FW 1987. Segregation. In Pacione M (ed.), *Social Geography: Progress and Prospect*, pp 90-128. London: Croom Helm.
- Brown K 1981. Race, Class and Culture: Towards a Theorisation of the 'Choice/Constraint' Concept. In Jackson P & Smith SJ (eds.). *Social Interaction and Ethnic Segregation*. Institute of British Geographers Special Publication No 12, pp 185-203. London: Academic Press.
- Callaghan SJ 2001. Comparative Perspectives on Housing Segregation. [Online] Available: <http://cain.ulst.ac.uk/issues/segreat/callaghan01.htm> [02/12/13].

- Chen PSJ 1983. *Singapore Development Policies and Trends*. Singapore: Oxford University Press.
- Christopher AJ 1988. Roots of Urban Segregation: South Africa at Union, 1910. *Journal of Historical Geography* 14, 2: 151-169.
- Christopher AJ 1989. Spatial Variations in the Application of Residential Segregation in South African Cities. *Geoforum* 20, 3: 253-267.
- Christopher AJ 1990. Apartheid and Urban Segregation Levels in South Africa. *Urban Studies* 27, 3: 421-440.
- Christopher AJ 1991. Before Group Areas: Urban Segregation in South Africa in 1951. *South African Geographer* 18, 1/2: 85-96.
- Christopher AJ 2001. Monitoring Segregation levels in South African Cities 1911-1996. *South African Geographical Journal* 83, 3: 249-257.
- Clark WAV 1986. Residential Segregation in American Cities: A Review and Interpretation. *Population Research and Policy Review* 5: 95-127.
- Clark WAV 1991. Residential Preferences and Neighbourhood Racial Segregation: A Test of the Schelling Segregation Model. *Demography* 28, 1: 1-19.
- Clark WAV 1992. Residential Preferences and Residential Choices in a Multiethnic Context. *Demography* 29, 3: 451-466.
- Clark WAV 1993. Measuring Racial Discrimination in the Housing Market: Direct and Indirect Evidence. *Urban Affairs Quarterly* 28, 4: 641-649.
- Darden JT 1987. Socioeconomic Status and Racial Residential Segregation: Blacks and Hispanics in Chicago. *International Journal of Comparative Sociology* 28: 1-13.
- Darden JT 1990. Choosing Neighbors and Neighborhoods: The Role of Race in Housing Preference. In Tobin GA (ed) *Divided Neighborhoods: Changing Patterns of Racial Segregation*. Volume 32, Urban Affairs Annual Reviews, pp 15-42. Newbury Park: Sage Publications.
- Davies RJ 1981. The Spatial Formation of the South African City. *GeoJournal* Supplementary Issue 2: 59-72.
- DeFrances CJ 1996. The Effects of Racial Ecological Segregation on Quality of Life: A Comparison of Middle-Class Blacks and Middle-Class Whites. *Urban Affairs Review* 31, 6: 799-810.

- Denton NA & Massey DS 1989. Racial Identity Among Caribbean Hispanics: The Effect of Double Minority Status on Residential Segregation. *American Sociological Review* 54: 790-808.
- Denton NA & Massey DS 1991. Patterns of Neighbourhood Transition in a Multiethnic World: U.S. Metropolitan Areas, 1970-1980. *Demography* 28, 1: 41-63.
- Dewar D 1994. Reconstructing the South African Countryside: The Small Towns. *Development Southern Africa* 11: 3, 351-377.
- Dewar D 1995. The Urban Question in South Africa: The Need for a Planning Paradigm Shift. *Third World Planning Review* 17: 407-419.
- Donaldson SE 1999. Restructuring in a South African City During Transition: Urban Development and Transformation in Pietersburg During the 1990s. Doctoral dissertation, University of Stellenbosch.
- Donaldson SE & Van der Merwe IJ 1999. Urban Transformation and Social Change in Pietersburg During Transition. *Society in Transition* 30, 1: 69-82.
- Donaldson SE & Van der Merwe IJ 2000. Urban Restructuring During Transition: A Model for South African Urban Development in the 21st Century. *Africa Insight* May: 45-57.
- Duncan OD & Duncan B 1955. A Methodological Analysis of Segregation Indexes. *American Sociological Review* 20: 210-217.
- Duncan OD & Duncan B 1965. *The Negro Population of Chicago: A Study of Residential Succession*. Chicago: The University of Chicago Press.
- Ellen IG 1998. Stable Racial Integration in the Contemporary United States: An Empirical Overview. *Journal of Urban Affairs* 20, 1: 27-42.
- Ellen IG 2000. Race-based Neighbourhood Projection: A Proposed Framework for Understanding New Data on Racial Integration. *Urban Studies* 36, 9: 1513-1533.
- Erbe BM 1975. Race and Socioeconomic Segregation. *American Sociological Review* 40, 6: 801-812.
- Fainstein N 1995. Black Ghettoization and Social Mobility. In Smith, M P , & Feagin, J R (eds.). *The Bubbling Cauldron: Race, Ethnicity, and the Urban Crisis*, pp 123-141. Minneapolis: University of Minnesota Press.
- Farley JE 1982. Segregated City, Segregated Suburbs: To what Extent are they Products of Black-White Socioeconomic Differentials? *Urban Geography* 7, 2: 164-171.

- Farley JE 1990. Segregation in 1980: How Segregated are America's Metropolitan Areas? In Tobin G A (ed) *Divided Neighborhoods: Changing Patterns of Racial Segregation*. Volume 32, Urban Affairs Annual Reviews, pp 95-114. Newbury Park: Sage Publications.
- Farley JE 1995. Race Still Matters: The Minimal Role of Income and Housing Cost as Causes of Housing Segregation in St. Louis, 1990. *Urban Affairs Review* 31, 2: 244-254.
- Farley R 1977. Residential Segregation in Urbanized Areas of the United States in 1970: An Analysis of Social Class and Racial Differences. *Demography* 14, 4: 497-518.
- Farley R & Frey WH 1994. Changes in the Segregation of Whites from Blacks during the 1980s: Small Steps Toward an More Integrated Society. *American Sociological Review* 59: 23-45.
- Farley R, Bianchi S & Colasanto D 1979. Barriers to Racial Integration of Neighborhoods: The Detroit Case. *Annals of the American Academy of Political and Social Science* 441: 97-113.
- Farley R, Schuman H, Bianchi S, Colasanto D & Hatchett S 1978. "Chocolate City, Vanilla Suburbs:" Will the Trend toward Racially Separate Communities Continue? *Social Science Research* 7: 319-344.
- Farley R, Steeh C , Krysan M, Jackson T & Reeves K 1994. Stereotypes and Segregation: Neighbourhoods in the Detroit Area. *American Journal of Sociology* 100, 3: 750-780.
- Ford WS 1972. *Interracial Public Housing in Border City: A Situational Analysis of the Contact Hypothesis*. Lexington: Lexington Books.
- Friedrich RJ 1982. The Workshop: In Defense of Multiplicative Terms in Multiple Regression Equations. *American Journal of Political Science*, 26, 4: 797- 833.
- Galster G 1988. Residential Segregation in American Cities: A Contrary Review. *Population Research and Policy Review* 7: 93-112.
- Galster G 1998. A Stock/Flow Model of Defining Racially Integrated Neighborhoods. *Journal of Urban Affairs* 20,1: 43-51.
- Galster GC 1990. Neighbourhood Racial Change, Segregationist Sentiments, and Affirmative Marketing Policies. *Journal of Urban Economics* 27: 334-361.
- Galster GC & Keeney WM 1988. Race, Residence, Discrimination, and Economic Opportunity: Modeling the Nexus of Urban Racial Phenomena. *Urban Affairs Quarterly* 24, 1: 87-117.

- Galster G & Keeney H 1993. Subsidized Housing and Racial Change in Yonkers, New York. *Journal of the American Planning Association* 59, 2: 172-181.
- Garside J 1993. Inner City Gentrification in South Africa: The Case of Woodstock, Cape Town. *GeoJournal* 30, 1: 29-35.
- Gibson JL, Ivancevich JM & Donnelly JR 1994. *Organisations*. 8th ed. Burr Ridge: Irwin.
- Goering JM 1978. Neighbourhood Tipping and Racial Transition: A Review of Social Science Evidence. *Journal of the American Planning Association* 44, 1: 68-78.
- Goering JM (ed) 1986. *Housing Desegregation and Federal Policy*. Chapel Hill: The University of North Carolina Press.
- Goldstein I & White C 1985. Residential Segregation and Color Stratification Among Hispanics in Philadelphia: Comment on Massey and Mullen. *American Journal of Sociology* 31: 391-395.
- Gordon MM 1964. *Assimilation in American Life: The Role of Race, Religion and National Origins*. New York: Oxford University Press.
- Hart DM 1988. Political Manipulation of Urban Space: The Razing of District Six, Cape Town. *Urban Geography* 9: 603-628.
- Hart G 1989. On Grey Areas. *South African Geographical Journal* 71, 2: 81-88.
- Helper R 1986. Success and Resistance Factors in the Maintenance of Racially Mixed Neighborhoods. In Goering JM (ed) *Housing Desegregation and Federal Policy*, pp 170-194. Chapel Hill: The University of North Carolina Press.
- Herbert DT & Johnston RJ (eds.) 1978. *Social Areas in Cities: Processes, Patterns and Problems*. Chichester: John Wiley & Sons.
- Horn A 2001. A Revised Method for Expressing Distributive Segregation in Cities. Paper Delivered at the Fourth Biennial Conference of the Society of South African Geographers, Rawsonville, South Africa.
- Human Sciences Research Council 2000. Race Relations are Gradually Improving – HSRC survey. Media Release from the Human Sciences Research Council. [Online] Available: http://www.hsrc.ac.za/corporate/media/2000/dec18_1.html [02/01/16].
- Hwang S, Murdock SH, Parpia B & Hamm RR 1985. The Effects of Race and Socioeconomic Status on Residential Segregation in Texas, 1970-80. *Social Forces* 63, 3: 732-747.
- Jackman MR & Jackman RW 1980. Racial Inequalities in Home Ownership. *Social Forces* 58, 4: 1221-1234.

- Jackson P & Smith SJ (eds.) 1981. *Social Interaction and Ethnic Segregation*. Institute of British Geographers Special Publication No 12. London: Academic Press.
- Jakubs JF 1981. A Distance-Based Segregation Index. *Socio-Economic Planning Sciences* 15: 129-136.
- James DR & Taeuber KE 1985. Measures of Segregation. In Tuma NB (ed.) 1985. *Sociological Methodology*, pp 1-32. San Francisco: Jossey-Bass.
- Janse van Rensburg HS 2000a. Smaller Urban Settlements and Development: An International Perspective. Masters research project literature review. Stellenbosch: University of Stellenbosch, Department of Geography and Environmental Studies.
- Janse van Rensburg HS 2000b. Smaller Urban Settlements and Development in South Africa. Masters research project literature review. Stellenbosch: University of Stellenbosch, Department of Geography and Environmental Studies.
- Janse van Rensburg HS 2002. Residential Integration in Post-Apartheid Vredenburg. Poster presented at the Regional Conference of the International Geographical Union, Durban.
- Kain JF 1986. The Influence of Race and Income on Racial Segregation and Housing Policy. In Goering JM (ed) *Housing Desegregation and Federal Policy*, pp 99-118. Chapel Hill: The University of North Carolina Press.
- Kamali M 1999. Distorted Integration: Problems of Monolithic Order. *Innovation* 12, 1: 81-97.
- Kantrowitz N 1969. Ethnic and Racial Segregation in the New York Metropolis, 1960. *The American Journal of Sociology* 74: 685-695.
- Kantrowitz N 1979. Racial and Ethnic Residential Segregation in Boston 1830-1970. *Annals of the American Academy of Political and Social Science* 441: 41-54.
- Kotze NJ & Donaldson SE 1996. Desegregation in Pietersburg after the repeal of the Group Areas Act. *Development Southern Africa* 13,1: 119-127.
- Kotze NJ & Donaldson SE 1998. Residential Desegregation in Two South African Cities: A Comparative Study of Bloemfontein and Pietersburg. *Urban Studies* 35, 3: 467-477.
- Kuper L, Watts H, & Davies R, 1958. *Durban: A Study in Racial Ecology*. London: Jonathan Cape.
- Landecker WS 1951. Types of Integration and their Measurement. *The American Journal of Sociology* 41, 4: 332-340.

- Lee BA & Wood PB 1991. Is Neighbourhood Racial Succession Place Specific? *Demography* 28, 1: 21-40.
- Lemon A 1997 Post-apartheid Cities: Planning for a New Society. In Davies RJ (ed.) *Contemporary City Structuring*, 62-73. Johannesburg: Society of South African Geographers.
- Leven CL, Little JT, Nourse HO & Read RB 1976. *Neighborhood Change: Lessons in the Dynamics of Urban Decay*. New York: Praeger Publishers.
- Lewis DA & Maxfield MG 1980. Fear in the Neighborhoods. *Journal of Research in Crime and Delinquency* 17: 160-189.
- Lieberson S & Carter DK 1982. Temporal Changes and Urban Differences in Residential Segregation: A Reconsideration. *American Journal of Sociology* 88, 2: 296-328.
- Logan JR & Alba RD 1993. Locational Returns to Human Capital: Minority Access to Suburban Community Resources. *Demography* 30, 2: 243-268.
- Logan JR & Schneider M 1984. Racial Segregation and Racial Change in American Suburbs, 1970-1980. *American Journal of Sociology* 89: 874-888.
- Logan JR & Stearns LB 1981. Suburban Racial Segregation as a Nonecological Process. *Social Forces* 60, 1: 61-73.
- Louw DA & Edwards DJA 1993. *Sielkunde: 'n Inleiding vir Studente in Suid-Afrika*. Johannesburg: Lexicon Publishers.
- Maharaj B & Mpungose J 1994. The Erosion of Residential Segregation in South Africa: The 'Greying' of Albert Park in Durban. *Geoforum* 25, 1: 19-32.
- Marshall A 1994. The Quiet Integration of Suburbia. *American Demographics* 16, 8: 9-11.
- Marshall H & Jiobu R 1975. Residential Segregation in United States Cities: A Causal Analysis. *Social Forces* 53, 3: 449-460.
- Massey DS 1985. Ethnic Residential Segregation: A Theoretical Synthesis and Empirical Review. *Sociology and Social Research* 69: 315-350.
- Massey DS & Bitterman B 1985. Explaining the Paradox of Puerto Rican Segregation. *Social Forces* 64, 2: 306-331.
- Massey DS & Denton NA 1985. Spatial Assimilation as a Socioeconomic Outcome. *American Sociological Review* 50: 94-106.

- Massey DS & Denton NA 1987 Trends in the Residential Segregation of Blacks, Hispanics, and Asians: 1970-1980. *American Sociological Review* 52, 6: 802-825.
- Massey DS & Denton NA 1988. The Dimensions of Residential Segregation. *Social Forces* 67: 281-315.
- Massey DS & Denton NA 1989. Hypersegregation in U.S. Metropolitan Areas: Black and Hispanic Segregation Along Five Dimensions. *Demography* 26, 3: 373-391.
- Massey DS & Denton NA 1993. *American Apartheid: Segregation and the Making of the Underclass*. Cambridge: Harvard University Press.
- Massey DS & Eggers ML 1990. The Ecology of Inequality: Minorities and the Concentration of Poverty, 1970-1980. *The American Journal of Sociology* 95, 5: 1153-1188.
- Massey DS & Mullen BP 1984. Processes of Hispanic and Black Spatial Assimilation. *American Journal of Sociology* 89, 4: 836-873.
- Massey DS, Condran GA & Denton NA 1987. The Effect of Residential Segregation on Black Social and Economic Well-Being. *Social Forces* 66, 1: 29-56.
- Miller VP & Quigley JM 1990. Segregation by Racial and Demographic Group: Evidence from the San Francisco Bay Area. *Urban Studies* 27, 1: 3-21.
- Morrill RL 1991. On the Measure of Geographic Segregation. *Geography Research Forum* 11, 25-36.
- Neter J, Wasserman W & Whitmore GA 1982. *Applied Statistics* 2nd ed. Boston: Allyn and Bacon.
- Norušis M 1995. *SPSS: SPSS 6.1 Guide to Data Analysis*. Englewood Cliffs: Prentice Hall.
- O'Brien DJ & Clough L 1982. The Future of Urban Neighbourhoods. In Gappert G & Knight RV (eds.) *Cities in the 21st Century*, pp 232-248. Beverly Hills: Sage.
- Ottensmann JR, Good DH & Gleeson ME 1990. The Impact of Net Migration on Neighbourhood Racial Composition. *Urban Studies* 27, 5: 705-717.
- Pallant P 2001. *SPSS Survival Manual: A Step-by-Step guide to Data Analysis Using SPSS for Windows (Version 10)*. Buckingham: Open University Press.
- Parnell S 1988. Racial Segregation in Johannesburg: The Slums Act, 1934-1939. *South African Geographical Journal* 70, 2: 112-126.
- Pawson H 1988. Race and the Allocation of Public Housing: Changing Perspectives, Recurrent Themes. *Housing Studies* 3, 2: 134-139.

- Peach C 1981. Conflicting Interpretations of Segregation. In Jackson, P & Smith, S J (eds.). *Social Interaction and Ethnic Segregation*, pp 19-33. Institute of British Geographers Special Publication No 12. London: Academic Press.
- Peach C, Robinson V, & Smith S (eds). 1981. *Ethnic Segregation in Cities*. London: Croom Helm.
- Pearce DM 1979. Gatekeepers and Homeseekers: Institutional Patterns in Racial Steering. *Social Problems* 26, 3: 325-342.
- Pettigrew TF (ed.) 1975. *Racial Discrimination in the United States*. New York: Harper & Row.
- Polikoff A 1986. Sustainable Integration or Inevitable Resegregation: The Troubling Questions. In Goering JM (ed). *Housing Desegregation and Federal Policy*, 43-71. Chapel Hill: The University of North Carolina Press.
- Preacher KJ 2001. Analyzing and Interpreting Interactions in Multiple Linear Regression (MLR): A Practical Guide. [Online] Available: <http://quantrm2.psy.ohio-state.edu/kris/interactions/interactions.htm> [19/07/02]
- Roof WC 1975. Housing Segregation and Racial Inequality in Southern Cities. In Pettigrew TF (ed.). *Racial Discrimination in the United States*, pp 137-151. New York: Harper & Row.
- Roof WC, Van Valey TL & Spain D 1976. Residential Segregation in Southern Cities: 1970. *Social Forces* 55, 1: 59-71.
- Roseman CC, Thieme G & Laux HD (eds) 1996. *EthniCity: Geographic Perspectives on Ethnic Change in Modern Cities*. Boston: Rowman and Littlefield Publishers.
- Rosenbaum E 1992. Race and Ethnicity in Housing: Turnover in New York City, 1978-1987. *Demography* 29, 3: 467-486.
- Rosenbaum E 1994. The Constraints on Minority Housing Choices: New York City 1978-1987. *Social Forces* 72, 3: 725-747.
- Rosenbaum E 1996. The Influence of Race on Hispanic Housing Choices: New York City: 1978-1987. *Urban Affairs Review* 32, 2: 217-244.
- Rossi PH & Nock SL 1982. *Measuring Social Judgements: The Factorial Survey Approach*. Beverly Hills: Sage.
- Rule SP 1989. The Emergence of A Racially Mixed Residential Suburb in Johannesburg: Demise of the Apartheid City? *The Geographical Journal* 155, 2: 196-203.

- Saff G 1991. From Race to Space: Reconceptualising the Post-Apartheid Urban Spatial Environment. *Urban Forum* 2, 1: 59-90.
- Saff G 1993. An Evaluation of Neighbourhood Integration Management Programmes in the United States: Their Relevance for South Africa. *Urban Forum* 4, 1: 55-80.
- St. John C & Bates NA 1990. Racial Composition and Neighbourhood Evaluation. *Social Science Research* 19: 46-61.
- Saldanha Bay Municipality 2002. History of Vredenburg. [Online] Available: <http://saldanhabay.co.za/tourism/vredenburg.htm> [01/06/02].
- Schelling TC 1972 A Process of Residential Segregation: Neighborhood Tipping. In Pascal AH (ed.). *Racial Discrimination in Economic Life*, pp 157-184. Lexington, Lexington Books.
- Schlemmer L & Stack SL 1990. *Black, White and Shades of Grey: A Study of Responses to Residential Segregation in the Pretoria-Witwatersrand Region*. Research Report No 9, Centre for Policy Studies, Graduate School of Business Administration. Pretoria: University of the Witwatersrand.
- Schneider M & Logan JR 1982. Suburban Racial Segregation and Black Access to Local Public Resources. *Social Science Quarterly* 63, 4: 762-770.
- Schwab WA & Marsh E 1980. The Tipping Point Model: Prediction of Change in the Racial Composition of Cleveland, Ohio, Neighbourhoods, 1940-1970. *International Journal of Architectural and Building Research, Environment and Planning A* 12: 385-398.
- Scott P 1955. Cape Town: A Multi-Racial City. *The Geographical Journal* 121: 146-157.
- Shlay AB & DiGregorio DA 1985. Same City, Different Worlds: Examining Gender- and Work-based Differences in Perceptions of Neighborhood Desirability. *Urban Affairs Quarterly* 21: 66-86.
- Skogan WG & Maxfield M 1981. *Coping with Crime: Individual and Neighbourhood Reactions*. Beverly Hills: Sage.
- Smith RA 1991. The Measurement of Segregation Change through Integration and Deconcentration, 1970-1980. *Urban Affairs Quarterly* 26, 4: 477-496.
- Smith RA 1998. Discovering Stable Racial Integration. *Journal of Urban Affairs* 20, 1: 1-25.
- South Africa (Republic of) 1997. *Living Cities: Urban Development Framework*. Pretoria: Department of Housing.

- South SJ & Deane GD 1993. Race and Residential Mobility: Individual Determinants and Structural Constraints. *Social Forces* 72, 1: 147-167.
- Squires GD, Velez W & Taeuber KE 1991. Insurance Redlining, Agency Location, and the Process of Urban Disinvestment. *Urban Affairs Quarterly* 26, 4: 567-588.
- Statistics South Africa 1996. Census 96 data in digital format.
- Stearns LB & Logan JR 1986. Measuring Trends in Segregation: Three Dimensions, Three Measures. *Urban Affairs Quarterly* 22, 1: 124-150.
- Stipak B & Hensler C 1983. Effect of Neighborhood Racial and Socioeconomic Composition on Urban Residents' Evaluations of their Neighbourhoods. *Social Indicators Research* 12: 311-320.
- Taeuber KE & Taeuber AF 1965. *Negroes in Cities: Residential Segregation and Neighbourhood Change*. Chicago: Aldine Publishing Company.
- Taub RD, Taylor DG & Dunham JA 1984. *Paths of Neighborhood Change: Race and Crime in Urban America*. Chicago: University of Chicago Press.
- Telles EE 1992. Residential Segregation by Skin Color in Brazil. *American Sociological Review* 57, 2: 186-197.
- Telles EE 1995. Race, Class and Space in Brazilian Cities. *International Journal of Urban and Regional Research* 19, 3: 395-406.
- Trochim WM 2002. Research Methods Knowledge Base. [Online] Available: <http://trochim.human.cornell.edu/kb> [10/02/03].
- Urban Foundation, The 1990. *Tackling Group Areas*. Urban Debate 2010, no 6. Policies for a New Urban Future Series. Braamfontein: Urban Foundation.
- Uyeki ES 1990. Spatial Stratification in Sapporo, Japan 1975. *Urban Studies* 27, 4: 559-569.
- Van Bergen MM & Olivier JJ 1983. Sosiale Differensiasie Tussen Blanke Etniese Groepe in Pretoria. *South African Geographer* 11, 1: 41-48.
- Van der Merwe IJ 1993. The South African City in Relation to International City Form. *Development Southern Africa* 10: 481-496.
- Van Grunsven L 1992. Integration Versus Segregation: Ethnic Minorities and Urban Politics in Singapore. *Tijdschrift voor Economische en Sociale Geografie* 83, 3: 196-215.
- Van Kempen ET 1994. The Dual City and the Poor: Social Polarisation, Social Segregation and Life Chances. *Urban Studies* 31, 7: 995-1015.

- Villemez WJ 1980. Race, Class, and Neighborhood: Differences in the Residential Return on Individual Resources. *Social Forces* 59, 2: 414-430.
- Vredenburg-Saldanha Municipality 1992. Vredenburg-Saldanha en Omgewing: Stedelike Struktuurplan. Projek no 4.037. Vredenburg: Vredenburg-Saldanha Municipality.
- West Coast District Council 1999. 'n Verstedelikingsraamwerk vir die Weskus Streek. Moorreesburg: West Coast District Council.
- West Coast District Council 2000. Verstedelikingstrategie. Moorreesburg: West Coast District Council.
- Western J 1978. Knowing One's Place: "The Coloured People" and the Group Areas Act in Cape Town. In Ley D & Samuels MS (eds). *Humanistic Geography: Prospects and Problems*, 297-318. Chicago: Maaroufa Press.
- White MJ 1983. The Measurement of Spatial Segregation. *American Journal of Sociology* 88, 5: 1008-1018.
- White MJ 1984. Racial and Ethnic Succession in Four Cities. *Urban Affairs Quarterly* 20, 2: 165-183.
- White MJ 1986. Segregation and Diversity Measures in Population Distribution. *Population Index* 52, 2: 198-221.
- Williams RM (Jr.) 1964. *Strangers Next Door: Ethnic Relations in American Communities*. Englewood Cliffs: Prentice-Hall.
- Wilson BM 1989. Birmingham Segregation: Is it a Product of Black-White Socioeconomic Differences? *Southeastern Geographer* 29: 92-105.
- Wilson FD 1979. *Residential Consumption, Economic Opportunity, and Race*. London: Academic Press.
- Winship C 1977. A Revaluation of Indexes of Residential Segregation. *Social Forces* 55, 4: 1058-1066.
- Wong DWS 1997. Spatial Dependency of Segregation Indices. *The Canadian Geographer* 41, 2: 128-136.
- Wood PB & Lee BA 1991. Is Neighborhood Racial Succession Inevitable?: Forty Years of Evidence. *Urban Affairs Quarterly* 26, 4: 610-620.
- Yinger J 1990. The Racial Dimension of Urban Housing Markets in the 1980s. In Tobin G A (ed) *Divided Neighborhoods: Changing Patterns of Racial Segregation*. Volume 32, Urban Affairs Annual Reviews, pp 43-67. Newbury Park: Sage Publications.

PERSONAL COMMUNICATIONS

Harris R 2001. Segregation. E-mail received from the Urban Geography listserv urbgeog@listserv.arizona.edu. [01/03/14].

Neethling A 2002 Pers.com. Former researcher at the Human Sciences Research Council of South Africa. Currently lecturer in statistics at the South African Military Academy.

STRICTLY CONFIDENTIAL

**APPENDIX A1:
SURVEY QUESTIONNAIRE:
PART 1**

PART 1: PERSONAL DETAILS (Mark the applicable squares with a X)

How old were you at your last birthday (in years):

Wat is your gender? Male Female

To which population group do you belong?

Black/African Coloured White Indian Other

If "Other", specify which group:

.....

What is your household's gross yearly income?

R1 to R2 400 R2 401 to R6 000 R6 001 to R12 000

R12 001 to R18 000 R18 001 to R30 000 R30 001 to R42 000

R42 001 to R54 000 R54 001 to R72 000 R72 001 to R96 000

R96 001 to R132 000 R132 001 to R192 000 R192 001 to R360 000

R360 001 or more

What is the highest school grade passed by the head of the household?

1 2 3 4 5 6 7 8 9 10 11 12

What is the highest post-school qualification obtained by the head of the household?

Diploma (1 year) Diploma (2 years) Diploma (3 years)

B-degree (3-4 years) Honours Degree Masters degree

Doctorate Other

If "Other", specify what qualification:

.....

STRICTLY CONFIDENTIAL

STRICTLY CONFIDENTIAL

PART 2: Read through each of the six neighbourhood vignettes listed below, each representing a fictitious neighbourhood. Indicate your like or dislike of the neighbourhood by drawing a circle around a number on each corresponding scale on the right hand side of the paper.

Melkbosrand:

Located in the outskirts of Vredenburg.
Most of the people who live there are White but some are Coloured.
Very frequently people are assaulted or bothered by strangers while out walking alone at night.
There is frequently litter scattered in the streets and in the yards.
The houses are modest in size and well maintained.
Usually the neighbours are very considerate of others.

- 1 (Strong dislike of neighbourhood)
- 2
- 3
- 4 (Neutral)
- 5
- 6
- 7 (Strong liking of neighbourhood)

Swartlandskuur:

Located in central Vredenburg.
Most of the people who live there are Coloured but some are White.
There have been several occasions where people have been assaulted or bothered by strangers while walking alone at night.
Most people really need to clean up the trash on their property.
The houses are large and well taken care of.
Usually the neighbours are very considerate of others.

- 1 (Strong dislike of neighbourhood)
- 2
- 3
- 4 (Neutral)
- 5
- 6
- 7 (Strong liking of neighbourhood)

Leeupark:

Located in the outskirts of Vredenburg.
All the people who live there are Coloured.
No one has ever been assaulted or bothered by strangers while walking alone at night.
There is frequently litter scattered in the streets and in the yards.
The houses are large and well taken care of.
Most of the neighbours do not seem to care about anyone else.

- 1 (Strong dislike of neighbourhood)
- 2
- 3
- 4 (Neutral)
- 5
- 6
- 7 (Strong liking of neighbourhood)

Elephant Park:

Located in central Vredenburg.
All the people who live there are Coloured.
There have been several occasions where people have been assaulted or bothered by strangers while walking alone at night.
There is frequently litter scattered in the streets and in the yards.
The houses are modest in size, but not much attention is given to upkeep.
Some neighbours do not seem to have much respect for others.

- 1 (Strong dislike of neighbourhood)
- 2
- 3
- 4 (Neutral)
- 5
- 6
- 7 (Strong liking of neighbourhood)

Eagle Cliffs:

Located in central Vredenburg.
About half of the people who live there are White and about half are Coloured.
Very frequently people are assaulted or bothered by strangers while out walking alone at night.
Most people really need to clean up the trash on their property.
The houses are modest in size, but not much attention is given to upkeep.
The neighbours are very considerate of others.

- 1 (Strong dislike of neighbourhood)
- 2
- 3
- 4 (Neutral)
- 5
- 6
- 7 (Strong liking of neighbourhood)

Protea Glenn:

Located in central Vredenburg.
All the people who live there are Coloured.
No one has ever been assaulted or bothered by strangers while walking alone at night.
Most people really need to clean up the trash on their property.
The houses are modest in size and well maintained.
Some neighbours do not seem to have much respect for others.

- 1 (Strong dislike of neighbourhood)
- 2
- 3
- 4 (Neutral)
- 5
- 6
- 7 (Strong liking of neighbourhood)

October 2001

P.O. Box 1208
Vredenburg
7380

Dear Head of Household

YOUR HELP KINDLY REQUESTED

I am currently registered as an Urban Studies Masters student at the University of Stellenbosch. I am doing a study on the residential integration of the West Coast and I need to ask you about your likes and dislikes regarding different types of residential neighbourhoods. You can voice your opinions on the matter by completing the attached questionnaire. Your answers will aid my study and should have potential value for policy-makers and planners in the local municipality.

Your household, along with some 300 other households, has been randomly identified from all the households in Vredenburg to take part in the study. Your responses to the questionnaire will be treated as strictly confidential in order to protect your privacy. Please DO NOT write your name or any other identifying marks on the questionnaire (anonymity will help to protect your privacy). Please answer the questions as honestly as possible so that the study will be a true reflection of the opinions held by respondents.

Who should complete the questionnaire? The head of your household.

When should the questionnaire be completed? By 08:00 on Wednesday, 17 October 2001.

What to do with the completed questionnaire? Put it in the envelope in which you received it and place it in your postbox at home on the above date and time. If you do not have a postbox at home or lock your postbox, the questionnaire will be collected at your front door. Someone will be at your home to collect it during the course of the day on Wednesday 17 October 2001.

The questionnaire accompanying this letter is in Afrikaans. Should you prefer to fill in an English questionnaire, write "English" on the front of the envelope. I will then provide you with an English version at a later stage. This arrangement is based on the practical consideration of saving paper, because most people living in the area are Afrikaans speaking.

Your help with the study is much appreciated, as your answers are essential to getting a picture of neighbourhood requirements. I hope that the results of the research will inform local government in their efforts to formulate housing policy to the advantage of all Vredenburg's residents.

Yours sincerely

Hennie Janse van Rensburg
Student number: 12311367
Telephone: (022) 702 3108 (office hours)

EAs	African/Black	Coloured	Indian/Asian	White	Total	%NW	%W	Area (m2)	Total Pop	Total White	Total Non-white	D	xP'x	xP'y	RCO
1340029	161	159	0	0	320	100.00	0.00	4788420025	320	0	0	0.020095913	0	0	0.000
1340030	179	95	0	0	274	100.00	0.00	2243980800	274	0	0	0.017891225	0	0	0.000
1340028	89	201	0	0	270	100.00	0.00	39944123600	270	0	0	0.017830926	0	0	0.000
1340082	8	873	0	0	879	100.00	0.00	43292428371	879	0	0	0.057398459	0	0	0.000
1340080	0	828	0	0	828	100.00	0.00	49415219591	828	0	0	0.041008228	0	0	0.000
1340084	0	829	0	0	829	100.00	0.00	53495555411	829	0	0	0.041073527	0	0	0.000
1340087	2	343	0	0	345	100.00	0.00	66047560825	345	0	0	0.022528405	0	0	0.000
1340079	20	569	0	0	589	100.00	0.00	71039904042	589	0	0	0.038461538	0	0	0.000
1340083	535	1	0	0	536	100.00	0.00	73258263972	536	0	0	0.035000653	0	0	0.000
1340086	8	778	14	0	798	100.00	0.00	89935260639	798	0	0	0.052109181	0	0	0.000
1340081	23	827	1	0	851	100.00	0.00	92204328299	851	0	0	0.055570067	0	0	0.000
1340031	84	145	0	0	229	100.00	0.00	105940032700	229	0	0	0.014953637	0	0	0.000
1340077	1	818	5	0	824	100.00	0.00	109072278134	824	0	0	0.053806974	0	0	0.000
1340085	0	1036	0	0	1036	100.00	0.00	113573184387	1036	0	0	0.067850518	0	0	0.000
1340011	0	35	0	243	278	12.99	87.41	119845290326	278	243	35	0.044752837	0.041116236	0.005922092	5637322018.795
1340073	15	907	0	3	925	99.68	0.32	128776252208	925	3	922	0.059625627	1.88342E-06	0.000578837	74782957.147
1340018	5	7	0	332	344	3.49	96.51	129195027243	344	332	12	0.06348276	0.062204507	0.00224185	8302893736.871
1340017	8	9	0	338	355	4.79	95.21	133820254338	355	338	17	0.064317702	0.062294635	0.003133162	8755564453.363
1340075	27	732	0	3	762	99.61	0.39	136005825469	762	3	759	0.048981772	2.2893E-06	0.000578434	78981199.450
1340088	46	902	18	1	967	99.90	0.10	141161504398	967	1	966	0.062885962	2.00179E-07	0.000193733	8604402066.805
1340074	10	851	11	0	872	100.00	0.00	149977104625	872	0	872	0.058941361	0	0	0.000
1340093	3	1064	7	0	1074	100.00	0.00	165799693049	1074	0	1074	0.070131905	0	0	0.000
1340092	4	22	0	423	449	5.79	94.21	167426174239	449	423	26	0.08018374	0.077140063	0.00474147	1370911827.891
1340076	19	900	11	0	936	99.36	0.64	196411463662	936	6	930	0.05967305	7.44513E-06	0.001153995	228120201.698
1340016	0	5	0	94	99	5.05	94.95	263434397849	99	94	5	0.01789398	0.017276912	0.000918985	4793424970.539
1340015	3	22	2	767	794	3.40	96.60	384889933642	794	767	27	0.146707678	0.143422016	0.005048754	57115082350.567
1340012	8	22	1	702	733	4.23	95.77	420647447327	733	702	31	0.13386421	0.130145152	0.00574669	57201917929.385
1340013	23	97	0	450	570	21.05	78.95	475232219117	570	450	120	0.079272047	0.068769485	0.018338529	41396534766.289
1340008	0	6	0	0	6	100.00	0.00	559723121781	6	0	6	0.000391798	0	0	0.000
1340078	8	1023	28	0	1059	100.00	0.00	618262561500	1059	0	1059	0.06915241	0	0	0.000
1340014	14	84	0	578	676	14.50	85.50	1163918116682	676	578	98	0.105486031	0.095865331	0.016220073	130225440369.320
1340009	10	80	0	459	549	16.39	83.61	1238396788258	549	459	90	0.082973199	0.074284572	0.014585602	110032036935.815
1340010	9	48	0	767	824	6.92	93.08	1461862541012	824	767	57	0.144748686	0.138200341	0.01027043	217017132976.349
	1298	13918	98	5166	20480	2296.73601	1003.26399	9011252568745	20480	5166	15314	0.96	0.910347425	0.089652575	654595660800.807

n1=J11
T1=5288
n2=J27
T2=5211
-0.748
0.806
-0.929

EAs	Distance	X White Proportion	A Area Proportion	White ACE	X Non-White Proportion	A Area Proportion	Non-White ACE
1340013	536	0.087108014	0.052737843	0.00	0.007835967	0.052737843	0.00
1340012	664	0.135888502	0.046713533	0.01	0.002024291	0.046713533	0.00
1340092	680	0.081881533	0.018579878	0.03	0.001897793	0.018579878	0.00
1340009	706	0.088850174	0.137428152	0.08	0.005876975	0.137428152	0.00
1340077	785	0	0.012104009	0.11	0.053806974	0.012104009	0.00
1340018	879	0.064286357	0.014337078	0.11	0.000783597	0.014337078	0.02
1340011	975	0.047038328	0.013299515	0.14	0.00228549	0.013299515	0.02
1340017	988	0.065427797	0.01485035	0.16	0.001110095	0.01485035	0.02
1340079	1167	0	0.007883466	0.18	0.038461538	0.007883466	0.02
1340010	1271	0.14847077	0.162206367	0.27	0.003722084	0.162206367	0.05
1340014	1297	0.111885405	0.129162745	0.44	0.006396973	0.129162745	0.07
1340081	1302	0	0.010232132	0.51	0.055570067	0.010232132	0.08
1340015	1358	0.14847077	0.04268984	0.55	0.001783093	0.04268984	0.12
1340086	1421	0	0.009980328	0.66	0.052109181	0.009980328	0.12
1340008	1488	0	0.062113798	0.72	0.000391798	0.062113798	0.17
1340082	1506	0	0.004804283	0.72	0.057398459	0.004804283	0.17
1340073	1551	0.00058072	0.014290605	0.74	0.080206347	0.014290605	0.22
1340085	1553	0	0.012603483	0.75	0.067850518	0.012603483	0.27
1340016	1579	0.018195896	0.029233938	0.78	0.000326499	0.029233938	0.33
1340084	1673	0	0.005036528	0.80	0.041073527	0.005036528	0.34
1340078	1710	0	0.068610058	0.87	0.08915241	0.068610058	0.40
1340080	1717	0	0.005483724	0.87	0.041008228	0.005483724	0.46
1340087	1779	0	0.007329454	0.88	0.022528405	0.007329454	0.50
1340074	1883	0	0.018643314	0.90	0.056941361	0.018643314	0.53
1340083	1886	0	0.008129643	0.91	0.035000653	0.008129643	0.59
1340088	1921	0.000193573	0.015865028	0.92	0.063079535	0.015865028	0.63
1340075	2084	0.00058072	0.015092866	0.94	0.049562492	0.015092866	0.70
1340093	2368	0	0.018399184	0.96	0.070131905	0.018399184	0.76
1340076	2497	0.00116144	0.021798248	0.98	0.060728745	0.021798248	0.85
1340028	2819	0	0.004432894	0.98	0.017630926	0.004432894	0.91
1340029	2935	0	0.001895788	0.98	0.020895912	0.001895788	0.93
1340031	2961	0	0.011756416	1.00	0.014953637	0.011756416	0.96
1340030	3082	0	0.003578135	1.00	0.017892125	0.003578135	0.98
			19.93	19.57			11.27
			0.36				-0.54

Model summary

R	R ²	Adjusted R	Standard Error of the Estimate	Change Statistics				
				R ² Change	F Change	df 1	df 2	Significance of F Change
0.578(a)	0.334	0.31	1.65	0.334	14.172	21	59 4	<0.001

Model correlations

		SCORE	RACECOMP	CRIME	ENVCLEAN	HOUSQUAL	SOCENV	LOCATION
Pearson Correlation Coefficients (r)	SCORE	1	-0.051	-0.286	-0.177	-0.271	-0.23	0.024
	RACECOMP	-0.051	1	0.033	0.051	-0.055	-0.046	0.104
	CRIME	-0.286	0.033	1	-0.049	0.013	-0.005	-0.022
	ENVCLEAN	-0.177	0.051	-0.049	1	0.044	0.026	-0.037
	HOUSQUAL	-0.271	-0.055	0.013	0.044	1	0.084	-0.077
	SOCENV	-0.23	-0.046	-0.005	0.026	0.084	1	-0.035
	LOCATION	0.024	0.104	-0.022	-0.037	-0.077	-0.035	1
	Significance (1-tailed)	SCORE	.	0.104	0	0	0	0
RACECOMP		0.104	.	0.206	0.104	0.085	0.129	0.005
CRIME		0	0.206	.	0.11	0.372	0.451	0.294
ENVCLEAN		0	0.104	0.11	.	0.138	0.257	0.178
HOUSQUAL		0	0.085	0.372	0.138	.	0.018	0.027
SOCENV		0	0.129	0.451	0.257	0.018	.	0.19
LOCATION		0.274	0.005	0.294	0.178	0.027	0.19	.

Model coefficients

	Unstandardised Coefficients		Standardised Coefficient	t	Significance
	B	Standard Error	Beta		
(Constant)	7.946	0.632		12.563	<0.001
RACECOMP	-0.046	0.048	-0.033	-0.957	0.339
CRIME	-0.505	0.059	-0.291	-8.576	<0.001
ENVCLEAN	-0.289	0.061	-0.161	-4.738	<0.001
HOUSQUAL	-0.457	0.061	-0.258	-7.529	<0.001
SOCENV	-0.345	0.06	-0.195	-5.753	<0.001
LOCATION	-0.014	0.135	-0.003	-0.102	0.918
SPRINGBOKPARK	-0.404	0.319	-0.055	-1.266	0.206
LEEUPARK	0.136	0.293	0.021	0.465	0.642
EAGLE CLIFFS	-0.147	0.293	-0.023	-0.501	0.616
MELKBOSRAND	-0.119	0.301	-0.018	-0.395	0.693
ELEPHANT PARK	-0.098	0.301	-0.015	-0.326	0.745
TORTOIS GROVE	0.033	0.294	0.005	0.113	0.91
SWARTLANSKUUR	0.139	0.306	0.02	0.454	0.65
RHINO PARK	0.380	0.3	0.057	1.268	0.205
BOLANDHOOGTE	-0.009	0.292	-0.001	-0.032	0.975
RACEBI	0.414	0.268	0.099	1.542	0.123
MCLASS	0.097	0.188	0.024	0.515	0.607
UCLASS	-0.783	0.265	-0.173	-2.952	0.003
AREA	-0.248	0.283	-0.062	-0.876	0.382
AGE	0.004	0.007	0.022	0.64	0.523
GENDER	0.030	0.157	0.007	0.192	0.848

Dependent Variable: SCORE

Model summary

R	R ²	Adjusted R ²	Standard Error of the Estimate	Change Statistics				
				R ² Change	F Change	df1	df2	Significance of F Change
0.618	0.382	0.346	0.161	0.382	10.568	34	581	<0.001

Abbreviations used in the Interaction model

Abbreviation	Meaning
C	CRIME
EC	ENVCLEAN
HQ	HOUSQUAL
MC	MCLASS
RB	RACEBI
RC	RACECOMP
SE	SOCENV
UC	UCLASS
X	Interaction
Z	Z-score

Model correlations

		SCORE	Zscore(RACE COMP)	Zscore(CRIME)	Zscore(ENV CLEAN)	Zscore(HOUSQUAL)	Zscore(SOCENV)	ZRCXZC	ZRCXZE	ZRCXZH Q	ZRCXZSE	ZCXZEC	ZCXZHQ	ZCXZSE	ZECXZHQ	ZECXZSE	ZHQXZSE
Pearson Correlation Coefficients (r)	SCORE	1	-0.051	-0.286	-0.177	-0.271	-0.23	0.011	0.077	0.084	0.037	-0.063	-0.013	-0.036	-0.024	-0.032	0.059
	RACEBI	0.259	-0.055	0.012	-0.024	0.006	-0.049	0.013	-0.058	0.015	0.022	-0.005	-0.003	-0.025	0.034	0.01	-0.048
	MCLASS	0.146	-0.061	-0.069	0.017	0.008	0.027	-0.024	0.083	-0.012	0.012	-0.058	0.009	-0.007	0.004	-0.031	0.023
	UCLASS	-0.275	0.07	-0.009	0.034	-0.054	0.005	0.048	0.032	-0.046	-0.008	0.039	0.016	0.028	0.006	0.05	0.015
	Zscore(RACECOMP)	-0.051	1	0.033	0.051	-0.055	-0.046	0.029	-0.056	-0.054	0.004	0.019	0.016	0.018	-0.013	-0.049	-0.057
	Zscore(CRIME)	-0.286	0.033	1	-0.049	0.013	-0.005	-0.026	0.02	0.016	0.018	-0.009	0.021	0.009	-0.001	0.053	-0.071
	Zscore(ENVCLEAN)	-0.177	0.051	-0.049	1	0.044	0.026	0.02	-0.067	-0.013	-0.049	0.034	-0.001	0.054	0.108	0.025	-0.025
	Zscore(HOUSQUAL)	-0.271	-0.055	0.013	0.044	1	0.084	0.017	-0.014	0.003	-0.057	-0.001	0.001	-0.072	0.022	-0.024	-0.023
	Zscore(SOCENV)	-0.23	-0.046	-0.005	0.026	0.084	1	0.019	-0.05	-0.057	-0.061	0.052	-0.072	-0.014	-0.024	0.013	0.022
	ZRCXZC	0.011	0.029	-0.026	0.02	0.017	0.019	1	-0.063	0.022	-0.01	0.057	-0.057	-0.035	0.026	0.027	0.052
	ZRCXZEC	0.077	-0.056	0.02	-0.067	-0.014	-0.05	-0.063	1	-0.006	0.039	0.068	0.027	0.029	-0.083	-0.072	-0.028
	ZRCXZHQ	0.084	-0.054	0.016	-0.013	0.003	-0.057	0.022	-0.006	1	0.092	0.024	0.051	0.054	0.019	-0.022	-0.038
	ZRCXZSE	0.037	0.004	0.018	-0.049	-0.057	-0.061	-0.01	0.039	0.092	1	0.025	0.054	0.02	-0.021	0.111	-0.018
	ZCXZEC	-0.063	0.019	-0.009	0.034	-0.001	0.052	0.057	0.068	0.024	0.025	1	0.061	-0.004	-0.044	0.012	-0.027
	ZCXZHQ	-0.013	0.016	0.021	-0.001	0.001	-0.072	-0.057	0.027	0.051	0.054	0.061	1	0.088	-0.071	-0.031	0.002
	ZCXZSE	-0.036	0.018	0.009	0.054	-0.072	-0.014	-0.035	0.029	0.054	0.02	-0.004	0.088	1	-0.031	-0.064	0.01
	ZECXZHQ	-0.024	-0.013	-0.001	0.108	0.022	-0.024	0.026	-0.083	0.019	-0.021	-0.044	-0.071	-0.031	1	0.115	-0.027
ZECXZSE	-0.032	-0.049	0.053	0.025	-0.024	0.013	0.027	-0.072	-0.022	0.111	0.012	-0.031	-0.064	0.115	1	0.025	
ZHQXZSE	0.059	-0.057	-0.071	-0.025	-0.023	0.022	0.052	-0.028	-0.038	-0.018	-0.027	0.002	0.01	-0.027	0.025	1	
Significance (1-tailed)	SCORE	.	0.104	0	0	0	0	0.391	0.028	0.018	0.178	0.06	0.375	0.186	0.272	0.215	0.071
	Zscore(RACECOMP)	0.104	.	0.206	0.104	0.085	0.129	0.237	0.082	0.09	0.459	0.316	0.344	0.325	0.372	0.115	0.08
	Zscore(CRIME)	0	0.206	.	0.11	0.372	0.451	0.261	0.309	0.344	0.327	0.41	0.298	0.41	0.493	0.095	0.038
	Zscore(ENVCLEAN)	0	0.104	0.11	.	0.138	0.257	0.307	0.047	0.371	0.112	0.202	0.493	0.092	0.004	0.269	0.272
	Zscore(HOUSQUAL)	0	0.085	0.372	0.138	.	0.018	0.34	0.368	0.473	0.079	0.493	0.495	0.036	0.29	0.272	0.287
	Zscore(SOCENV)	0	0.129	0.451	0.257	0.018	.	0.322	0.108	0.08	0.066	0.098	0.037	0.369	0.273	0.375	0.29
	ZRCXZC	0.391	0.237	0.261	0.307	0.34	0.322	.	0.059	0.294	0.402	0.078	0.08	0.194	0.259	0.249	0.099
	ZRCXZEC	0.028	0.082	0.309	0.047	0.368	0.108	0.059	.	0.442	0.168	0.047	0.252	0.238	0.02	0.037	0.241
	ZRCXZHQ	0.018	0.09	0.344	0.371	0.473	0.08	0.294	0.442	.	0.011	0.277	0.102	0.092	0.32	0.292	0.172
	ZRCXZSE	0.178	0.459	0.327	0.112	0.079	0.066	0.402	0.168	0.011	.	0.268	0.089	0.312	0.297	0.003	0.33
	ZCXZEC	0.06	0.316	0.41	0.202	0.493	0.098	0.078	0.047	0.277	0.268	.	0.065	0.457	0.139	0.379	0.256
	ZCXZHQ	0.375	0.344	0.298	0.493	0.495	0.037	0.08	0.252	0.102	0.089	0.065	.	0.015	0.04	0.218	0.479
	ZCXZSE	0.186	0.325	0.41	0.092	0.036	0.369	0.194	0.238	0.092	0.312	0.457	0.015	.	0.221	0.056	0.404
	ZECXZHQ	0.272	0.372	0.493	0.004	0.29	0.273	0.259	0.02	0.32	0.297	0.139	0.04	0.221	.	0.002	0.253
	ZECXZSE	0.215	0.115	0.095	0.269	0.272	0.375	0.249	0.037	0.292	0.003	0.379	0.218	0.056	0.002	.	0.265
	ZHQXZSE	0.071	0.08	0.038	0.272	0.287	0.29	0.099	0.241	0.172	0.33	0.256	0.479	0.404	0.253	0.265	.

Model coefficients

	Unstandardised Coefficients		Standardised Coefficients	t	Significance
	B	Standard Error	Beta		
(Constant)	3.378	0.244		13.868	< 0.001
RACEBI	0.936	0.207	0.225	4.519	< 0.001
MCLASS	0.149	0.174	0.037	0.855	0.393
UCLASS	-0.401	0.286	-0.089	-1.403	0.161
Zscore (RACECOMP)	-0.483	0.214	-0.243	-2.258	0.024
Zscore (CRIME)	-0.236	0.214	-0.119	-1.101	0.272
Zscore (ENVCLEAN)	-0.354	0.215	-0.178	-1.644	0.101
Zscore (HOUSQUAL)	-0.522	0.218	-0.263	-2.391	0.017
Zscore (SOCENV)	-0.344	0.214	-0.173	-1.604	0.109
ZRCXZC	0.044	0.068	0.022	0.643	0.52
ZRCXZEC	0.161	0.069	0.08	2.343	0.019
ZRCXZHQ	0.113	0.067	0.057	1.696	0.091
ZRCXZSE	0.010	0.067	0.005	0.145	0.885
ZRCXRB	0.318	0.169	0.13	1.889	0.059
ZRCXMC	0.512	0.172	0.178	2.97	0.003
ZRCXUC	0.015	0.223	0.004	0.068	0.945
ZCXZEC	-0.090	0.065	-0.047	-1.387	0.166
ZCXZHQ	-0.036	0.067	-0.018	-0.533	0.594
ZCXZSE	-0.085	0.067	-0.043	-1.279	0.202
ZCXRB	-0.155	0.174	-0.064	-0.89	0.374
ZCXMC	-0.221	0.167	-0.076	-1.324	0.186
ZCXUC	-0.487	0.228	-0.122	-2.139	0.033
ZECXZHQ	-0.043	0.066	-0.022	-0.662	0.508
ZECXZSE	-0.006	0.066	-0.003	-0.094	0.925
ZECXRB	0.071	0.171	0.029	0.418	0.676
ZECXMC	0.036	0.172	0.012	0.208	0.836
ZECXUC	-0.085	0.226	-0.022	-0.375	0.708
ZHQXZSE	0.110	0.066	0.056	1.669	0.096
ZHQXRB	-0.040	0.178	-0.016	-0.222	0.825
ZHQXMC	0.055	0.17	0.019	0.322	0.747
ZHQXUC	0.062	0.227	0.016	0.273	0.785
ZSEXRB	0.051	0.17	0.02	0.298	0.765
ZSEXMC	-0.214	0.172	-0.075	-1.247	0.213
ZSEXUC	0.078	0.225	0.02	0.345	0.73
RBXUC	-0.885	0.378	-0.105	-2.339	0.02

a Dependent Variable: SCORE