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DEVELOPMENT AND EMPIRICAL TESTING OF A THEORETICAL MODEL EXPLAINING MEDICAL STUDENTS'

INTENTION TO PRACTISE IN URBAN OR RURAL SOUTH AFRICA

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DECLARATION

By submitting this thesis electronically, I declare that the entirety of the work contained therein is my own, original work, that I am the authorship owner thereof (unless to the extent explicitly otherwise stated) and that I have not previously in its entirety or in part submitted it for obtaining any qualification.

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ABSTRACT

The shortage of medical practitioners is a worldwide dilemma and South Africa is also affected by these shortages which result in many health-related issues. Rural areas suffer the most. Research indicates that medical practitioners prefer certain areas of practice. Thus the aim of this study is to develop and empirically test a structural model to explain variance in medical students' intention to practise in rural areas or in urban areas at the outset of their careers as general practitioners. The intention to choose an area of practice is explained through the Fishbein model. This model aims to explain factors influencing intention to act. The study was conducted on fifth-year medical students at Stellenbosch University. The study consisted of questionnaires and interviews. Results are more or less the same as results from other studies discussed in this study, with the difference that the results of the current study in particular sheds light on the intention of medical students through the use of the Fishbein model.

ABSTRAK

Die tekort aan mediese praktisyns is a wêreldwye krisis en Suid Afrika word ook deur hierdie tekort geraak. Die resultaat daarvan is vele ander gesondheidsverwante probleme. Die doel van die studie was om 'n strukturele model wat mediese student se intensie om in plattelandse of stedelike areas te praktiseer, te ontwikkel en empiries te toets. Die intensie om sekere areas te kies word deur die Fishbein-model verduidelik. Hierdie model poog om faktore te verduidelik wat intensie om te kies beïnvloed. Die studie is op vyfde-jaar mediese studente van die Stellenbosch Universiteit toegepas. Die studie het vraelyste en onderhoude beslaan. Resultate van die studie is grotendeels in lyn met die resulate van studies wat in die literatuurstudie bespreek word, met die verskil dat die resultate van die huidige studie die intensie van mediese student met behulp van die toepassing van die Fishbein model verduidelik.

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CHAPTER ONE: INTRODUCTION

An urgent need makes the improvement of systems for health, especially the public health and private health sectors, a priority. Together with the need for improvement of systems for health, countries worldwide are faced with shortages of healthcare professionals, which include medical practitioners. Developing countries especially suffer from major shortages of healthcare professionals and this issue needs urgent attention (McGrail, Humphreys & Joyce, 2011; World Health Organisation, 2013).

Diseases such as HIV and AIDS, tuberculosis, Ebola, cancer and many more have been and still are a threat to life expectancy as well as the quality of life. New diseases and illnesses are discovered daily with the world-wide population expansion (Botha, 2014), a situation which places enormous pressure on health systems and medical practitioners. The World Health Organisation (1946, p. 100) defines health as not simply the absence of illness and disease but "a complete state of physical, mental and social well-being". This implies that systems for health cannot merely focus on curing of disease but should also adopt an approach by which preventative health is promoted. Worldwide medical practitioners and institutions are faced with these challenges. Good health or the lack thereof cannot be seen in isolation for it affects three major global situations, namely development, security, and human rights. Development refers to socio-economic progress, which is a problem in many countries, especially developing countries. Better health contributes to better living standards and quality of life which, in turn, results in socio-economic progress. When individuals are healthier there are less turnover and absenteeism in the workplace, which holds economic advantages for the workplace as well as for the individual. In this regard a link can be made between industrial psychology and systems for health. In a later part of this study, this link is discussed thoroughly as the researcher considers this an important link between health care and Industrial Psychology. National and human security is a major concern as a result of many factors that threaten security and human life. Lastly, human rights present a burning topic. All people have rights, particularly

the right to proper healthcare (Frenk, Chen, Bhutta, Cohen, Crisp, Evans, Fineberg, Garcia, Ke, Kelley, Kistnasamy, Meleis, Naylor, Pablos-Mendez, Reddy, Scrimshaw, Sepulvedu, Serwadda, 2010). Healthcare practitioners, and more specifically medical practitioners, thus have a much greater role to play than just to treat illnesses and cure patients; these practitioners are part of a bigger system that impacts on global health and all subjects related to global health.

The term healthcare professional refers to a range of healthcare professions including nurses, occupational therapists, physiotherapists, and speech and language therapists. This is a group of professionals who strives to provide healthcare to a wide variety of persons and communities (Naidu, Irlam & Diab, 2013). This study uses the term medical practitioner to refer to healthcare professionals working in the public sector with a basic medical degree (MB ChB) or, in addition to that, also a master's degree in Family Medicine (MMed (Fam Med)). According to the Institute for International Medical Education (2014), the definition of a medical practitioner is a professional who obtained a degree in medicine and who is trained to find solutions to health-related problems and treat a variety of diseases and illnesses. Two groups of medical practitioners exist: general practitioners and specialists. General practitioners have wide-ranging knowledge of medicine in general and can treat a wide spectrum of illnesses. Specialists complete the same course as general practitioners but pursue further studies in a specific field of interest such as neurology, surgery, psychiatry, etc. Specialists have in-depth knowledge in the particular discipline. The term medical student is also used in referring to a student studying towards the above-mentioned degrees. This study focuses on medical practitioners in general to place the challenges of this career into context. Following this, the specific focus of the study is concentrated on medical students and their intention to willingly choose rural practice or urban practice.

The world is faced with many health-related issues, the need for improved systems for health, the lack of medical practitioners, as well as the maldistribution of these medical practitioners. According to the Global Consensus for Social Accountability in Medical Schools (2010) these are not the only issues that

call for attention. The education of medical students and the management of human resources are other aspects to consider. This study considers the clinical training of medical students as well as factors in rural practice and urban practice that influence medical students' decision to choose an area in which to practice. In order to provide developed and developing countries with skilled medical practitioners, educational systems need to put in some effort to deliver more medical practitioners to serve the great need in the health sector. According to Rourke (2010), most medical schools around the world are situated in urban areas. The result is that it is more difficult for individuals from a rural origin to access medical education.

Personal characteristics as well as factors in the rural practice and the urban practice are discussed from an industrial psychology perspective, in order to determine which of these factors influence the decisions of medical students. Human resource management further plays a vital role in the placement of medical graduates in areas where the need is the highest. The industrial psychologist, through the management of human resources, is able to assist in the support and retention of medical practitioners in urban and rural practice. According to the Health Professions Council of South Africa (2011), industrial psychologists have the knowledge and skills to plan and implement strategies and interventions to manage and optimise individual and group behaviour. The industrial psychologist can also assist in finding answers to questions concerning why medical practitioners would choose certain areas of practice that may thereby lead to shortages in other areas.

The burning issue of the maldistribution and shortage of medical practitioners lead to the question of how many medical practitioners will be enough. The World Health Organization (2006) recommends that there should be at least one medical practitioner for every 5000 individuals per area. Despite this valued recommendation, the shortage of health workers in developed countries as well as in developing countries remains. This is one of the main reasons why important health-related goals are not met (Bärninghausen & Bloom, 2009; Serneels *et al.*, 2010). Countries such as China, the United States of

America, Brazil, and India, host more than 600 medical schools all together. Even a country such as Germany, which is a leader when it comes to providing health care, is faced with the issue of underserved rural areas. Recent statistics for this country is proof that 200 rural medical offices have no staff and it is anticipated that nearly 50% of general practitioners will retire soon. An estimate indicates that by 2025 there will be a need for 825 new medical practitioners (Holst, Normann, & Herrmann, 2015).

 In sub-Saharan Africa, nearly 26 countries have no medical training facilities at all (Frenk *et al*., 2010). African countries such as Ethiopia and Rwanda are suffering from this shortage of medical practitioners and other health professionals. In Rwanda, 82% of the population lives in rural areas but 88% of the country's physicians work in urban areas (Serneels *et al*., 2010). Malawi is faced with the same problem. In 2004 more than 80% of the Malawian population lived in rural areas but, despite the great number of residents living in the countryside, most medical practitioners worked in urban hospitals while some of the rural hospitals did not even have one medical practitioner (Bailey, Mandeville, Rhodes, Mipando & Muula, 2012). Why would medical practitioners choose to work in urban areas rather than in rural areas where the need is the greatest? The researcher wanted to discover the answer to this question.

Before further attention can be given to the maldistribution between areas, these areas should first be defined. An urban area refers to an area which contains a certain population within fixed boundaries, usually referred to as cities or towns (World Health Organisation, 2006). Examples of such areas in South Africa are Johannesburg and Pretoria in the Gauteng province. According to Muula (2007), rural areas can be defined in terms of a community's distance from health services and medical practitioners. However, according to Couper (2003), this definition is too vague to use as a standard classification of rural areas, for then the assumption is made that rural areas in themselves do not contain proper healthcare facilities. The researcher agrees with this statement. According to Couper (2003) there is a difference between how developed countries and developing countries define rural. In developed countries, the areas referred to as rural are often far from urban areas with a well-developed infrastructure and are easily distinguished.

In developing countries such as South Africa the rural and urban areas are often close to each other with less defined boundaries (Couper, 2003). A more proper definition by De Vries and Reid (2003) classifies rural areas as settings outside large metropolitan areas such as cities and provincial capital cities in South Africa. Examples of such areas are Garies, in the Northern Cape, and Montague in the Western Cape Province. A third area can be defined in South Africa and is called a peri-urban area. These areas were previously classified as rural areas and developed into peri-urban areas because of the enlargement of urban areas in South Africa (Du Plessis, 2015). Examples of such a peri-urban area in South Africa are those of Stellenbosch and Paarl in the Western Cape Province and Randfontein in the Gauteng province.

For the purpose of this study, it is also important to define the term rural practice. Rural practice is a "practice in non-urban areas, where most medical care is provided by general practitioners and family physicians with limited or distant access to specialist resources and high technology healthcare" (Rouke, 1997, p. 114). It is assumed that the urban practice offers more medical specialties and more access to technology and resources. However, this definition is slightly biased and include assumptions that are not necessarily true for all rural areas in all countries. A more suitable definition by Couper (2003) is that

> Rural medical practice is healthcare provided by generalist medical practitioners whose scope of practice include care that would be provided by specialists in urban areas. It is appropriate technology healthcare, appropriate to the needs of particular communities that are served. It usually includes elements of family practice, public health, and extended procedural work, within the context of primary healthcare and the primary healthcare team (Couper, 2003, p. 2).

This definition by Couper (2003) is appropriate for the purpose of the study and serves as a guideline to define rural and urban practice. The maldistribution and shortage of medical practitioners across urban practice and rural practice is a major problem worldwide, South Africa is no exception (Padarath *et al*., 2003). Healthcare in South Africa is further marked by inequality. Inequality exists between private health

services, which are mainly in urban areas, and public health services, which are mainly in rural areas. For the purpose of this study, the researcher will not necessarily focus on public or private health systems but rather on rural and urban health systems in general.   There is also a maldistribution of medical practitioners among the nine provinces of South Africa. The size of the rural areas in each of these provinces differs, so does the distribution of medical practitioners (Versteeg, Du Toit, Couper & Mnqapu, 2013).

Apart from the major misdistribution of medical practitioners in South Africa, the country is faced with four main health-related issues and these issues will continue to be important now and in the future, according to Aaron Motsoaledi (2012), the current South African Minister of Health. Firstly, the life expectancy of citizens need to improve; mother and child deaths need to be decreased; HIV and tuberculosis-related illness need to be diminished, and, lastly, the total functioning of the country's health system has to improve. In the Annual Report of the National Department of Health, these four goals were again highlighted as priority outcomes for the next term (Matsoso, 2014). These challenges can only be addressed through the commitment of all healthcare practitioners in urban as well as in rural practice. It does not seem unrealistic with one million medical students and nurses who graduate each year from 2887 medical schools and medical training centres around the globe (Frenk *et al*., 2010). In South Africa, 1200 medical students graduate annually from local universities. However, only 3% of these graduates end up working in rural areas (Wits Centre for Rural Health Strategy, 2008). This is a problem, considering that just less than half of the South African population resides in the rural areas. Thus these areas are under served. Medical students clearly decide to choose urban areas rather than rural areas. The result of such a decision is that the three provinces with the highest rural population in South Africa are the provinces with the lowest number of medical practitioners. These provinces are the North West, Eastern Cape and the Limpopo Provinces. Rural areas on average only have 13 general practitioners per 100 000 individuals (Wits Centre for Rural Health Strategy, 2008). This ratio is much less than recommended by

the World Health Organisation (2010). Another alarming fact is that 25% of the students who graduate in South Africa emigrate to other countries (Econex, 2010). Statistics such as these highlight the problem systems for health South Africa is faced with. Serneels *et al*. (2010) propose the very important argument that attracting medical students to an area is a matter of choice and preference. This argument is directly linked to the core of this study which ultimately aims to determine what influences the choice of medical students.

This shortage and loss of medical practitioners and health professionals to other countries is a great challenge and rural areas are suffering the most. There is a great need for general health practitioners and their role is vital. Recent research indicates that the private sector in South Africa employs 46% of all registered general practitioners and 56% of specialised medical practitioners. This leaves the public sector with 54% of the registered general practitioners in the country and only 44% of registered specialists (Ashmore, 2013). Considering this ratio between urban and rural area population there is a need for more specialists and general practitioners in rural areas. A logical solution is that more medical practitioners should be trained in order to minimise this shortage. But according to Econex (2010), South Africa currently only has the capacity to deliver 1400 graduates per year. This alone is not enough to solve the problem. In reality it is also difficult to accurately estimate how many general practitioners and specialists are working in South Africa at a given time. Data from the Health Professions Council of South Africa can be used, but not all registered practitioners are actively practising, therefore Econex (2013) conducted a study to determine how many practitioners were actively working in South Africa. Results indicated that fewer medical practitioners than the 30 728 currently registered at the Health Professions Council of South Africa are working in South Africa. It seems that there is a supply and demand effect. The demand is for more skilled medical practitioners to be employed and retained in rural areas and the supply is from medical students who completed their training and are seeking the best possible area to practice in. The choice that a medical student makes is the factor that determines whether the demand will be met or

not. This choice, however, is influenced by many factors on the side of the demand and the side of the supply. Serneels *et al.* (2010) mention factors such as opportunities for career development, working conditions and living conditions. It is interesting to note that these factors are not necessarily linked to financial compensation, as one would imagine. Other outside factors, such as significance others, perceptions, push-and-pull factors, etc. also complicate the decision.

From the literature referred to above it is clear that South Africa is faced with many challenges of which the shortage of specialist and general practitioners in rural South Africa is a major problem that needs urgent attention. Reid, Couper and Volmink (2011) state that South African medical practitioners are in high demand in rural as well as urban areas, thus these practitioners can choose where to practise. The question arises as to why medical practitioners and, more specifically for the purpose of this study, medical students would make the decision to practise in an urban setting rather than in a rural setting. Financial considerations (Ashmore, 2013), background, clinical training, job satisfaction and personal characteristics such as altruism, concern for others, ethical concerns, professionalism, individualism, proper schooling for children, job opportunities for spouses and even the health of aging parents (Couper, Hugo, Conradie & Mfeyana, 2007) have been identified as influencing the intention to choose between urban area and rural areas (Reid *et al*., 2011). These factors are thoroughly discussed in different sections of this research study.

From the research studies mentioned above it is clear that choosing between urban and rural practice is no easy decision. It is even more so for medical students who have not really had much chance to experience rural or urban practice. The researcher identified a gap in research in terms of precisely what influences medical students' intention to choose rural practice or urban practice in the information available to these students.

Subsequently, the research initiating question flowing from the introductory argument pertains to why medical students vary in their intention to practise in a rural area or an urban area in South Africa. Thus the aim of this study was to develop and emperially test a structural model to explain variance in medical students' intention to practise in rural areas or in urban areas. The objective therefore was to develop and emperially test a theoretical model to explain medical students' intention to practise in rural areas or in urban areas. The theoretical model was based on the Fishbein model and was tested through statistical analysis. The Fishbein model is a model which explains what influences decision making.

In the light of the above-mentioned challenges and proposed aim for the study, the literature review discusses the training of medical students and then provides an overview of urban practice and rural practice. This discussion explains some factors that will also influence medical students to choose certain areas. The role of human resource strategies and interventions in urban and rural practice are discussed. Furthermore, the influence of personal characteristics on the decision to practise in a particular area is also discussed. Decision making in consumer behaviour and medicine, as well as motivation in decision making is explained through the Fishbein model in order to assist in understanding the decisions made by medical students.

CHAPTER TWO: LITERATURE REVIEW

The previous section provided an overview on global systems for health, as well as the healthcare situation in Africa and South Africa. The goal of the study has been defined and the following section provides a thorough literature review pertaining to the training of medical students, rural and urban areas, human resource-related topics and characteristics of medical students which might influence decision making. Motivation in decision making is explained through the Fishbein model and the intention to act, in order to gain insight into why medical practitioners choose certain areas for practice.

2.1   General training of students planning to become medical practitioners

According to Frenk *et al.*, (2010), medical education is confronted with the problem that medical practitioners globally are not well-equipped to face the many health-related problems. This is a result of curricula that cannot keep up with the rapid changes in the global systems for health (Frenk *et al.*, 2010). The argument is that the shortage and maldistribution might be a result of training institutions failing to equip students with the necessary competencies to practise in these areas and to act as change agents and leaders to help address the health needs of persons and communities. Factors such as the lack of safety in rural areas, better quality of living in urban areas among several other are given as the possible explanation for the reluctance (Reid & Cakwe, 2011; Frenk *et al.*, 2010).

Medical practitioners spend so many hours at the hospital or local clinic, the work environment should be safe and supportive. This does not only refer to physical safety and support but also includes supportive and healthy work relationships. The rural work environment consists of small teams working close together and management should recognise the value and vulnerability of these individuals and provide extra care and support. The availability of equipment and a manageable workload also contribute to satisfying working conditions (Cooke Couper & Versteeg, 2011). Motivation plays a vital role in the retention of medical practitioners, which, in turn, also plays a role in the management of human resources

(Witter, Thu, Shengalia & Vujicic, 2011). According to Serneels *et al*. (2010), intrinsic motivation is a factor that influences practice choice. Intrinsic motivation refer to the willingness to do well without motivation from outside factors such as rewards or money.

Problems, amongst others, include poor leadership and teamwork, competencies that do not meet the needs of patients and communities; the lack of contextual understanding; and gender inequalities, to name just a few. With competencies that do not meet the needs of patients and communities being among these problems, twenty professionals and leaders from across the globe formed a commission to establish a global vision to guide educational institutions to better equip healthcare professionals. Recommendations and actions steps accompanied the vision to provide educational institutions across the spectrum with thorough guidelines for improving healthcare and the clinical training of medical students. The vision of The Commission is that

> all health professionals in all countries should be educated to mobilise knowledge and to
> engage in critical reasoning and ethical conduct so that they are competent to participate
> in patient and population-centred health systems as members of locally responsive and
> globally connected teams" (Frenk *et al*., 2010, p. 1924).

Besides teaching pure knowledge of medicine, it is important to clinically train medical students to become future leaders that will change and improve health systems that will aid medical practitioners in providing excellent healthcare. Consequently, tertiary institutions had to adopt new strategies with the aim of meeting this vision of the commission. Dudley *et al*. (2015) agree with this statement in referring to the social accountability that tertiary institutions have to provide competent medical students that can see to the health needs of society. Holst *et al.* (2015) encourage rural exposure during training as a method to motivate medical students to willingly choose rural practice after training. Rourke (2010)

suggests that medicals schools and health care facilities should form alliances in order to promote health care education and health care in the local hospitals.

In accordance with this very important vision, the Stellenbosch University provides a comprehensive clinical training programme that allows aspiring medical practitioners the training that is needed to make a difference. For the purpose of this study, medical students from Stellenbosch University were used as the sample population. The Faculty of Medicine and Health Sciences (2013) outlines seven roles and several competencies in which students are trained to become competent medical practitioners. These roles are defined by the Health Professions Council of South Africa and guides institutions in educating medical practitioners. The roles are that of communicator, collaborator, leader and manager, health advocate, scholar and professional (Health Professions Council of South Africa, 2014). The following figure illustrates these roles of a medical practitioner.
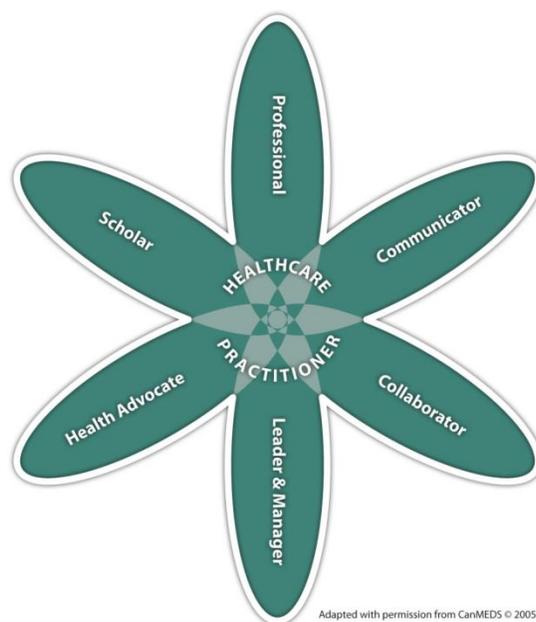
Figure 2.1: Roles of a Healthcare Practitioner (Graduate attributes for undergraduate students in teaching and learning programmes at the Faculty of Medicine and Health Sciences, p. 1)

According to Doherthy, Couper, Campbell and Walker (2013), leadership and clinical leadership, especially, are necessary competencies all medical practitioners should develop. Other important competencies to develop are emotional intelligence, professionalism, communication skills, and even human resource management skills. During the years of clinical training medical students gain exposure to different clinical settings, including rural communities. According to Reid *et al.* (2011), this exposure to rural communities will strongly influence medical students' decision to work in a rural area after completion of their training.

Holst *et al*. (2015) place the emphasis on the importance of not only training students on a theoretical level to practise in rural areas but that the training must physically take place in the rural areas in order to gain first-hand experience. Thus the rationale behind exposing students to rural areas is to provide an opportunity for these students to be trained by expert medical practitioners who have experience of practising in these settings. Students' clinical judgement and skills are improved through these experiences. The Ukwanda Rural Clinical School close to Worcester in the Western Cape was established after it was discovered that exposure to community-based education in practice provided a very positive experience to students (De Villiers, Conradie, Snyman, Van Heerden & Van Schalkwyk, 2014). The Ukwanda Rural Clinical School is part of the Faculty of Medicine and Health Sciences at Stellenbosch University. This school was a first for South Africa and proves to prepare young medical practitioners for the reality of healthcare in a country marked with many health-related challenges. Training institutions in the UK, USA and Australia have long been introducing students to rural clinical schools in order to provide realistic experiences of what rural health entails (Daniels-Felix, Conradie, & Vos, 2015). Rural exposure supports the concept of community-based education. If rural exposure influences medical students to choose rural areas, it may be assumed that, should students get more exposure during their studies, they might consider working in a rural area after completion of studies (Couper *et al*., 2007; Reid

et al., 2011). According to Holst *et al*. (2015), for training institutions to become more rural-orientated, a drastic change in attitudes, values, behaviours and thought processes are needed.

According to Frenk *et al*. (2014), community-based education is a rather important focus area for public health education and medical education in general. Community-based education offers students the knowledge and information needed to make an informed decision on where to practise after completion of training. Holst *et al*. (2015) also note that early and prolonged experience in rural areas contributes to a positive experience. According to Walker, De Witt, Pallant and Cunningham (2012), when medical students are exposed to rural areas during the first year of study, the chances are better that these students will choose rural practice. It is argued that current medical students will form the backbone of the systems for health and therefore their training, career aspirations and plans needs attention at an early stage (George, Gow & Bachoo, 2013). Thus it is also important to understand the intended decision making of medical students and, moreover, the influence of factors such as those mentioned above.

Interestingly, Doherthy *et al*. (2013) refer to the informal curriculum. This curriculum refers to behaviours and attitudes displayed by lecturers and seniors from which the medical student learns. These attitudes and behaviours of lecturers and seniors can impact the attitudes of medical students toward their own intention to choose a rural area or not. Such an informal curriculum serves as a kind of organisational culture through which certain values, attitudes, and behaviours are communicated. Holst *et al*. (2015) add to the idea of the informal curriculum by stating that medical students are susceptible to good influences, not only from role models but also from lecturers and seniors they get to meet during practical training. The values and positive attitudes of such superiors influence the choices medicals students must make. This is linked to both the attitudinal and subjective norms factors of the Fishbein model.

Rourke (2010) highlights four strategies through which medical training facilities can contribute to the successful retention of medical practitioners in rural areas. These strategies are, firstly, the recruitment

of medical students from rural areas, followed by relevant and focused education, postgraduate training and professional development. These strategies shift the focus from the workplace itself to training institutions which have a very important role to play in the creation of medical students that have a passion for rural practice.

It would seem that universities have a very important role to play in the preparation of the medical practitioner for rural areas. Thus the rationale for this study is to determine what influences the intention of a medical student to willingly choose urban practice or rural practice. The study by Couper *et al*. (2007) revealed that the respondents felt that training institutions did not play a role in their decision to choose rural practice; as a matter of fact, some lecturers and senior students discouraged them from choosing rural practice. Respondents in this particular study also indicated that the curriculum itself did not prepare them well enough for rural practice. With initiatives such as The Ukwanda Rural Clinical School this picture might change. If these medical practitioners felt that lecturers and the medical school did not prepare and motivate them to choose rural practice, the question must be asked, what influenced the decision? As other personal characteristics might have influenced the decisions, the role of such personal factors as an influence on choice is discussed in a later part of the study. Holst *et al*. (2015) interestingly note that even the fact that medical students reside in rural areas whilst studying has a positive influence on choosing rural areas.

It is important to put the clinical training of medical students in South Africa into context. In South Africa, medical students receive five or six years of clinical training depending on the duration of the course at the different universities in South Africa. This is followed by a two-year internship. For the internship, medical students who have by now graduated and have become medical practitioners are placed at a secondary or tertiary hospital selected by the government. After the internship, the government again places medical practitioners at a hospital to complete a final year of community service. It is important to note that the government places these individuals. Only after completing this process can medical

practitioners finally choose an area to practise in. This, however, does not imply that the medical student does not already have a preference for an urban or a rural area. According to Holst *et al*. (2015) the global trend is that medical schools focus on preparing students for urban practice. Stellenbosch University offers fifth-year medical students the opportunity to either finish their studies on the urban campus or to do rotations at nearby rural hospitals. A very recent study indicated that only about 12% of medicals students choose the second option (Daniels-Felix *et al*., 2015). This once again poses the question about what influences these students to make this particular decision.

The trend is for individuals who have completed their studies, the internship year and the hospital year to migrate from rural to urban areas; some medical practitioners even emigrate to other counties. This is widely referred to as the 'brain drain' (Muula, 2005). The brain drain is the result of certain national and international push-and-pull factors.

When young medical practitioners need to choose an area in which to practise, certain push-and-pull factors influence their intention in making this decision. Sheikh, Naqvi, Sheikh, Naqvi and Bandukda (2012) define push factors in the context of systems for health as the factors that encourage the migration of medical practitioners from the current system to another system. Pull factors in the context of systems for health are defined as those factors that appeal to medical practitioners in such a fashion that the choice is made to migrate from the current system to another system. South African medical practitioners mostly choose to exchange the rural areas for urban areas (George, *et al*., 2013; Rasool, Botha & Bisschoff, 2012). Interestingly, Muula (2005) also refers to "stick factors" with regard to factors that influence a medical practitioner to remain in the current area. The researcher was curious to know exactly why factors such as these would influence medical students' intention in making a decision.

It is important to find answers to questions such as these. International emigration causes South Africa to lose intellectual strength, skills, competencies, and experience to the international world. This is also

the case between urban and rural areas. The international environment serves as a pull factor that include greater career opportunities abroad which implies improved working conditions and greater incentives and remuneration (Padarath *et al.*, 2003). This fact is confirmed by Girasek, Eke, and Szocska (2010) when it is argued that a major reason for the shortage of medical practitioners locally is medical students' desire to work abroad to gain better experience. Thus the assumption can be made that, if educational institutions provide sufficient practical and community-based education and opportunities to gain experience, medical students might not feel compelled to seek opportunities for experience abroad. When students are exposed to rural settings the communities get used to these medical students and the students become familiar with the rural environment. Some kind of relationship and mutual understanding is developed which opens doors to future practice. This understanding and relationship might positively influence the intention of the medical student to choose urban practice after completion of studies, internship and hospital years (Couper, Worley & Strasser, 2011).

A study by De Vries, Iram, Couper, and Kornik (2010) indicated that half of the students (743 students) who took part in their study aspired to work abroad for a few years and some planned to relocate permanently. The majority of the students indicated a preference for private practice. However, a percentage of the students indicated that working in rural areas after studies was strongly considered. What influences an individual to prefer a particular area above another? This is a question that calls for attention.

According to the recommendations made by Frenk *et al*. (2010), training institutions provide a starting point towards training medical practitioners that display competencies that promise upliftment of the South African systems for health and closing the gap between rural and urban practice. Leadership on different levels is therefore needed. Clinical leadership is one concept that brings new perspective to the training of medical students. The concept acknowledges that medical practitioners and other healthcare staff have the ability to make decisions regarding patients and required treatment. This is also true for

medical students during the course of their practical work. The essence of the concept is that clinical leaders serve as role models and mentors in a clinical setting and that these leaders can make critical decisions. This does not imply that the medical practitioner must be the manager, but rather a partner who exhibits leadership skills. Holst *et al.* (2015) agree that positive role models during the practical experience is a factor that enables medical students to have a positive rural experience and, as a result, to be more likely to choose rural areas. It is suggested that medical schools include the development of clinical leadership in order to equip medical students to not only be leaders in their field but also to be leaders in the hospitals and clinics where they practise. This kind of leadership skill is essential in rural areas. Rural clinical academic leadership is a concept that flows from the concept of clinical leadership. The assumption is that, if students with good leadership skills could be encouraged to practise in rural areas, a transformation would occur through clinical leadership (Doherthy *et al.*, 2013).

According to Rourke (2010), curricula focused on rural practice will teach medical students to better understand the rural context and will encourage medical students to choose rural practice. This suggestion can be linked to the attitudinal factor of the Fishbein model. If the attitudes of medical students can be changed at the level of training, it may influence the decision to choose rural practice. Studying medicine in urban areas is a greater challenge for medical students with a rural background than for their urban counterparts. Usually students from an urban origin are wealthier, have had better secondary schooling and are more familiar with the urban environment than rural students. Factors such as these make it slightly more difficult to adapt in urban areas and in to excel academically. The suggested solution to this problem is that governments and medical schools should work in collaboration to find strategies to recruit medical students from rural areas and to provide proper financing possibilities for these students (Rourke, 2010). It is also suggested that medical training should be tailored to be rural specific in order to prepare medical students for practice in rural areas. The reason for this suggestion is that there are significant demographic and geographic differences between urban and rural areas, which make

practising in rural areas very different from practising in urban areas. The social status of rural areas differs from urban areas and very often the causes of disease and the management thereof should be well understood. Thus context must be considered and medical students must be trained and prepared accordingly. There is a tendency for medical practitioners practising in rural areas to more likely be engaged in postgraduate training in these rural areas. It is suggested that providing more postgraduate residency training programme areas will result in medical students being more likely to choose rural areas. It is often difficult for medical practitioners working in rural areas to develop careers professionally because of the distance from training institutions (Rourke, 2010). Rural areas are marked by a large population with a wide variety of illnesses and very little, if any, specialists. This situation compels medical practitioners in these areas to develop a wide knowledge of illnesses and treatments. In urban areas, such illnesses will be referred to specialists. This is the motivation behind the establishment of graduate residency training programmes where contextual and procedural skills can be developed.

The researcher would like to assume that, if attitudes and norms could be influenced and changed at the level of university training, the situation in rural areas would be very different. Then the student's intention may be to choose the rural area to actively go and make a difference rather than seeing it as a burden. In order to understand what would influence a student's intention to choose an urban area, it is important to understand the dynamics of both an urban and a rural area. Thus the following two sections explore the dynamics of urban areas and rural areas together with characteristics of medical students to try and clarify why medical students would prefer urban or rural practice.

2.2   An overview of medical practice in urban areas

The decision to choose between urban and rural areas is not limited to medical practitioners only; medical students are also confronted with this decision. The majority of South African medical practitioners are

employed in urban areas while rural areas are suffering shortages of medical practitioners. This section examines the nature of a typical urban area in South Africa.

Research provides many reasons why a majority of medical practitioners practise in urban areas (Bailey *et al*., 2012; Girasek *et al*., 2010). These reasons are discussed in depth with supporting evidence from other studies because they comprise a rather complex interaction of many factors that need to be considered and cannot be viewed in isolation (Lehmann, Dieleman & Martineau, 2008). Factors such as job satisfaction (Ashmore, 2013), the social and political climate and labour relations in South Africa influence how medical practitioners and consequently medical students perceive rural areas (Lehmann *et al*., 2008).

Rewards and incentives, work context, social work environment, and work itself are other factors that have an influence on medical practitioners' intention to choose a rural area. These factors were identified by Ashmore (2013) to conduct a research study on medical practitioners to compare urban and rural settings. When medical practitioners experienced these factors to be satisfactory, general job satisfaction occurred, which led to a general feeling of satisfaction with the setting in which the medical practitioners operated. The researcher also uses these four very relevant categories to unpack medical students' preference regarding practising in urban and rural areas.

2.2.1   Rewards and incentives

When considering rewards and incentives, Padarath *et al*. (2003) identified a tendency amongst medical practitioners to migrate from low-income areas (which generally are rural areas) to higher income areas that are urban areas. Better salaries together with opportunities for promotion are very appealing factors. According to statistics, urban hospitals and clinics offer higher financial rewards and incentives than rural hospitals (Ashmore, 2013). Medical students might find this very appealing. By implication, higher

standards of living and quality of life are offered by an urban setting, which makes it more appealing than the rural areas. A higher standard of living and quality of life are not results of a better income only, as safety of the family and an environment marked by less crime and violence also creates better living conditions (De Vries *et al.* 2010; Rasool, Botha & Bisschoff, 2012). Standard of living serves as a pull factor in the sense that it draws individuals to areas that offer a better quality of life and higher standard of living. This is not necessarily true for all individuals in all situations but it can certainly be a factor that pushes medical practitioners from one area to another. The lack of opportunities for promotion in rural areas and better work opportunities in the urban areas force medical practitioners to make a decision (Lehmann *et al*., 2008). Thus highly skilled medical practitioners feel compelled to leave rural areas for better opportunities in urban areas. Urban areas also have more work opportunities for spouses. The economic instability experienced in South Africa makes it even more difficult to stay in rural areas, given that urban areas currently provide a greater measure of certainty and security (Lehmann *et al*., 2008).

2.2.2   Work context

South Africa struggles with the shortage of competent staff in healthcare facilities (Frenk, *et al.,* 2010; Lehmann *et al.,* 2008). The inefficiency of under skilled staff and the general shortage of personnel in rural areas result in exceptionally long working hours to serve all the people in need (Padarath *et al*., 2003). In contrast, urban hospitals are equipped with more staff and better skilled staff which reduces working hours for medical practitioners (Ashmore, 2013). However, a study by Couper *et al*. (2007) contrastingly revealed that some rural hospitals are well equipped with competent staff, support from management and experienced medical practitioners, and are well-functioning hospitals that provide excellent health care. This however, is not true for all rural hospitals.

Medical students indicated that it is extremely important to provide patients with excellent care; something that is not always possible in rural hospitals due to the lack of resources and personnel. That is why urban hospitals with sufficient staff and resources are preferred (Girasek *et al.,* 2010). Female medical practitioners often prefer a more flexible career path for reasons such as spending more time with the family when children are still young or to give more time and attention to family-related matters (Frenk *et al*., 2010). This results in the unwillingness of female medical students to choose a rural practice. This need for a more flexible career path could also influence female medical students' decisions. A flexible career path is much more associated with urban practice. The argument here is that urban medical practitioners are more likely to rate professional development high, thus they would rather choose urban practice. Consequently it is not necessarily the nature of rural areas that serves as a kind of push factor, but rather the need to specialise that pulls towards the urban area. However, this does not imply that those medical practitioners practising in rural area are not interested in career development. The need is just not strong enough to pull them towards urban areas (Reid*, et al*., 2011). In a study conducted by Daniels-Felix, *et al*. (2015), the majority of medical students rated the acquisition of clinical skills, procedure skills, and tutoring very high. It was also the perception of these students that these skills are more likely to be obtained in an urban setting.

2.2.3   Social work context

Urban hospitals and clinics employ highly skilled general practitioners and specialists that provide guidance and mentorship to younger medical practitioners in a team setting (Ashmore, 2013). A study by Girasek *et al*. (2010) found that medical students are reluctant to make decisions under pressure. This is the result of medical students considering themselves still too inexperienced to make the correct decision, especially when under pressure. In the study conducted by Daniels-Felix *et al.,* (2015) medical students

rated social support fairly high and had the perception that urban settings can offer more social support than rural settings. In urban settings this is less of an issue because there is sufficient support and coaching. The availability of highly skilled professionals as colleagues who can serve as mentors in urban areas is another aspect that serves as a pull factor (Cooke *et al*., 2011; Lehmann *et al.,* 2008). This factor also influences medical students' intention to choose urban practice. Apart from the need for coaching and mentorship, individual factors such as origin, age, gender, marital status, and personal characteristics play a major role in the choice of urban practice. For women, marriage and family considerations take preference and for men economic consideration play a role in considering urban practice (Cooke *et al*., 2011). Interestingly, a study by Reid *et al.,* (2011) indicated that factors such as family, career, and professional development seem to have much more weight for urban individuals than for rural individuals. This, to a certain extent explains why there is a tendency to migrate from rural to urban areas. It cannot be assumed, though, that these factors are not important at all for rural individuals.

2.2.4   Work itself

In terms of work itself, the deteriorating effect of HIV/AIDS on healthcare workers who contract this disease is another personal reason that discourages medical students from choosing a rural setting. The prevalence of HIV/AIDS among medical practitioners is higher in rural than urban areas.   These practitioners are not safeguarded against the terrible effects this disease has on sufferers and their families.   According to Lehmann *et al*. (2008) HIV/AIDS is a prominent issue among healthcare professionals, especially in lower income countries with large rural areas. The reality of HIV/AIDS is a threat to work itself. Medical practitioners and medical students work with these patients as part of their practical training and are exposed to many such diseases. Urban medical practitioners are less exposed to serious pathology because of better socio-economic conditions (Ashmore, 2013).   These types of

circumstances can influence a medical practitioners' intention to make certain decision concerning living conditions.

In summary, urban areas are marked as presenting relatively adequate rewards and incentives. The work context and social context related to the work environment also offer opportunities for personal growth and development. Promotion and work itself are also simplified by the often greater availability of staff, resources, and equipment. In the next section, rural areas are discussed using the same categories as in the current section to draw a comparison between the two areas.

2.3   An overview of medical practice in rural areas

The section above shed light on the dynamics of urban areas. This section provides a discussion of the factors that explain why medical practitioners prefer rural areas or do not. When medical students were asked which area, urban or rural, is the most difficult to work in, the majority identified the rural area (Aydin, Yaris, Dikici & Igde, 2015). A strong perception exists that working in a rural area is difficult. It is important to explore such a perception.

2.3.1   The rural environment in general

In rural areas four issues are at hand. The first issue is that it is difficult to access healthcare because not all people in rural areas live in towns close to hospitals and clinics. People often have to travel long distances to obtain healthcare; especially when one is ill and in need of treatment, travelling is not ideal. A second issue concerns the fact that apart from the cost of the treatment and medication, travelling also has a cost implication. The third issue is that human resources cannot use the same strategies in a rural area as in urban areas for the circumstances are very different and require more skilled staff. This again

is a concern because, if the health system in a rural area is poor because of all the factors mentioned already, why would human resource managers be interested in working in rural areas? The fourth issue is that people living in rural areas are poorer and in poorer health than in urban area. In the light of these issues it is understandable that medical students consider rural areas as a challenging environment to work in. This perception influences the intentions of medical students and medical practitioners with regard to willingly choosing rural practice (Cooke et al., 2011).

The categories used to explore urban areas as researched by Ashmore (2013) will now be used to further explore rural settings.

2.3.2   Work context

General labour relations, management styles and leadership, opportunities for growth and personal development, resources and equipment, and the availability of infrastructure are factors that influence the *work context* of rural medical practitioners. Results of a study by Couper *et al.* (2007) showed that the work context of medical practitioners played an important role in the intention to stay in a rural area or choosing a rural area to practice in. A general concern in rural areas is the fact that rural healthcare institutions are often marked by a lack of resources, which is one of the many factors that make working conditions in such a work environment very difficult. Limited career opportunities are another concern (Lehmann *et al.*, 2008). In the study conducted by Bailey *et al*. (2012) three out of four medical students indicated that they aspired to start postgraduate training. Supporting this fact, a study by Aydi *et al*. (2015) indicated that 97.6% of medical students considered further studies as a priority. The desire to specialise is a reason why medical students often prefer to not serve in rural areas. The location of the practice is not the only factor that influences students' choice to engage in postgraduate training. A study by De Vries *et al*. (2010) identified other important factors. Family planning, hours spent in the practice

and the intellectual challenge have been rated as the most important factors influencing further studies. De Vries *et al*. (2010) suggest that medical students need to be intellectually stimulated. If rural hospitals would grant the prospect of further studies while practising, medical practitioners may intend to choose a rural practice. The promise of opportunities for continued professional development in rural areas would be a motivating factor to practise in such areas (Wilson, *et al.,* 2009).

Graduates are often placed in rural areas for internships to solve the issue of understaffing and the shortage of medical practitioners (Palmer, 2006). However, these graduates feel that they are too inexperienced to handle difficult and challenging situations without supervision (Bailey *et al*., 2012). This feeling among medical students is not unexpected, but Frenk *et al*. (2010) argue that medical students should be able to absorb large amounts of information in a short period of time and use this information to make sound decisions. The knowledge and competencies gained in medical school must be applied to process information in a clinical setting in such a manner that solutions to unfamiliar problems are found.

Compulsory skills for rural medical practitioners are excellent organisational and communications skills. Rural medical practitioners often need to be driven team leaders of healthcare professionals in the hospital setting, but in the consulting room these medical practitioners still need to show compassion and empathy. As a result of the lack of resources, medical practitioners themselves need to be resourceful to keep providing quality care to patients. Medical practitioners need a vision to serve each and every patient. Flexibility is an essential characteristic that is necessary in the dual roles medical practitioners need to take up, (Cooke *et al*., 2011). Should medical practitioners want to develop their competencies and gain new skills, the rural environment is not such a bad choice. This need for personal and professional development on a level other than the academic level might influence medical students to choose a rural practice.

2.3.3   Social work context

As part of the social work environment, mentoring and guidance is a great need but the lack of personnel at hospitals and clinics makes it very difficult for medical students to see themselves doing the basic medical work and coaching inexperienced medical colleagues at the same time (Girasek *et al*., 2010). However, Doherthy *et al*. (2013) assert that medical students, who are trained to be clinical leaders, as discussed earlier, will be able to take on the role of mentor and teacher. In demonstrating these leadership skills in the work environment, other individuals may learn from the example. Along with the general high workload attending to large numbers of patients there are the additional administration duties because of the maldistribution of trained staff and lack of personnel. This allows medical practitioners even less time to spend with patients. The substandard working conditions together with poor living conditions and the lack of proper housing all add up to influence medical students to be unwillingly to choose rural areas where the need of healthcare is greater (Palmer, 2006). The problems around availability of proper schooling for children and accessibility of transportation are further concerns. Should the living conditions and the social environment be improved, medical students might consider choosing to work in rural areas (De Vries *et al*., 2010; Girasek *et al*., 2010). In contrast, a study by Tolhurst *Adams and Stewart* (2006) found that lifestyle preference, and leisure interests influenced the choice of rural practice in a positive manner. Some medical students indicated that rural areas seem to provide an environment where one could have a relaxed life. Outdoor activities and leisure activities are attractive features for individuals who enjoy such a lifestyle. Close social relationships are also at play and include relationships with colleagues and the extended family. Good and satisfying relationships with colleagues are essential and it, to some extent, is expected to be easy to form these types of relationships because medical practitioners work closer together in rural areas because there is less staff (Couper *et al*., 2007). Young medical practitioners can learn from older more experienced seniors and can, in turn, become the role models for newcomers such as interns and young medical practitioners. When

meaningful relationships can be built with individuals in the community as well as at work it serves as a motivating factor in favour of rural practices. The opportunity for the extended family to build meaningful relationships is another motivating factor. To a certain extent these factors are linked to the subjective norms factor of the Fishbein model. The Fishbein model explains the intention to act through the influence of attitude and social norms. This model is discussed in a later section of the study. Communities uphold certain standards in social interaction and relationships which can be adhered to if medical practitioners and their families live in a rural community where such relationships can develop (Tiliopoulos, Pallier & Coxon, 2010).

2.3.4   Work itself

In terms of work itself, the lack of resources and equipment in rural areas together with a lack of appreciation may contribute to low levels of job satisfaction which makes urban pull factors such as salaries and opportunities for promotion even more appealing. In rural areas, general practitioners often need to operate outside their scope of practice, which has certain ethical implications. In the rural context these medical practitioners are compelled to serve patients who may need specialist care because the lack of specialists in rural areas (Wilson *et al*., 2009). Thus rural medical practitioners need to be multi-skilled to function optimally in these settings. Rural medical practitioners need to possess a lot of general skills across different disciplines including, amongst others, psychiatry, surgery and paediatrics (Reid, 2011). Rural medical practitioners gain exposure on a completely different level. This diversity in the work contributes to job satisfaction in the sense that work is a challenge and new skills and competencies are developed (Couper *et al.,* 2007). According to Manahan, Hardy, and Macleod (2009), rural medical practitioners usually exhibit attributes such as flexibility, independence, self-confidence, resourcefulness, and the ability to be cope with ambiguity. Should medical students have these attributes the choice to

practice in rural area might not be that difficult. Couper *et al*. (2007) describe rural patients as less demanding, approachable, and appreciative. These patients, in contrast to urban patients, do not have the money to go to specialists. They appreciate any help they can get. This, in turn, contributes to job satisfaction.

2.3.5 Rewards and incentives

Sufficient rewards and incentives will serve as push and pull factors if individuals not only receive higher salaries for working in rural areas but also have the opportunity to enjoy a lifestyle that differs from life in the urban areas. It is suggested that a comprehensive system should be developed to combine financial and non-financial factors (Girasek *et al*., 2010). Incentives should form a package and not a single attracting factor. Financial incentives are certainly an important factor to motivate and reward medical practitioners working in rural areas. Rural allowances and the possibility of sabbatical leave for rural medical practitioners will serve as extra motivation. However, financial compensation alone was not enough to motivate medical practitioners to consider rural practice, although it had some influence (Wilson *et al*., 2009). Increasing the number of days of leave could add to better quality of life for these medical practitioners who work long hours under immense pressure (Rasool *et al.,* 2012). The possibility of bursaries and scholarships does encourage medical students to consider rural practice (Wilson *et al*., 2009).

From the research results mentioned above, it seems that individuals are sceptical about rural practice. Aydin, *et al*. (2015), conducted a study to investigate the anxiety levels of students working in rural areas, as well as the causes thereof. Students who came from a rural background experienced significantly lower levels of anxiety about choosing rural practice. Anxiety can thus be a factor that influences the intention to choose rural practice. This study revealed that only 14.2% of the participants would want to work in a

rural practice, but what was interesting was that 78.7% of the participants indicated that rural areas are prestigious locations to work at. This contradictory result may indicate that students see it as heroic to work in a rural area despite the circumstances and thus regard it as more prestigious, in spite of only 14.2% indicating that they would want to work there. In general males are more likely than females to be willing to practise in a rural area on account of the conditions experienced in rural areas (Wilson *et al*., 2009).

2.3.6   The rural environment as an opportunity for medical students

In contrast to all the valid statements presented in this section, Reid (2011) argues that rural areas provide valuable opportunities for medical students to develop their skills through activities in a clinical environment because it presents so many challenges. There is also less competition for attention, thus more opportunities to learn from more experienced medical practitioners. Rural practice allows individuals to spend more time with family and friends because less time is spent in travelling to and from work (Couper, 2007). This is in contrast to studies that indicate that the general shortage of personnel and incompetence of staff in rural areas result in very long working hours, which means less time with the family (Padarath *et al.,* 2003). However, an association that attends to the needs of rural medical practitioners as well as the rural population in need of medical services has been established in South Africa. The Rural Doctors Association of South Africa (RuDASA) is a network of professionals from rural facilities and tertiary type of rural health centres across South Africa. The aim of this organisation is to provide skilled and adequate staffing in rural areas, as well as opportunities for training and development for medical students aspiring to work in rural South Africa. Members of this association are encouraged to share experiences and ideas, challenges and concerns, and to promote rural health in South Africa. The association does not exist for the comfort and support of the members only, but aims to serve the greater

South Africa. This is done in collaboration with partner organisations and this creates public awareness of the challenges and rewards of working in rural South Africa.

A study by Bailey *et al*. (2012) interestingly revealed that seven out of eight medical students indicated that they would prefer to first get hands-on experience through working in rural hospitals. This contrasts with facts and perceptions that rural practice is too challenging and not recommended. The student respondents in this research provided a further four reasons for preferring rural areas. Their reasons link up with those proposed by Lehmann *et al.* (2008). A first and very significant reason is the need for actively improving general healthcare in the rural areas and hospitals. Secondly, some individuals see this type of environment as a challenge and motivating factor. Thirdly, the association and contact with the local community provides unique opportunities to make a difference. The last reason is that it also serves as an opportunity to grow personally and to even get hospital management experience, something that will rarely happen in the large urban hospitals. There is hope in the fact that a study by De Vries and Reid (2007) indicated that 47% of medical students from eight South African Universities who participated in the particular study intend to serve in rural areas. Despite the factors mentioned above, the question arises as to what makes these students consider rural areas?

Rural background might be a factor. McGrail *et al.* (2011) conducted a study that investigated the link between rural background and individuals who choose to work in rural areas. Results indicated a strong association between individuals who had a rural upbringing and individuals who return to rural areas. Wilson *et al*, (2009) and Daniels-Felix *et al*. (2015) also reported that rural background played a major role in motivating medical students to return to rural areas. In a recent study by Daniels-Felix *et al*. (2015) more than 50% of students who had a rural background indicated that they would choose a rural practice. The reason might be that these students had a more realistic idea of what living in rural areas entail. According to Doherthy *et al*. (2013) medical students who obtained a qualification at an institution that values practical training in a rural area and that positively cares for rural development are much more

likely to return to rural areas, with the reason being that students have a better understanding of the needs of the rural communities and how to provide healthcare that will meet these needs.

Studies by De Vries and Reid (2003), Lehmann *et al*. (2008), Rourke (2010) and Serneels *et al*. (2010) also confirmed that the medical student with a rural background was more likely to return to a rural area than their urban counterparts. According to Moodley, Wolvaardt, Louw and Hugo (2014), the intention to work in rural South Africa was greater when medical students originally came from rural areas.

It is clear from these studies that medical students are likely to return to rural communities if they had a rural upbringing. An important fact to consider is that it is often very difficult for learners coming from a rural background to get into medical school and to afford the education. Continued support from medical schools as well as governments is needed to overcome these barriers that hinder individuals from rural communities to get into medical schools (Lehmann *et al*., 2008; Reid & Cakwe, 2011; Serneels *et al*., 2010). An innovative solution to this problem would be to take the responsibility to select learners with potential and to let the community invest in them by paying for their studies. After completion of studies graduates can return to serve in the communities they come from (Frenk *et al*., 2010). However, it is not always easy for students coming from a rural background to study medicine (Diab, Flack, Mabuza, & Moolman, 2015). These students coming from rural areas firstly have to adapt to an urban environment and then cope with the stress of starting a degree. The second issue is that of the language of instruction at universities. These students have to study in a language that is not necessarily their mother tongue. A third issue is that of technology. Most universities in South Africa make use of technology in different ways and students with a rural origin often have had no exposure to technology on the level used at universities. A fourth issue involves coping with the personal and emotional stress of adapting to a new environment and leaving home for the first time. Such students find themselves far from their support systems and familiar environment. A fifth issue is financial considerations, which add to their stress levels. Some or even most of these students receive bursaries, but finances remain an extra burden. High levels

of anxiety are common when young individuals leave home to pursue their studies, even more so for rural students facing the novelties of an urban area.

The size of the community in which rural medical practitioners were brought up has little influence on the choice to return to such a rural community. This notion is supported by results from a South African study in which eight South African Universities took part in. The study was conducted by De Vries *et al*. (2010) with the aim to determine whether rural background had an effect on the career plans of medical students. All of the 846 participants were South African citizens; 50% originated from the city, 30% grew up in small towns, and 20% came from rural areas. Nearly 41% of these students indicated that private practice would be a career choice. Students who originated from rural areas indicated that rural practice was the preferred option.

The Department of Health in KwaZulu-Natal has adopted a policy on Community Service Officers that could serve as an example for the whole country. The aim of the policy is to encourage medical practitioners, including medical students, to remain in rural areas. The policy included a two-week orientation programme, guidelines for proper accommodation for medical practitioners, training and development, supervision and mentorship, all serving as pull factors (Cooke *et al.*, 2011). When medical students had the opportunity to experience rural health care during the undergraduate studies, these students were more likely to develop interest in rural practice. The attitudes of the students were changed and enhanced by the undergraduate rural experience. Attitude is a determinant of behavioural intention to consider and choose rural practice (Tolhurst et al., 2006). According to Daniels-Felix *et al.* (2015), medical students are more likely to choose rural practice when there is the prospect of further studies and the funding for these studies. Furthermore the availability of specialist services in rural hospitals is also a promising factor in persuading medical students to choose rural areas.

Characteristics of a medical practitioner are discussed in a subsequent section of this study, but leadership (Stoler, 2013), creativity and energy to drive change (Doherthy *et al*., 2013), resilience (Frenk *et al*., 2010), emotional intelligence, professionalism, and human resource management skills, amongst others, are essential. This is an argument that somehow turns the current picture around. It is not necessarily the rural hospitals and clinics that need to support and change the situation for the medical practitioner or medical student, but rather the medical practitioner or medical students who becomes the instruments that initiate and sustain change. It can be argued that medical students who possess these skills can and will make a difference in the workplace. It can further be argued that a medical student who has these skills may be more likely to choose a work environment where the largest difference could be made. The attitude of such a medical student would influence the intention to choose to work in a rural environment.

From this section it should be clear that many factors including perception and attitude influence medical students' decisions. The previous two sections touched briefly on human resource management and the role thereof in rural and urban areas. The following section presents the role of the industrial psychologist and human resource interventions and strategies in rural and urban areas.

2.4   The role of the industrial psychologist and human resource management in urban and rural practice

South Africa currently is faced with many challenges with regard to maldistribution of medical practitioners because of the major shortages of medical practitioners in the rural areas (Moodley *et al*., 2014). The National Department of Health evaluated current human resource needs in the national systems for health and identified four key focus areas, namely, Organisational development, Performance management, Employee Wellness and Labour Relations (Matsoso, 2014). A few proposed human resource strategies and interventions could solve problems in these key areas.

Human resource strategies and interventions have the potential to change workplace circumstances for urban and rural medical practitioners. The role of human resource management is considered such an important aspect in the systems for health that it is also included in the Annual Report of the Department of Health in South Africa. Thus, the researcher deems it an important aspect to consider and the following section presents a brief discussion of research on human resource strategies and interventions, as well as the role of the Industrial Psychologist as facilitator of these strategies and interventions. The Lancet meaningfully states that "health is all about people" (Frenk *et al*., 2010, p. 1925). In elaborating on this, Doherthy *et al*. (2013) refer to the health system as a value-based system. A significant relationship exists between patient and medical practitioner, as well as among medical practitioners as colleagues. The aim of medical practitioners and the professional team is twofold: to provide excellent healthcare and, secondly, to improve the health of the individual (Doherthy *et al*., 2013). Thus many people are indirectly linked to this chain of service delivery. The Industrial Psychologist can play a meaningful role in this process.

2.4.1   Role of the Industrial Psychologist

According to the Health Professions Council of South Africa the role of the industrial psychologist is to "plan, develop and apply paradigms, theories, models, constructs and principles of psychology to issues related to the world of work in order to understand, modify and enhance individual, group and organisational behaviour, well-being and effectiveness" (Health Professions Council of South Africa, 2011, p. 1). When considering human resource strategies and interventions, an industrial psychologist can play an important role in the implementation of the key human resource aspects as set out by the annual report. Industrial Psychologists can develop models and theories to initiate organisational development. Programmes to improve employee wellness are essential in any work context but especially in the health

sector. Furthermore Industrial psychologists can play a role in labour relations by acting as mediator or arbitrator in many labour-related disputes. The industrial psychologist can play a further role in functions such as career management and performance management. The implementation and improvement of performance management will contribute to more motivated medical practitioners.

2.4.2   Human resource strategies and interventions

Fifty-three rural specialists from the nine provinces of South Africa came together as a panel of experts to discuss challenges in the systems for health as well as solutions to these issues. Many challenges for healthcare have been identified and can be grouped under three categories, namely leadership and governance, human resource management for health and finance (Versteeg *et al*., 2013).

The first of these challenges is Leadership and governance, which includes issues such as management positions held by individuals that do not possess the necessary skills, knowledge and experience to manage a healthcare facility and the healthcare workers employed by the facility (Versteeg *et al.,* 2013). This is a situation that reveals the lack of norms needed to positively influence medical practitioners working in facilities. The attitude of managers and colleagues also has an impact on the morale in the workplace. A study by Couper *et al.* (2007) demonstrated that the style of managers in a hospital or clinic played an important part in decisions to stay or leave rural areas. Management style refers to many influencing factors such as leadership, motivational skills, organisational and personal skills and all the other factors that distinguish between positive and negative management. Should the industrial psychologist be able to change the attitude of medical practitioners despite circumstances and improve better social norms, this might influence the decision of medical practitioners to stay in rural practice. A transformation in the workplace to support medical practitioners might encourage medical students to choose rural practice and be part of the transformation.

The second challenge in human resource management concerns on the maldistribution of medical practitioners regarding urban and rural areas. The Department of Human Resource Management generally has little sense of urgency when recruiting more personnel and posts remain vacant for long periods of time (Versteeg *et al*., 2013). In this regard, Holst *et al*. (2015) refer to recruiting medical students from rural areas as an effective measure to assure returning to rural areas. Medical practitioners function under immense pressure, a situation that is worsened by lack of staff (Cooke *et al.*, 2011; Palmer, 2006). Well-developed recruitment and selection strategies (Ashmore, 2013) as well as retention programmes (Girasek *et al*., 2010) driven by committed industrial psychologists and human resource management personnel should serve as a solutions to this problem. These two strategies are discussed in a later part of this section.

Sibbald (2005) refers to three strategies for recruiting and retaining medical practitioners these are the utilitarian approaches, coercive measures and normative strategies. *Utilitarian strategies* has the aim of compensating medical practitioners for serving in underserved areas with financial rewards. *Coercive strategies* refers to strategies where a medical practitioner is placed in an underserved area for a certain period of time. This then also serves as part of the medical practitioners' training. *Normative strategies* focus more on the sense of responsibility to serve areas that are under served. The solution of recruitment and selection is complicated by the third challenge, namely finance. Budget cuts result in reluctance to recruit personnel and vacant posts are frozen because of the lack of funds to finance these posts. This is a dilemma in areas that are already underserved (Versteeg *et al.,* 2013). These challenges have no easy solutions or answers. However research by The World Health Organisation (2010) and Versteeg *et al*. (2013) propose some strategies and solutions to these challenges, while Ashmore (2013) suggests five human resource strategies and interventions through which an industrial psychologist can actively participate to solve the challenges discussed above.

The first suggestion is that management on all levels should display the required knowledge, skills and competencies, as well as management experience (Versteeg *et al*., 2013). This implies that training should be provided to fill this gap if a lack of skills and knowledge exists. In support of this recommendation, the second suggestion urges the development of a national human resource plan. There is a need for a plan that can regulate the management of human resources (Versteeg et al., 2013). Such a plan must include personal and professional development (World Health Organisation, 2010). The management of informal *training* such as through mentorship programmes and support could lead to higher retention rates (Reid & Cakwe, 2011). Career support and career planning are part of mentorship programmes and provide medical practitioners with the guarantee that their efforts are appreciated and valued (Cooke *et al*., 2011). Human resource managers can play a vital role by initiating and managing mentorship and training programmes. Doherthy *et al*. (2013) support the suggestion that continuous training has a positive effect on retention. It is furthermore suggested that career development also positively affects retention. Thus the assumption is that continuous training, support and development of career paths will increase the retention rate in rural areas. Herein the Industrial psychologist can play a major role in creating and sustaining structures in which the career of a medical practitioner can flourish.

The third suggestion is for more effort to be made through the recruitment of skilled medical practitioners, as well as the retention and support of senior medical practitioners (Lehmann *et al*., 2008; Versteeg *et al*., 2013). According to Girasek *et al*. (2010) recruitment and retention is essential to improve healthcare in rural areas. The recruitment of highly skilled professionals to rural hospitals will automatically raise the level for future appointments. In order to retain these skilled medical practitioners, satisfactory remuneration, suitable working conditions, non-financial rewards, and career development will serves as motivational factors.

Appropriate funding should be made available to support the various needs of healthcare facilities (Versteeg *et al*., 2013; World Health Organisation, 2010) and serves as the fourth suggestion. Furthermore, the provision of adequate financial and non-financial incentives will improve the morale in hospitals and clinics (Lehmann *et al*., 2008). General remuneration includes aspects of competitive salary levels, performance bonuses, allowances such as transport, and housing allowances. It is also suggested that medical practitioners should be granted the opportunity to practice privately in order to increase their basic income (Cooke *et al*., 2011). With a larger income, medical practitioners in rural areas are enabled to afford a higher standard of living and quality of life. By the improvement of basic living conditions such as suitable housing and access to the internet, the motivation of medical students to choose rural areas will be enhanced.

According to Rourke (2010), three components contribute to the effective retention of medical practitioners in the workplace. These are local authorities such as the government, the community itself and then the medical schools responsible for the training of medical students. As discussed earlier, training institutions can play a very important role in the provision of medical practitioners for rural areas (World Health Organisation, 2010).

 The fifth suggestion is that perceptions regarding rural practice can be changed for the good during the training of medical students. Attitudes displayed by these institutions can influence the perceptions and decisions of medical students and may act as a buffer to the role of personal characteristics that affect choices. The following section provides a discussion of the role of personal characteristics in choosing urban or rural practice.

2.5   The role of personal characteristics in choosing urban or rural practice

The preceding sections suggest that the urban environment in itself, like the rural areas in themselves contain push and pull factors which influence individuals to choose in favour or against working in rural areas. It has also been pointed out that the industrial psychologist can play an important role in managing these environments in order to influence the decisions of medical practitioners. However, research also highlights some interesting characteristics of medical practitioners which may have a powerful influence on medical students' intention to choose particular areas. Although some of these characteristics have been touched on in the preceding sections, this section will briefly consider these characteristics.

According to Reid *et al*. (2011), personal characteristics such as altruism, concern for others, ethical concerns, professionalism, and individualism can influence the intention to choose between urban area and rural area. Religious considerations with specific reference to Christian values urge individuals to respond to the need to serve the community. This might influence a medical student to willingly choose and area where there is a great need such as a rural area to actively serve the community. This personal motivation to reach out to the community and the opportunities to change the lives of others may influence the choice of a practice (Couper *et al.*, 2007). Medical students with a rural background strongly exhibited the above mentioned characteristics. These students indicated their awareness that returning to the rural background would provide opportunities to serve the community. This is imbedded in the knowledge of the community's support for the individual to pursue a career in medicine and that students have the opportunity to give back by serving (Couper *et al.*, 2007). The listed characteristics are strongly linked to an attitude that influences the intention of a medical student to choose an area for practice.

Couper *et al*. (2007) indicate four facilitating factors that influence the above-mentioned decision, namely the exposure to rural practice as part of medical studies, the attentiveness to needs in rural areas, the presence of positive role models and a dislike of urban areas. Dislike of urban areas is an interesting

factor. Respondents indicated that they saw the urban area as unsafe. This is contrary to other studies that indicated the perception that rural areas are unsafe (De Vries *et al*., 2010; Rasool, *et al*., 2012). It seems that perceptions play a major role in this type of opinion. Respondents also indicated a perception of urban areas as marked by a busy lifestyle and the threat of becoming very lonely because of the lack of a closely knitted community. These factors do not influence work itself but do influence the individual's decision making. Psychological factors such as openness to experience (Tolhurst *et al.*, 2006), sense of accountability (Reid *et al*., 2011), family and career orientation (De Vries *et al.*, 2010) greatly influence the choices of medical students. Apart from these very valuable attributes research identified three other characteristics of medical practitioners that positively impact the environment in which these medical practitioners operate and which will influence the choice of practice. These characteristics involve family and career orientation (De Vries *et al.*, 2010), and creativity and energy to drive change (Doherthy *et al*., 2013). According to Frenk *et al.* (2010) another four characteristics are very important, especially for rural medical practitioners, but which, in fact, apply to all medical practitioners and medical students. These characteristics are the ability the deal with uncertainty and ambiguity, which is common in the medical workplace. Being a risk taker and being a community advocate is important in treating illness and improving general health in the community. Lastly, medical practitioners need to be patient and resilient. These characteristics are essential when working in any healthcare environment. The question is whether these characteristics can be taught and learnt. A further question relates to the extent to which these characteristics and attitudes will influence a medical student's choice of rural or urban practice. The following sections will try to address these very valid questions. Maybe it is important to consider the personal characteristics such as altruism that drive medical practitioners to make certain career decisions. Altruism concerns the need to make a difference in the lives of others (Tolhurst *et al.*, 2006). According to this definition of altruism, one would assume that medical practitioners would choose areas where the need is the greatest, such as rural areas. Statistics prove that this is not the case. However, whether

working in a rural or an urban area, medical practitioners experience a sense of worth and meaning when they are helping society and can gain respect in return. These characteristics serve as motivation to keep fighting for the greater good (De Vries & Reid, 2003; Witter *et al*., 2011). Thus it can be assumed again that medical practitioners would choose an area where they can make a difference. While, rural areas seem like the most logical choice, it does not mean the medical practitioner cannot make a positive contribution in an urban area. There, these medical practitioners will also be serving society. Altruism and a sense of worthiness and meaning are not the only motivational factors that drive the decisions of medical practitioners. Other psychological mechanisms such as openness to experience (Tolhurst *et al*., 2006), sense of accountability (Reid *et al*., 2011), family and career orientation (De Vries *et al*., 2010) greatly influence the choice of medical practitioners

Uplifting the community and providing excellent care result in meaningful relationships with patients and the community.   Through this satisfying relationship medical practitioners gain recognition and appreciation in return for good service. And this contributes to more job satisfaction, a feeling of belonging and worthiness for the medical practitioner, which again serves as a motivating factor (Couper *et al*., 2007).

In the following section, motivation in decision making as explained by the Fishbein model and the impact that attitudes and social norms have on the intention to choose rural practice are discussed.

2.6   How the principles of decision making can be applied to this study

Decision making is part of our daily lives and involves decisions that are part of the normal process of living. These decisions, big or small have a meaningful effect on one's life. The researcher wanted to determine how the decision-making process works when medical students to choose between urban practice and rural practice.

In a study on consumer behaviour by Bee and Madrigal (2013) suggest that uncertainty in decision making affects emotions and behaviour. According to Schwartz (2011), medical decision making is marked by uncertainties. These uncertainties are everywhere, complex and essential for medical practitioners and aspiring medical practitioners to understand and manage. Decision making in the field of medicine is essential and the ability to make sound decisions is what distinguishes a good medical practitioner from an excellent medical practitioner. The field of consumer behaviour sheds some light on why and how decisions in general are made and this is also very applicable to medical decision making.

The general decision-making process and its influence are most simply explained by Darley, Blankson and Luethge (2010). The process starts with the recognition of a problem such as to choose between urban practice and rural practice followed by the internal and external search for information to make an informed decision. Then alternatives are assessed and a decision is made. The assessment of the alternatives is influenced by beliefs, attitudes, and intentions. At the end of the process, certain outcomes such as cognitive dissonance, satisfaction, or dissatisfaction are experiences which, again, influence beliefs, attitudes, and intentions to make similar decisions in the future. Researchers seek to explain decision making through components, models, processes, and mechanisms which are discussed below.

2.6.1   Components of decision making

Whether intuitive or rational decisions have to be made, four components are involved. According to Sadovykh, Sundaram and Piramuthu (2015), the four components in decision making are the decision maker (in the case of the study it is the medical student), the alternative choices (such as rural areas as one alternative and urban area as another), such as the cognitive process of making the decision and, lastly, the actual decision. Other components that are not taken into consideration here comprise other factors and influences such as attitudes and norms influencing the final decision as mentioned by Darley

et al. (2010). Culture can influence attitude and behaviour (Sekiguchi & Nakamura, 2011). In the case where medical students have the intention to choose between urban or rural practice, culture might also have an influence because of the cultural differences between these two areas. According to Yang and Yoo (2004), attitude has two components, namely the cognitive component and the affective component. The affective component refers to the attitude that describes the feeling towards the decision in the case of this study – the feelings held by the medical student towards rural areas. The cognitive component refers to the beliefs held by the individual. In the case of this study, the thoughts the individual harbours about rural areas. The combination of the two components results in the total attitude towards rural area or urban area.

2.6.2   Steps in the decision making process

In explaining the different views on decision making and the complexity thereof, a study by Sadovykh *et al*. (2015) presents the steps of decision making. The study examined the decision-making process through online social networks focused on health. The decision-making process consists of five steps that can be applied to decision-making situations such as choosing between rural practice and urban practice. These steps are intelligence, design, choice, implementation, and monitoring. The first step, intelligence, refers to the recognition and classification of the problem at hand such as the choice between rural and urban areas. The second step is design, which refers to the design of the alternatives, options and the possible cause of action. This part does not yet involve the actual decision, only the possibilities to get to the next step of choice. The third step is choice, which includes the solution and plan to solve the problem. The fourth step is implementation, the point at which the action is taken. The last step is monitoring, during which the decision that is taken is evaluated and analysed. Darley *et al*. (2010) tested this process in an online consumer behaviour study and found that this process is present in every day decision making.

This decision-making process can take from a few minutes up to weeks or months depending on the type and importance of the decision.

2.6.3   The theory of planned behaviour

It is clear from the above-mentioned studies that there are many theories to explain decision making and behaviour. An example of such a theory seeking to explain behaviour is the theory of planned behaviour by proposed by Ajzen and Fishbein (1972). This theory seeks to explain influence on behaviour with specific reference to motivation and information. Decision making in consumer behaviour and medicine is discussed next, in order to shed light on what influences decision making. Decision making in consumer behaviour is a widely researched concept with various influencing factors. These factors might explain what influences the decision making of medical students. According to Burchell and Patel (2013), social norms are one of these factors influencing consumer behaviour. Theories of conformity based on psychology and social psychology also explain why people would act in a particular manner. These theories explain why people often act or do something just because the majority does it. In the case of consumer behaviour people might choose to buy goods and products because the majority does. When significant others or influential individuals expect medical students to practice in a certain area it might influence their intention to act according to social norms influencing consumer behaviour. In the case of this study, medical students could be influenced by significant others that favour a certain area. A distinction can be made between *injunctive* and *descriptive norms*. *Injunctive norms* refer to moral beliefs and convictions that guide individual behaviour (Cialdini Demaine, Sagarin, Rhoads & Winter, 2006). These types of norms are usually accepted by most people. When conformation to these norms occurs, this process is called *normative group pressure* (McDonald, 2015). *Descriptive norms* refer to standards set by the majority and are not necessarily linked to moral beliefs (Cialdini *et al.,* 2006). Descriptive norms

are to a certain extent informative and are usually what is expected of a certain group. When individuals conform to this set of norms, it is called *informational social influence* (McDonald, 2015). These are all important concepts that play a role in consumer behaviour but also in general decision making. These concepts that play a role in consumer behaviour could explain intended decision making of medical students. Interestingly it is proven that the awareness of social norms starts at the age of eight to ten years (De Franca & Monteiro, 2013). It is clear from these definitions that groups subscribe to social norms and it is expected that individuals that deem themselves part of these groups conform to these norms. Should the individual belong to more than one group and the norms of these two groups are not the same or very different, *normative conflict* arises (McDonald, 2015). Should a medical practitioner need to choose between a rural or an urban area and the groups involved do not support the same social norms it can be very difficult to make the decision. It has been proved that, when the individual considers him/herself to have a lot in common with one group and truly feels part of the group, it is more likely that this individual will subscribe to the norms of that group, despite the fact that another group may follow different norms. The assumption can be made that, should medical students belong to a group that is positive toward rural practice, chances are that this individual will be more inclined to choose rural practice (McDonald, 2015).

Social norms signify pressure from the environment or other individuals to perform or refrain from some kind of behaviour (Rhodes & Courneya, 2005). According to Sekiguchi and Nakamaru (2014), social norms serve to coordinate the behaviour of an individual and also have the potential to put social constraints on the behaviour of the individual. When an individual acts on the influence of social norms, it does not mean that this behaviour reflects the attitude of the individual. This inconsistency between the behaviour influenced by social norms and by attitude can cause psychological stress for the individual. Attitude is an affective component that influences an individual's intention to act (Rhodes & Courneya, 2005), but social norms refer to common principles and opinions supported by a particular group of individuals

(Sekiguchi & Nakamaru, 2014). This implies that social norms are not necessarily principles and opinions held by everyone, but are specific to a certain group. Thus different groups supporting different social norms and the influence from the different groups can create psychological pressure for the individual. It is important to mention that, should there be discrepancy between the attitude of the individual and social norms it does not imply that an attitude change has taken place if the individual acts in coherence with the social norms (Sekiguchi & Nakamaru, 2014). A study undertaken by Sawang, Sun and Salim (2014) tested the influence of attitude, social norms, and behavioural control on behaviour regarding acceptance of technology on a group of Chinese people. Results indicate that social norms were the strongest indicator. Attitude also strongly predicted behaviour. As indicated by the results of the two studies mentioned here, it depends on the situation whether social norms or attitudes are the strongest predictor of behavioural intent.

The field of consumer behaviour shed some light on why and how decisions generally are made. Bee and Madrigal (2013) argue that intentions and emotions serve as valuable sources of information in decision making. Especially in the case where medical students need to make a decision whether to engage in rural or urban practice, an amount of uncertainty and emotion will be involved which will affect the attitude and intention to make the decision. Hope and fear are two strong emotions that affect general decision making and consumer behaviour. Hope has the promise that the decision to be made will have pleasurable outcomes and fear anticipates that the decision to be made might have less satisfying outcomes (Baumgarther & Bagozzi, 2008; MacInnis & De Mello, 2005). When medical students have hope that rural practice will have a favourable effect on their careers and family life this will influence their decision. Consequently, the existence of fear in contrast with hope will also influence the decision.

From the above it is clear that many factors – personal as well as work-related – influence medical practitioners' and medical students' decisions. Human resource management and interventions aim to manage all these factors in order to create personal and job satisfaction. Thus the following section will

deal with human resource strategies and interventions in urban and rural practice. The role of the Industrial Psychologist is also considered.

2.7   Motivation in decision making explained through the Fishbein model and the intention to act

According to Serneels *et al*. (2010), recruiting highly motivated individuals could provide solutions to get medical practitioners to rather work in rural areas. Motivation consists of two components, psychological and transactional processes. The psychological component refers to the purpose and direction of individual behaviour. The transactional component refers to the interaction between the individual and his environment (Franco, Bennett & Kanfer, 2002). Higher levels of motivation lowered the intention of leaving the healthcare facility (Bonenberger, Aikins, Akweongo & Wyss, 2014). Motivation is a very important factor in the decision to work in rural areas and is crucial in the retention of staff (George *et al*., 2013). Intrinsic and extrinsic motivation regulates behaviour and contributes to psychological wellbeing, psychological meaningfulness, and job satisfaction (Geldenhuys, Laba & Venter, 2014). Personal characteristics and values influence medical students' decision to work in rural areas (Manahan *et al*., 2009; Reid, 2011). These personal values relate to influence on the community, career development, family, and personal preference. Amongst others, personal characteristics include personal resourcefulness, flexibility, independence, confidence, and resilience. The ability to initiate and sustain healthy interpersonal relationships, and being sociable and adventurous also form part of these personal competencies. These factors refer to higher-order motivation indicating that medical practitioners will fulfil their duty for the greater good even without extrinsic rewards such as financial incentive, satisfying working conditions and other extrinsic factors.

The Fishbein model explains social behaviour with direct application in consumer behaviour (Ajzen & Fishbein, 1972). This model has the main concern of predicting intentions for behaviour, therefore this model can be used to explain and predict behaviour of medical students and their intention to practice in rural areas or in urban areas. This prediction of intentions of behaviour considers two factors, namely the attitudinal factor and the normative factor. The attitudinal factor is concerned with the individual's attitude towards certain behaviour such as a medical practitioners' or medical students' attitude towards relocating to a rural area. The normative factor is concerned with the perceived norms significant others uphold with regard to the behaviour (Vallerand et al., 1992). The normative factors would, for example, refer to the influence a medical students' family, friends of lecturers have on his decision to relocate. A student might the feel the need to work in rural areas because of an urgency to experience rural practice. However, people whose opinion the student values and respects might encourage the student to rather choose urban practice because it holds better opportunities for growth. Thus the norm regarding urban practice that is supported by others influence the intention of the student to choose rural practice. According to Reid *et al*. (2011), significant individuals referred to as role models or mentors had an influence on the career choice of students. When the influence was strong enough, it could motivate students, or a medical practitioner for that matter, to choose a particular area of practice. In a study by Reid *et al.,* 2011 close to half of the respondents indicated that significant others influence their decisions. These significant others could include parents, spouses, lecturers. A study by Couper *et al*. (2007) indicated that role models positively influenced individuals to either choose rural areas or to return to stay in rural areas. Consequently the decisions to work in a rural or an urban area are not solely based on personal factors such as personality or external factors such as location, but social factors also play a role. According to McDonald (2015, p. 147) "social norms are the foundation of culture, of language, of social interaction, cuisine, love, marriage, play, prejudice, economic exchange, and traffic control. A social norm is an expectation about appropriate behaviour that occurs in a group context". Hogg and Reid (2006)

indicate that attitude and behaviour are influenced by social norms, but this is in contrast to what the Fishbein model demonstrates. According to Fishbein, attitude and social norms both influence behaviour.

It is clear that these two factors will influence the intentions of the individual to engage in particular behaviour in particular situations. However, it is important to note that the attitudinal factor and the normative factor serve as determinants of intention. The strength of the relationship between the intention and the behaviour will determine whether the individual will engage in the behaviour. Thus intentions have a mediating effect on behaviour. This mediating role is more noticeable when there is a very strong relationship between the intensions and the behaviour. This mediating effect will later be explained in more detail. The attitudinal factor and the normative factor in turn have a mediating effect on other external variables. This means that, if an external variable has a strong influence on either the attitudinal or the normative factor and that factor has a significant weight, that variable will also have an effect on the prediction of intention (Ajzen & Fishbein, 1972). The following figure (Figure 2.2) graphically demonstrates the theory of reasoned action and moral behaviour.
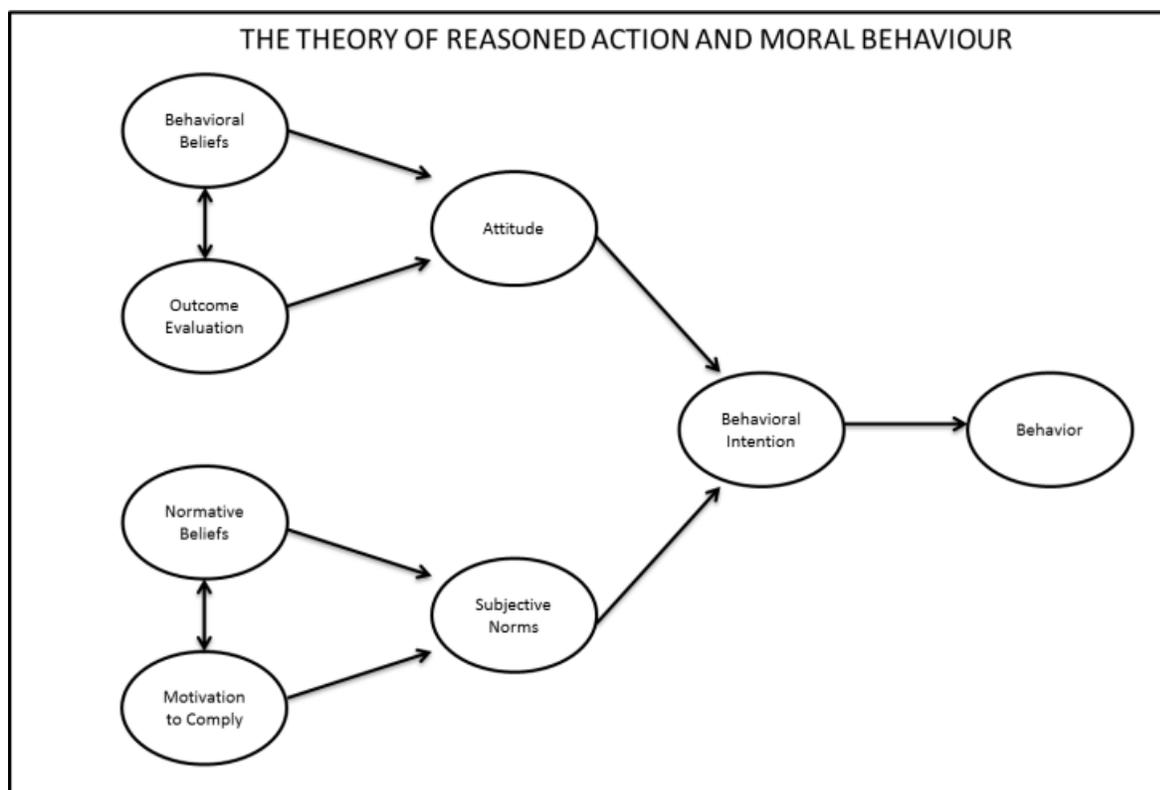
Figure 2.2: **Fishbein model. Adapted from Vallerand, Cuerrier, Cuerrier, Pelletier, & Mongeau, 1992, p 103.**

The figure presents a graphic view of the model explained in the formula. Fishbein's model does not focus attention on the attitude towards certain behaviour as the primary cause of the behaviour only; the model rather looks at the attitudes towards the behaviour to be performed and at subjective norms governing the behaviour.

It furthermore is important to note that the weight of the two factors, namely attitude and social norms, also play a role in the prediction of intended behaviour. The intensity of the attitude or the magnitude of the norms supported by significant others have an effect on the individual that will influence intended behaviour.

 The model is expressed through the following formula:

$B \approx BI = [Aact]\omega0 + [NB(Mc)]\omega1.$

B refers to the behaviour of the individual, whereas BI refers to the behavioural intentions. *Aact* indicates the individual's attitude towards the behaviour and *NB* refers to the normative beliefs of the individual – what is expected behaviour in specific situations. *Mc* symbolises the individual's motivation to comply with the set norms. In the formula, *NB(Mc)* does not merely refer to social norms; it refers to specific expected behaviour by the individual in a very specific situation. According to Ajzen and Fishbein (1972), there is plenty of information on the attitudinal component (*Aact*) of this model but there is a lack of information on the normative component *NB(Mc)*. $\omega 0$ and $\omega 1$ represent the indication of the weight assigned to the attitudinal factor and the normative factor (Ajzen & Fishbein, 1972). In other words *B = Overt behaviour; BI = Behaviour intention; Aact = attitude towards the act; NB = Normative belief; Mc = Motivation to comply with the normative belief; and w_0 and w_1 are empirically determined weights.* These weights are determined by the given situation, behaviour and individual involved.

Fishbein's model does not focus attention on the attitude towards certain behaviour as the primary cause of the behaviour only; the model rather looks at the attitudes towards the behaviour to be performed and subjective norms affecting the behaviour.

In Table2.1, the Fishbein model is explained by using examples from a study by Tolhurst *et al*. (2006). This study focussed on issues affecting the choice of rural practice of students from a rural background. The results of this study will be used as practical examples as displayed in Table 2.1 to explain the Fishbein model.

Table 2.1

Practical Application of The Fishbein Model

FISHBEIN MODEL COMPONENTS	DEFINITION / EXPLANATION	INFLUENCED BY	PRACTICAL EXAMPLE
Behaviour (*B*)	Actual task to be performed, actions to be taken or decision to be made (Ajzen & Fishbein 1972).	Behavioural intention	Students would finally choose the location of practice but this choice (behaviour) was influenced by certain factors that influenced their intention to act (Tolhurst et al., 2006).
Behavioural intention (*BI*)	The intention to perform a task, take action or make a decision (Ajzen & Fishbein, 1972).	Attitude and subjective norms	
Attitude (*Aact*)	Certain values held by the individual towards someone or something (Ajzen & Fishbein, 1972).	Behavioural beliefs and evaluation of the outcomes	Medical practitioners' attitude is influenced by: values; work interest - to remain a general practitioner or to specialise; life experience - seeking the comfort of urban settings or the thrill of a new experience in a rural setting); altruism, openness to experience; personal interest; previous rural experiences (Tolhurst et al., 2006).
Subjective norms *NB(MC)*	Certain standards and opinions held by society or significant others towards someone or something (Ajzen & Fishbein, 1972)	Normative beliefs and the motivation to comply	Social norms are influenced by: Close social relationships with family and friends; size of the community; role models; the University's attitude towards rural settings (comply with norms of institution) (Tolhurst et al., 2006).

From the literature discussed above it is clear that many factors influence students and or medical practitioners in choosing between rural practice and urban practice. It seems like certain concrete factors such as the work environment, remuneration and family considerations play a role, but on a more personal level motivation and personality attributes also affects considering rural practice.

The methodology followed for this research is discussed in the following section will discuss to facilitate

better insight into the concepts and ideas discussed in the previous sections.

CHAPTER THREE: METHODOLOGY

The research problem and the theoretical and empirical objectives for the study are discussed in this section. The preceding sections have shown that shortages of medical practitioners exist and these shortages affect the country, especially rural South Africa. The literature as discussed reveal possible reasons for and the roots of this situation. Research by Cooke *et al.* (2011); Frenk *et al.* (2010); and Girasek *et al*. (2010) indicated that medical students generally are less likely to choose a rural area after completing their studies and this led to the question initiating the current research study as to why medical students at the outset of their career vary with regard to intention to practice in a rural area in South Africa. The aim of this research study thus was to develop and empirically test an explanatory structural model aimed at explaining variance in medical students' intention to practise in rural areas as opposed to practising in urban areas at the outset of their careers as general practitioners. Assisted by the theories presented in the foregoing literature review, a possible explanation for the choices of medical students was developed on the basis of the Fishbein model of reasoned action.

3.1   Research problem

The overarching research problem is the question whether the Fishbein model as depicted in Figure 2.2, when applied to medical students, provides a valid description of the psychological mechanism that determines the strength of the intention of medical students to practise in rural areas at the outset of their careers.

3.2   Substantive research hypotheses

The overarching substantive hypothesis (hypothesis 1a) that was derived from the literature study was that the Fishbein model as depicted in Figure 2.2, when applied to medical students, provides a valid description of the psychological mechanism that determines the strength of the intention of medical students to practise in rural areas at the outset of their careers as well as (hypothesis 1b) their intention to practise in urban areas. This overarching substantive research hypothesis was dissected into the following two path-specific substantive hypotheses:

Hypothesis 2a: Medical student's attitude towards practising in rural areas (X_1) significantly explains unique variance in their intention to practise in rural areas (Y_1) that is not explained by their social or subjective norm towards practising in rural area (X_2).

Hypothesis 2b: Medical students' attitude towards practising in urban areas (X_3) significantly explains unique variance in their intention to practise in urban areas (Y_2) that is not explained by their social or subjective norm towards practising in urban area (X_4).

Hypothesis 3a: Medical students' social or subjective norm towards practising in rural areas (X_2) significantly explains unique variance in their intention to practise in rural areas (Y_1) that is not explained by their attitude towards practising in rural area (X_1).

Hypothesis 3b: Medical students' social or subjective norm towards practising in urban areas (X_4) significantly explains unique variance in their intention to practise in urban areas (Y_2) that is not explained by their attitude towards practising in rural area (X_3).

3.3   Research design

An *ex post facto* correlation design was used to empirically test the theoretical model to explain medical students' intention to make a decision to practise in an urban or rural area. According to Simon and Goes (2014), this design is suitable in situations where experimental research designs cannot be used but where relationships between a number of independent variables and dependent variables are to be examined. This type of research design is appropriate if the exogenous latent variables in the model cannot be experimentally manipulated. The existing levels of the exogenous latent variables have already been determined (hence the term *ex post facto*) and could only be observed by the researcher through measurement. In the case of this study of medical students' attitude towards practising in rural areas, the subjective norm that they perceive and the strength of their intention to practise in a rural area have already been determined. Thus the researcher had no control over or influence on the exogenous latent variables. Research subjects (n) were not assigned to designated groups or categories and no control group was needed as in true experimental designs. This type of design has only a few limitations such as the fact that random assignment is not possible, which has the effect that research subjects might be very similar in nature, which leads to the second limitation that generalisation of results are restricted because research subjects could be very similar.

The *ex post facto* correlational design is shown in Figure 3.1a and Figure 3.1b.

$$[X_{11}] \qquad [X_{12}] \qquad [Y_{11}]$$
$$[X_{21}] \qquad [X_{22}] \qquad [Y_{21}]$$
$$[X_{31}] \qquad [X_{32}] \qquad [Y_{31}]$$
$$\vdots \qquad\qquad \vdots \qquad\qquad \vdots$$
$$[X_{i1}] \qquad [X_{i2}] \qquad [Y_{i1}]$$
$$\vdots \qquad\qquad \vdots \qquad\qquad \vdots$$
$$[X_{n1}] \qquad [X_{n2}] \qquad [Y_{n1}]$$

Figure 3.1a: Ex post facto **correlational design used to test the Fishbein model with intention to practise in rural areas as the dependent variable**

$$[X_{12}] \quad [X_{13}] \quad [Y_{12}]$$
$$[X_{22}] \quad [X_{23}] \quad [Y_{22}]$$
$$[X_{32}] \quad [X_{33}] \quad [Y_{32}]$$
$$\vdots \qquad\quad \vdots \qquad\quad \vdots$$
$$[X_{i2}] \quad [X_{i3}] \quad [Y_{i2}]$$
$$\vdots \qquad\quad \vdots \qquad\quad \vdots$$
$$[X_{n2}] \quad [X_{n3}] \quad [Y_{n2}]$$

Figure 3.1b: **Ex post facto correlational design used to test the Fishbein model with intention to practise in urban areas as the dependent variable**

3.3.1   Research variables

In this study, as shown in Figure 2.2 and in the research design depicted in Figure 3.1a and Figure 3.1b, a single endogenous and two exogenous latent variables were operationalised by means of a single dependent and two independent observed or indicator variables. The model depicted in Figure 2.2 was fitted twice. The endogenous latent variable was medical students' intention to practise in a rural (or an urban) area and the two exogenous latent variables were attitude towards practising in a rural (or an urban) area and social norm towards practising in a rural (or an urban) area. The two observed attitude variables represented composite scores calculated by multiplicatively combining the belief and evaluation ratings across all salient outcomes associated with practising in a rural (or an urban) area. The two observed social norm (SN) variables represented composite scores calculated by multiplicatively combining the normative belief and motivation to comply ratings associated with practising in a rural (or an urban) area across all salient reference groups.

3.3.2   Type of research

The researcher made use of research techniques namely qualitative and quantitative research. This was done in two phases. Phase one consisted of qualitative research whereby the researcher made use of semi-structured interviews. The aim of these interviews was to identify the salient outcomes that medical students naturally mobilise when reflecting on practising in rural areas of South Africa. The qualitative interviews also served to identify the salient reference groups or individuals. Phase two consisted of quantitative research whereby the researcher made use of a survey questionnaire that provided multi-indicator measures.

3.3.3   Units of analysis

For the first phase of the study a group of fifth year medical students at Stellenbosch University was interviewed to test their intention to make a decision to practice in a rural area or in an urban area. For the second phase of the study a group of fifth year medical students at Stellenbosch University completed a questionnaire testing their intention to make a decision to practice in a rural area or in an urban area.

3.3.4   Statistical hypotheses

Hypothesis 1a:

The Fishbein model as depicted in Figure 2.2, when applied to medical students, provides a valid description of the psychological mechanism that determines the strength of the intention of medical students to practice in rural areas at the outset of their careers.

H_{01a}: P^1[Att_R, SN_R; ItP_R] = 0

H_{a1a}: P[Att_Rl, SN_R; ItP_R] > 0

Hypothesis 1b:

The Fishbein model as depicted in Figure 2.2, when applied to medical students, provides a valid description of the psychological mechanism that determines the strength of the intention of medical students to practise in urban areas at the outset of their careers.

H_{01b}: P^2[Att_U, SN_U; ItP_U] = 0

H_{a1b}: P[Att_U, SN_U; ItP_U] > 0

Hypothesis 2a:

Medical students' attitude towards practising in rural areas significantly explains unique variance in their intention to practise in rural areas.

H_{02a}: β_1Att_R = 0 | β_2SN_R ≠ 0

H_{a2a}: β_1Att_R > 0 | β_2SN_R ≠ 0

Hypothesis 2b:

Medical students' attitude towards practising in urban areas significantly explains unique variance in their intention to practise in urban areas.

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[1] The symbol P is the Greek capital letter rho and denotes the multiple correlations in the parameter.
[2] The symbol P is the Greek capital letter rho and denotes the multiple correlations in the parameter.

H_{02b}: $\beta_1 Att\_U = 0 | \beta_2 SN\_U \neq 0$

H_{a2b}: $\beta_1 Att\_U > 0 | \beta_2 SN\_U \neq 0$

Hypothesis 3a:

Medical students' social or subjective norm towards practising in rural areas significantly explains unique variance in their intention to practise in rural areas.

H_{03a}: $\beta_2 SN\_R = 0 | \beta_1 Att\_Rl \neq 0$

H_{a3a}: $\beta_2 SN\_R > 0 | \beta_1 Att\_R \neq 0$

Hypothesis 3b:

Medical students' social or subjective norm towards practising in urban areas significantly explains unique variance in their intention to practise in urban areas.

H_{03b}: $\beta_2 SN\_U = 0 | \beta_1 Att\_U \neq 0$

H_{a3b}: $\beta_2 SN\_U > 0 | \beta_1 Att\_U \neq 0$

3.4   Population and sampling

This study consisted of two phases of data collection and consequently of two phases of sampling. Convenience sampling as a sub category of nonprobability sampling was used. The advantage of this sampling method is that it is easy to obtain a sample; the disadvantage, however, is that this sample is not always representative of the population, which complicates the generalisation of the results. But for the purpose of this study, convenience sampling was expected to be appropriate.

3.4.1   Data collection - Phase one:

Fifth-year medical students from Stellenbosch University were invited to participate in the first stage of the research. These medical students were interviewed by the researcher in order to obtain data on the salient outcomes that medical students spontaneously considered when reflecting on whether to practise in a rural or in an urban area. The constructs of the Fishbein model served as a guideline for interview questions.

3.4.2   Data collection - Phase two:

Fifth-year medical students (n = 209) from Stellenbosch University were invited to complete a questionnaire. This questionnaire firstly collected data on the intention of students to work in rural and the intention of students to work in urban areas after completion of their studies. The research questionnaire in addition contained questions based on the results of the prior qualitative phase aimed at measuring the attitude and social norm constructs of the Fishbein model.

3.5   Measuring instruments

The following measuring instruments were utilised for data collection:

3.5.1   Biographical questionnaire

The questionnaire gathered information regarding demographics, age, gender, home language, and race from participants. However, the researcher failed to obtain information regarding the marital status of the medical student. Consequently the reason of some of the missing values could not be explained. Some medical students did not complete questions such as whether a spouse would influence their decision to

choose a certain area. Had information regarding marital status been obtained, the missing values could have been explained clearly

3.5.2 Interview questions

Structured interview questions gathered information regarding medical students' decision to work in rural areas or in urban areas based on the Fishbein model.

3.5.3 Research survey questionnaire

The questionnaire gathered information from fifth-year medical students at Stellenbosch University regarding their intention to work in rural and in urban areas; their attitude towards practising in rural and urban areas early in their careers and the social norm governing practising in rural and urban areas. The questionnaire consisted of seven sections. Section one measured the evaluation of the salient set of outcomes identified during the qualitative data collection phase. Evaluation was measured on a 7-point horizontal graphic rating scale ranging from bad (-3) to good (+3) through the question "How good or bad are each of the following outcomes?" The items in this section of the research survey questionnaire had the following format:

Affordable accommodation

Very bad -3 -2 -1 0 +1 +2 +3 *Very good*

Sections 2 and 3 assessed the strength of the belief that practising in a rural area would result in each of the salient outcomes (Section 2) and that practising in an urban area would result in each of the salient outcomes (Section 3). Belief strength was measured on a 7-point horizontal graphic rating scale, ranging from extremely unlikely (1) to extremely likely (7) through the question "How likely are each of the

following outcomes given that you have chosen to practise in a rural/urban area in South Africa?" The

items in these two sections of the research survey questionnaire had the following format:

How likely is it that affordable accommodation can be obtained?

Extremely unlikely 1 2 3 4 5 6 7 *Extremely likely*

Sections 4 and 5 assessed the normative belief strength of the expectation held by salient reference

groups/individuals towards practising in rural (Section 4) or urban areas (Section 5) in South Africa.

Normative belief strength was measured using a 7-point horizontal graphic rating scale, ranging from

extremely opposed (1) to extremely in favour (7) through the question "How supportive/opposed are

each of the following referent groups or individuals to you practising in a rural/urban area in South

Africa?" The items in these two sections of the research survey questionnaire had the following format:

How supportive/opposed are your parents to you practicing in a rural area?

Extremely opposed 1 2 3 4 5 6 7 *Extremely in favour*

Section 6 assessed medical students' *motivation to comply* with the expectations of referent others.

Motivation to comply was measured on a 7-point horizontal graphic rating scale ranging from Not at all (-

3) to Very much (+3) through the question "How much do you want to comply with the expectations of

each of the following referent groups or individuals?" The items in this section of the research survey

questionnaire had the following format:

How much do you want to comply with the expectation of your parents?

Not at all -3 -2 -1 0 +1 +2 +*3 Very much*

Section 7 assessed behavioural intention to practise in a rural area in South Africa and in an urban area

via two single-indicator items. Behavioural intention was measured on a 7-point horizontal graphic rating

scale ranging from extremely unlikely (1) to extremely likely (7) through the question "All things

considered, how likely is it that you will choose to practise in a rural/urban area in South Africa at the

outset of your medical career?" The items in these two sections of the research survey questionnaire had

the following format:

All things considered, how likely is it that you will choose to practise in a rural/urban area in South Africa at the outset of your medical career?

Extremely unlikely 1 2 3 4 5 6 7 Extremely likely

3.6   Data collection procedure

For phase one, fifth-year medical students voluntarily took part in the study by being interviewed, after

permission had been obtained from the head of the Division of Institutional Research and Planning of

Stellenbosch University and from the Medical Faculty at Stellenbosch University. Students completed a

biographical questionnaire to provide biographical data in order to describe the sample in terms of its

biographical characteristics. For phase two, fifth-year medical students were invited to complete a

questionnaire to obtain data with regard to their *intention to practise* in a rural or in an urban area and to

measure the components of the *attitude* and *social norm* constructs. Both phases were conducted with

the consent of the participants.

3.7   Data analysis

To test the statistical hypotheses formulated in paragraph 3.4.4, *intention to practise* in a rural area (ItP_R)

was regressed onto a weighted composite of *attitude* (Att_R) and *social norm* (SN_R) and *intention to*

practise in an urban area (ItP_U) was regressed onto a weighted composite of *attitude* (Att_U) and *social*

norm (SN_U). Scores were obtained for *attitude towards practising in a rural area* (Att_R) by calculating

the sum of the multiplicative combination of the *belief that practising in a rural area* would result in each

of the salient outcomes (b_i) and the *evaluation* of each salient outcome (e_i). Scores were obtained for

attitude towards practising in an urban area (Att_U) by calculating the sum of the multiplicative combination of the belief that practising in an urban area would result in each of the salient outcomes (b_i) and the evaluation of each salient outcome (e_i).

Scores were obtained for *Social norm towards practising in a rural area* (SN_R) by calculating the sum of the multiplicative combination of the *normative belief* (Nb_i) that each referent other holds towards practising in a rural area and the *motivation to comply* with each of these expectations (Mc_i). Scores were obtained for *Social norm towards practising in an urban area* (SN_U) by calculating the sum of the multiplicative combination of the *normative belief* (Nb_i) that each referent other holds towards practising in an urban area and the *motivation to comply* with each of these expectations (Mc_i).

The two multiple regression models are expressed as follow in the parameter:

$E(ItP\_R|Att\_R; SN\_R] = \alpha + \beta_1 Att\_R + \beta_2 SN\_R$

$E(ItP\_U|Att\_U; SN\_U] = \alpha + \beta_1 Att\_U + \beta_2 SN\_U$

The statistical hypotheses that were formulated in paragraph 3.3.4 apply to these two regression models.

The two multiple regression models are expressed as follows in the sample:

$E(ItP\_R|Att\_R; SN\_R] = a + b_1 Att\_R + b_2 SN\_R$ -- [1]

$E(ItP\_Un|Att\_U; SN\_U] = a + b_1 Att\_U + b_2 SN\_U$ -- [2]

3.8   Ethical statement

As a registered student psychologist one is required to follow certain rules and guidelines set by the Health Professions Council of South Africa based on the Health Professions Act, 1974 (Act no. 56 of 1974). A

researcher is required to enter into an agreement with the research participants participating in the research prior to conducting the research. This agreement is the informed consent form. This agreement clearly stated the purpose of the research as well as the rights and responsibilities of all parties. All participants provided informed consent before they took part in the research. According to the Health Professions Council of South Africa (2006, p. 42) informed consent involves the following:

(1) *A psychologist shall use language that is reasonably understandable to the research participant concerned in obtaining his or her informed consent.*

(2) *Informed consent referred to in sub rule (1) shall be appropriately documented, and in obtaining such consent the psychologist shall –*

   (a) *inform the participant of the nature of the research;*

   (b) *inform the participant that he or she is free to participate or decline to participate in or to withdraw from the research;*

   (c) *explain the foreseeable consequences of declining or withdrawing;*

   (d) *(d) inform the participant of significant factors that may be expected to influence his or her willingness to participate (such as risks, discomfort, adverse effects or exceptions to the requirement of confidentiality);*

   (e) *explain any other matters about which the participant enquires;*

   (f) *when conducting research with a research participant such as a student or subordinate, take special care to protect such participant from the adverse consequences of declining or withdrawing from participation;*

   (g) *when research participation is a course requirement or opportunity for extra credit, give a participant the choice of equitable alternative activities; and*

   (h) *in the case of a person who is legally incapable of giving informed consent, nevertheless–*

      a. *provide an appropriate explanation;*

  b. *obtain the participant's assent; and*

  c. *obtain appropriate permission from a person legally authorised to give such*

   permission. (Health Professions Council of South Africa, 2006 p. 42)

In adhering to the above-mentioned guidelines, participants in this study were well informed before taking part in the study and informed consent was obtained before commencement of the study. Furthermore, permission to involve the students of the faculty of Medicine and Health Sciences from Stellenbosch University was obtained from the Faculty of Medicine and Health Sciences prior to conducting the research. As set out by the rules and regulations of Stellenbosch University, an application for ethical clearance was submitted to the Research Ethics Committee of Stellenbosch University. This ethical application was approved prior to the commencement of the study.

CHAPTER FOUR: RESULTS

The overarching substantive hypothesis (hypothesis 1a) that was derived from the literature study, and that was tested in the current study, was that the Fishbein model as depicted in Figure 2.2, when applied to medical students, provides a valid description of the psychological mechanism that determines the strength of the intention of medical students to practise in rural areas at the outset of their careers as well as (hypothesis 1b) their intention to practise in urban areas. This overarching substantive research hypothesis was dissected into two two-part path-specific substantive hypotheses. A sample of n = 209 fifth-year medical students from Stellenbosch University was selected to complete the composite research questionnaire. Results obtained from the statistical analyses as outlined in Chapter 3 and aimed at testing the statistical hypotheses derived from the path-specific hypotheses are presented and discussed in depth with supportive data displayed in suitable graphs, tables, and figures in Chapter 4.

To provide an overview of the composition of the sample, the results obtained on the biographical variables included in the composite research questionnaire are discussed first.

4.1   Description of the composition of the sample

A description of the research sample is important so as it allows meaningful comparison with the results obtained in other studies on the same topic. Especially if contradictory results were obtained in different studies, it becomes important to be able to explain the possibility that biographic characteristics might moderate some of the effects that have been hypothesised.

All the participants in the study were fifth-year medical students at Stellenbosch University. This implies that the decision concerning where they would eventually prefer to practise as medical practitioner, after completion of their community service year, was an imminent decision.

Of the 209 participants only 31% were male. The gender distribution for the sample is displayed in Table

4.1. The age of the participants varied from 21 (the youngest) to 32 (which was the oldest). The majority

of participants were 22 years of age. The age distribution for the sample is displayed in Table 4.2. The

most represented group comprised White medical students (40.2%) followed by Coloured medical

students (30.6%). The rest of the racial distribution was as follows: Indian (14.8%); Black (9.6%); Asian

(1.9%); Taiwanese (0.5%) and other (1.9%). The race distribution for the sample is displayed in Table 4.3.

Most of the participants were English speaking (49.8%). Other languages represented in this sample were

Zulu (5.3%); Xhosa (2.4%); Mandarin (1.9%); Sepedi (1.4%); Tshivenda (1%); Xitsonga (0.5%) and Tswana

(0.5%).

Table 4.1:

Gender Distribution of the Research Sample

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	65	31.1	31.1	31.1
	Female	144	68.9	68.9	100.0
	Total	209	100.0	100.0	

Table 4.2

Age Distribution of the Research Sample

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	21	12	5.7	5.7	5.7
	22	122	58.4	58.4	64.1
	23	50	23.9	23.9	88.0
	24	13	6.2	6.2	94.3
	25	3	1.4	1.4	95.7
	26	1	.5	.5	96.2
	27	4	1.9	1.9	98.1
	28	1	.5	.5	98.6
	29	1	.5	.5	99.0
	30	1	.5	.5	99.5
	32	1	.5	.5	100.0
	Total	209	100.0	100.0	

Table 4.3

Race Distribution of the Research Sample

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	White	84	40.2	40.2	40.2
	Coloured	64	30.6	30.6	70.8
	Black	20	9.6	9.6	80.4
	Indian	31	14.8	14.8	95.2
	Asian	4	1.9	1.9	97.1
	Mixed	1	.5	.5	97.6
	Other	4	1.9	1.9	99.5
	Taiwanese	1	.5	.5	100.0
	Total	209	100.0	100.0	

Table 4.4

Home Language Distribution of the Research Sample

	Frequency	Percent	Valid Percent	Cumulative Percent
English	104	49.8	49.8	87.1
Zulu	11	5.3	5.3	92.3
Xhosa	5	2.4	2.4	94.7
Tshivenda	2	1.0	1.0	95.7
Sepedi	3	1.4	1.4	97.1
Mandarin	4	1.9	1.9	99.0
Xitsonga	1	.5	.5	99.5
Tswana	1	.5	.5	100.0
Total	209	100.0	100.0	

The following section discusses the testing of the statistical hypotheses related to substantive hypothesis 1a and 1b, followed by a discussion of the application of the results.

4.2   Testing of the statistical hypotheses related to substantive hypothesis 1a

Substantive hypothesis 1a states that the Fishbein model as depicted in Figure 2.2, when applied to medical students, provides a valid description of the psychological mechanism that determines the

strength of the intention of medical students to practice in rural areas at the outset of their careers. Substantive hypothesis 1a therefore claims that the attitude towards practicing in a rural area (Att_R) and the perceived social norm towards practicing in a rural area (SN_R) both explain unique variance in final year medical students intention to practice in a rural area (Int_R).

4.2.1 Preliminary analyses

The overarching and path-specific substantive research hypotheses were tested by fitting a multiple regression model in which intention to practise in a rural area (Int_R) was regressed on the attitude towards practising in a rural area (Att_R) and the perceived SN towards practising in a rural area (SN_R). In interpreting the partial regression slope coefficients, the tolerance statistics and the variance inflation factor statistics[3] (Tabachnick & Fidell, 2007) it is of value to have insight into the manner in which the predictors individually correlate with the dependent variable and the manner in which the predictors individually correlate with each other. The Pearson correlations between the intention to practise in a rural area (Int_R), the attitude towards practising in a rural area (Att_R) and the perceived SN towards practising in a rural area are depicted in Table 4.6.

The correlations shown in Table 4.6 were interpreted using the guidelines provided by Guilford (cited in Tredoux & Durrheim, 2002, p. 184) on the appropriate adjectives to use when describing correlation analysis results. The Guilford convention is shown in Table 4.5.

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[3] The tolerance statistics and variance inflation factor describe the degree of multicollinearity in the predictor (Tabachnick & Fidell, 2007).

Table 4.5

Guilford Convention for Interpreting Correlation Coefficients

Absolute value of r	Interpretation
< .19	Slight; almost no relationship
.20 – .39	Low correlation; definite but small relationship
.40 – .69	Moderate correlation; substantial relationship
.70 – .89	High correlation; strong relationship
.90 – 1.00	Very high correlation; very dependable relationship

The use of the Guilford taxonomy assured consistency in the interpretation of the correlation analysis results throughout Chapter 4.

Table 4.6

Correlation Matrix: Rural Areas

		Int_R	Att_R	SN_R
Int_R	Pearson Correlation	1	.258[**]	.454[**]
	Sig. (1-tailed)		.000	.000
	N	209	208	193
Att_R	Pearson Correlation	.258[**]	1	.266[**]
	Sig. (1-tailed)	.000		.000
	N	208	208	192
SN_R	Pearson Correlation	.454[**]	.266[**]	1
	Sig. (1-tailed)	.000	.000	
	N	193	192	193

** $p < .01$

Int_R – Intention for rural area
Att_R – Attitudinal factor for rural area
SN_R – Social norms factor for rural area

A positive, statistically significant ($p < .05$) definite but small relationship was observed between medical students' intention to practise in a *rural area* (Int_R) and their *attitude towards practising in a rural area*

(Att_R), (r = .258, p < .05). The null hypothesis H_0: ρ[Int_R,Att_R,] = 0^4 is consequently rejected in favour of H_a: ρ[Int_R,Att_R,] > 0. The statistically significant (p < .05), positive but low correlation is compatible with the hypothesis that the attitude of medical students towards practising in rural areas influence their intention to choose a rural area to practise in.[5] Attitude towards practising in a rural area only explains 6.65% of the variance in intention to practise in a rural area.

A positive, statistically significant (p < .05) definite but small relationship was observed between medical students' intention to practice in a *rural area* (Int_R) and *social norms towards practising in a rural area* (SN_R), (r = .454, p < .05). The null hypothesis H_0: ρ[Int_R,SN_R,] = 0^6 is consequently rejected in favour of H_a: ρ[Int_R,SN_R,] > 0. The statistically significant (p < .05), positive but low correlation is compatible with the hypothesis that the social norms held by medical students towards practising in rural areas influence their intention to choose a rural area to practice in.[7] Social norms held towards practising in a rural area only explain 20.61% of the variance in intention to practise in a rural area. A statistically significant (p <

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[4] No formal statistical hypotheses were formulated in Chapter 3 regarding the bivariate relationships between the predictors and the dependent variable and the bivariate relationship between the predictors.

[5] The *ex post facto* nature of the correlational design that was used in the current study to investigate the substantive research hypotheses that were derived from the literature study in response to the research initiating question precludes the possibility of drawing causal conclusions from positive findings. A statistically insignificant correlation would have justified the conclusion that the attitude of medical students toward practicing in rural areas does not influence their intention to practise in a rural area. The opposite is, however, not true. A statistically significant and positive correlation only means that the two variables are systematically related and that the hypothesis that the attitude of medical students toward practising in rural areas influences their intention to practise in a rural area provides a plausible hypothesis for this relationship. The relationship could, however, also be explained in terms of a number of alternative processes/structural models that involve additional variables and no direct linkage between Int_R and Att_R.

[6] No formal statistical hypotheses were formulated in Chapter 3 regarding the bivariate relationships between the predictors and the dependent variable and the bivariate relationship between the predictors.

[7] The *ex post facto* nature of the correlational design that was used in the current study to investigate the substantive research hypotheses that were derived from the literature study in response to the research initiating question precludes the possibility of drawing causal conclusions from positive findings. A statistically insignificant correlation would have justified the conclusion that the attitude of medical students toward practising in rural areas does not influence their intention to practise in a rural area. The opposite is, however, not true. A statistically significant and positive correlation only means that the two variables are systematically related and that the hypothesis that the attitude of medical students toward practising in rural areas influence their intention to practise in a rural area provides a plausible hypothesis for this relationship. The relationship could, however, also be explained in terms of a number of alternative processes/structural models that involve additional variables and no direct linkage between Int_R and Att_R.

.05), positive but low correlation exists between *rural area* (Att_R) and *social norms* (SN_R), (r = .266, p < .05).

The sample size was n = 209. Missing values were obtained on the variable attitude towards practising in a rural area and the variable social norm towards practising in a rural area. The missing values can be explained by the fact that some participants did not answer all the questions related to these two variables. An example of such a case is when the participant did not answer the questions because the question referred to job opportunities for one's spouse and the participant was not married. In other cases concerning participants who were also not married, the question was answered referring to the fact that it was a factor that would have been considered should the participant have been married. Pairwise deletion of cases with missing values resulted in the different sample sizes associated with the three correlations reported in Table 4.6.

Pearson correlation analysis assumed a linear relationship between the variables that are correlated. To determine whether the rather modest correlations reported in Table 4.6 could have been due to a violation of this assumption a matrix scatter plot was requested via the Statistical Package for the Social Sciences (SPSS) (SPSS, 2016). The resultant matrix scatter plot is shown in Figure 4.1.
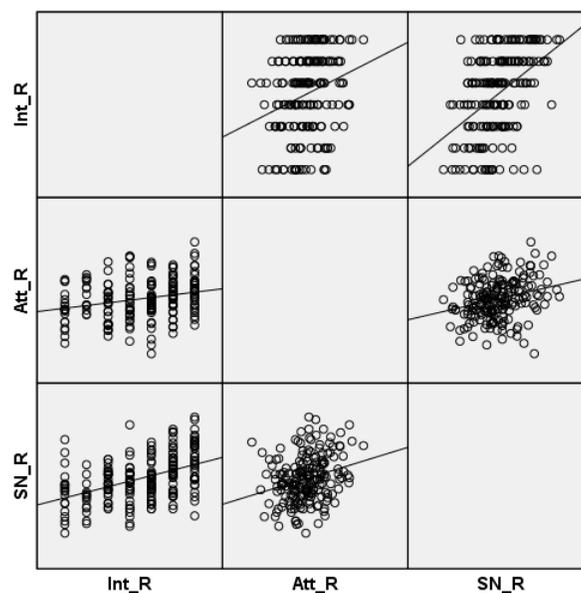
Figure 4.1: **Scatter Plot of the Relationship between Int_R, Att_R and SN_R**

Figure 4.1 echoes the message derived from Table 4.6 that Int_R, Att_R and SN_R are only moderately correlated at best. Figure 4.1 in addition suggests that the assumption that all variables are linearly related is not an unreasonable assumption.

Multiple standard regression analysis makes specific assumptions about the data being analysed (Howell, 1992; Tabachnick & Fidell, 2007). The validity and credibility of the results obtained via the regression analysis is contingent on the extent to which the data set that was analysed satisfied these assumptions. Failure to report on the extent to which the data satisfies the assumptions made by the analysis creates uncertainty and erodes confidence in the validity of the findings. The following assumptions made by multiple standard regression analysis can be identified (Howell, 1992; Tabachnick & Fidell, 2007):

- Linearity: The relationship between the dependent variable (Y) and the predictor variables (X_i) is linear;

- Normality: The residuals (Y-E[Y|Xi]) should follow a univariate normal distribution (alternatively stated, the conditional Y distributions Y|X should be distributed univariate normal);

- Homoscedasticity: the conditional variance in the residuals should be constant across values of E[Y|Xi] (alternatively stated, the conditional Y variance should be constant across values of E[Y|Xi]).

- Absence of collinearity/singularity: Predictors are individually and in combination not strongly correlated with each other;

- Absence of highly influential observations: observations/cases that exert excessive influence on the regression parameter estimates.

To identify potential influential cases, three characteristics of the observations need to be evaluated, namely the magnitude of the standardised residual for each observation; the leverage each observation has; and the influence of each observation (Tabachnick & Fidell, 2007). Observations with large standardised residuals indicate observations that are outliers that substantially fall outside the main mass of observation with regard to the Y-axis. Observations with high leverage, in turn, are observations that substantially fall outside the main mass of observation with regard to the X_i-axes. Influential observations, lastly, are observations that substantially affect the regression model parameter estimates and therefore also E[Y|X_i] when they are deleted from the data set compared to when they are left in (Howell, 1992; Tabachnick & Fidell, 2007).

To evaluate the data for the possible presence of outliers, the calculation of standardised residuals and the calculation of Mahalanobis distances for each observation, based on the fitted regression model defined by equation 1, were requested in SPSS (SPSS 23, 2016). To evaluate leverage, the calculation of the centred leverage value was requested in SPSS (SPSS, 2016). To evaluate the influence each

observation exerts on the fitted regression model, Cook's distance, the Standardised DfFit and Standardised DfBeta[s] were calculated in SPSS (SPSS, 2016).

The normal probability plot in which the expected cumulative probabilities associated with the standardised residuals, assuming normality is plotted against the actual cumulative probabilities, is shown in Figure 4.2
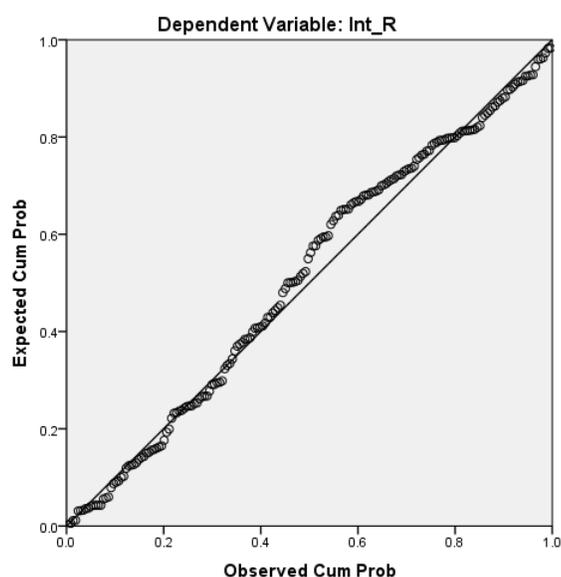
***Figure 4.2*: Normal Probability Plot for Int_R**

Figure 4.2 indicates a modest departure from the 45° reference line in the middle of the distribution. To check whether this signals a statistically significant departure from univariate normality, the null hypothesis that the standardised residuals follow a univariate normal distribution was formally tested. Table 4.7 depicts the results for the Kolmogorov Smirnov test of the null hypothesis that the standardised residuals follow a univariate normal distribution.

Table 4.7

Kolmogorov-Smirnov Test of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Standardised Residual	.087	192	.001	.983	192	.019
a. Lilliefors Significance Correction						

Table 4.7 Indicates that the null hypothesis of a univariate normal standardised residual distribution had to be rejected (p < .05). Howell (1992, p. 496) reports that moderate departures of normality in the conditional Y distributions are "tolerable".

Figure 4.3 depicts the standardised residuals plotted against the standardised weighted linear composite of Att_R and SN_R.
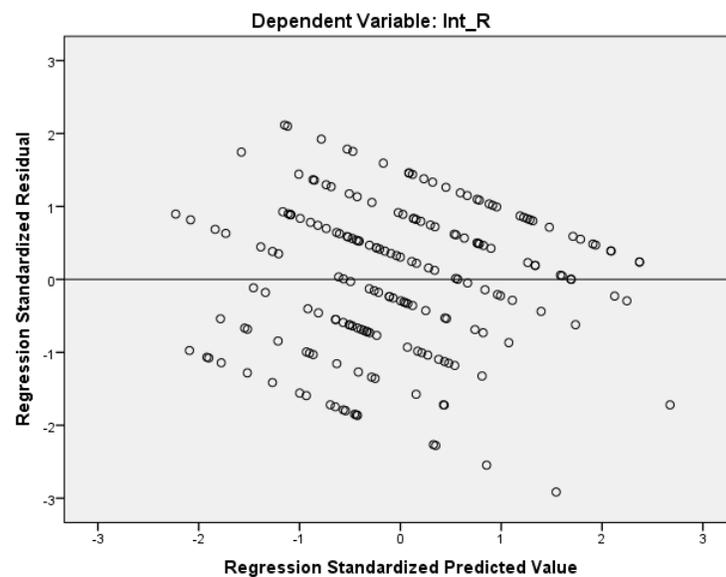
Figure 4.3: **Plot of Standardised Residuals for Int_R as Dependent Variable**

The plot of the standardised residuals was used to evaluate the linearity and homoscedasticity assumptions. The absence of a fan-like structure in the overall shape of the scatter plot indicates that the homoscedasticity assumption had been satisfactorily met. The absence of a clear curved structure in the overall shape of the scatter plot indicates that the linearity assumption had been met (Tabachnick & Fidell, 2007).

Before interpreting the results obtained from the multiple regression analysis aimed at testing path-specific hypothesis 1a, the possibility was examined that the data set contained one or more observations that exerted unduly strong influence on the regression model parameter estimates. The regression diagnostic statistics (standardised residuals, Mahanalobis distances, exceedance probability associated with the Mahanalobis distances, the centred leverage value, Cook's distance, the standardised DfFit and three standardised DfBetas (one for the intercept estimate and two for the two partial regression slope coefficients (SPSS, 2016)) are shown for all 209 cases in Appendix D.

The results depicted in Appendix D indicated no outliers, leverage cases or high influence cases. The critical cut-off values that were used are indicated at the bottom of the table in Appendix D (SPSS, 2016).

The potential problem of collinearity was examined by inspecting the correlation matrix shown in Table 4.6 and the collinearity statistics shown in Table 4.7. A low but statistically significant ($p < .05$) correlation between Att_R and SN_R (r= .266) is shown in Table 4.6. The tolerance statistic reflects the proportion of variance in each predictor that is not explained by the other predictor in the model ($1-R^2$). The large tolerance values in Table 4.7 and the small correlation between the two predictors shown in Table 4.6 suggested that multicollinearity was definitely not a problem that plagued the multiple regression analysis aimed at testing overarching hypothesis 1a and path specific hypotheses 2a and 2b.

The fitted regression model as defined by equation 1 was therefore interpreted. Listwise deletion resulted in a loss of 17 observations. The effective sample size in the regression analysis was therefore 192.

4.2.2   Testing overarching hypothesis 1a

The regression output when regressing Int_R on Att_R and SN_R is shown in Table 4.8.

Table 4.8

Multiple Standard Linear Regression of Int_R on Att_R and SN_R

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.473[a]	.223	.215	1.669

	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	151.459	2	75.729	27.184	.000[b]
	Residual	526.520	189	2.786		
	Total	677.979	191			

	Unstandardised Coefficients		Standardized Coefficients			Correlations			Collinearity Statistics	
Model	B	Std. Error	Beta	t	Sig.	Zero-order	Partial	Part	Tolerance	VIF
1 (Constant)	1.238	.461		2.686	.008					
Att_R	.007	.003	.140	2.108	.036	.251	.152	.135	.929	1.076
SN_R	.029	.005	.416	6.250	.000	.453	.414	.401	.929	1.076

Hypothesis 1a postulates that the Fishbein model as depicted in Figure 2.2, when applied to medical students, provides a valid description of the psychological mechanism that determines the strength of the intention of medical students to practise in rural areas at the outset of their careers. This overarching hypothesis translated to the statistical null hypothesis that the weighted composite of Att_R and SN_R does not statistically significantly (p > .05) explain variance in Int_R:

$$H_{01a}: P[\text{Att\_rural, SN\_rural; ItP\_rural}] = 0$$

$$H_{a1a}: P[\text{Att\_rural, SN\_rural; ItP\_rural}] > 0$$

Table 4.8 Indicates that H_{01a} could be rejected in favour of Ha1 (p < .01). The weighted composite of Att_R and SN_R does statistically significantly (p < .05) explain variance in Int_R. Table 4.8 indicates that the

weighted composite of Att_R and SN_R explains approximately 22% of the variance in intention to practise in rural areas.

The hypothesis that the Fishbein model as depicted in Figure 2.2, when applied to medical students, provides a valid description of the psychological mechanism that determines the strength of the intention of medical students to practise in rural areas at the outset of their careers therefore survived an opportunity to be falsified. In that sense support was obtained for overarching substantive hypothesis 1a.

4.2.3   Testing path-specific hypotheses 2a and 3a

Given that the regression model defined in equation 1 statistically significantly ($p < .05$) fitted the data, the two path-specific hypotheses that Att_R and SN_R each statistically significantly explains unique variance in Int_R not explained by the other predictor in the model, was tested. Path-specific hypothesis 2a that medical students' attitude towards practising in rural areas significantly explains unique variance in their intention to practice in rural areas was translated to the following statistical hypothesis (H_{a2a}):

$$H_{02a}: \beta_1 Att\_R = 0 \,|\, \beta_2 SN\_rural \neq 0$$

$$H_{a2a}: \beta_1 Att\_R > 0 \,|\, \beta_2 SN\_rural \neq 0$$

Path-specific hypothesis 3a that medical students' social or subjective norm towards practising in rural areas significantly explains unique variance in their intention to practise in rural areas.

$$H_{03a}: \beta_2 SN\_R = 0 \,|\, \beta_1 Att\_rural \neq 0$$

$$H_{a3a}: \beta_2 SN\_R > 0 \,|\, \beta_1 Att\_rural \neq 0$$

Table 4.8 Indicates that both $b_1 Att\_R$ and $b_2 SN\_R$ are statistically significant ($p < .05$) and therefore that both H_{02a} and H_{03a} can be rejected in favour of H_{a2a} and H_{a3a}. Thus attitude towards practicing in a rural

area is statistically significantly related to the intention to choose rural practice when controlling for differences in social norm. This finding is compatible with the position that the attitude of medical students towards practising in a rural area will influence their intention to choose rural areas to practise in. This finding is, however, not sufficient to make such a causal conclusion. In addition, social norm towards practising in a rural area is statistically significantly related to the intention to choose rural practise when controlling for attitude. This finding is in line with the position advocated by the Fishbein model that social the norm that is held by the medical student towards practising in rural areas will influence whether a medical student chooses a rural area to practise in. Again this finding is not sufficient to draw such a causal conclusion.

Table 4.8 interestingly indicates that the perceived social norm towards practising in a rural area is the more influential predictor of variance in intention to practise in a rural area. SN_R explained $.453^2$ = .205209 of the variance in Int_R when ignoring Att_R, whereas Att_R explained $.251^2$ = .063001 of the variance in Int_R. When controlling for the variance that Att_R explained in SN_R and in Int_R, the unique variance in SN_R not shared with Att_R, explained $.414^2$ = .171396 of the unique variance in Int_R not explained by Att_R. When controlling for the variance that SN_R explained in Att_R and in Int_R, the unique variance in Att_R not shared with SN_R, explained only $.152^2$ = .023104 of the unique variance in Int_R not explained by SN_R. When only controlling for the variance that Att_R explained in Int_R, the unique variance in SN_R not shared with Att_R explained $.401^2$ = .160801 of the total variance in Int_R. When only controlling for the variance that SN_R explained in Int_R, the unique variance in Att_R not shared with SN_R explained only $.135^2$ = .018225 of the total variance in Int_R.

4.3   Testing of the statistical hypotheses related to substantive hypothesis 1b

Substantive hypothesis 1b states that the Fishbein model as depicted in Figure 2.2, when applied to medical students, provides a valid description of the psychological mechanism that determines the strength of the intention of medical students to practice in urban areas at the outset of their careers. Substantive hypothesis 1a therefore claims that the attitude towards practicing in an urban area (Att_U) and the perceived social norm towards practicing in an urban area (SN_U) both explain unique variance in final year medical students intention to practice in an urban area (Int_U).

4.3.1   Preliminary analyses

The overarching and path-specific substantive research hypotheses were tested by fitting a multiple regression model in which intention to practise in an urban area (Int_U) was regressed on the attitude towards practising in a urban area (Att_U) and the perceived SN towards practising in an urban area (SN_U). In interpreting the partial regression slope coefficients, the tolerance statistics and the variance inflation factor statistics (Tabachnick & Fidell, 2007), it is of value to have insight into the manner in which the predictors individually correlate with the dependent variable and the manner in which the predictors individually correlate with each other. The Pearson correlations between the intention to practise in an urban area (Int_U), the attitude towards practising in an urbanl area (Att_U) and the perceived SN towards practising in an urban area are depicted in Table 4.9.

Table 4.9

Correlation Matrix: Urban Areas

		Int_U	Att_U	SN_U
Int_U	Pearson Correlation	1	.181[**]	-.091
	Sig. (1-tailed)		.005	.104
	N	208	206	195
Att_U	Pearson Correlation	.181[**]	1	.097
	Sig. (1-tailed)	.005		.088
	N	206	207	194
SN_U	Pearson Correlation	-.091	.097	1
	Sig. (1-tailed)	.104	.088	
	N	195	194	196

** p<.01

Int_U – Intention for urban area
Att_U – Attitudinal factor for urban area
SN_U – Social norms factor for urban area

A positive, statistically significant ($p < .05$) definite but small relationship was observed between medical students' intention to practise in an *urban area* (Int_U) and their *attitude towards practising in an urban area* (Att_U), ($r = .181$, $p < .05$). The null hypothesis H_0: ρ[Int_U,Att_U,] = 0[8] is consequently rejected in favour of H_a: ρ[Int_U,Att_U,] > 0. The statistically significant ($p < .05$), positive but low correlation is compatible with the hypothesis that the attitude of medical students towards practicing in urban areas influence their intention to choose urban area to practice in[9]. Attitude towards practising in an urban area only explains 3.28% of the variance in intention to practise in a rural area.

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[8] No formal statistical hypotheses were formulated in Chapter 3 regarding the bivariate relationships between the predictors and the dependent variable and the bivariate relationship between the predictors.
[9] The *ex post facto* nature of the correlational design that was used in the current study to investigate the substantive research hypotheses that were derived from the literature study in response to the research initiating question precludes the possibility of drawing causal conclusions from positive findings. A statistically insignificant correlation would have justified the conclusion that the attitude of medical students toward practising in rural areas does not influence their intention to practise in a rural area. The opposite is, however, not true. A statistically significant and positive correlation only means that the two variables are systematically related and that this the hypothesis that that the attitude of medical students toward practising in rural areas influences their intention to practise in a rural area provides a plausible hypothesis for this relationship. The relationship could, however, also be explained in terms of a number of alternative processes/structural models that involve additional variables and no direct linkage between Int_R and Att_R.

A negative non-significant (p > .05) relationship was observed between medical students' intention to practise in an *urban area* (Int_U) and their *social norm towards practising in an urban area* (SN_U), (r = -.091, p < .05). The null hypothesis H_0: ρ[Int_U,SN_U,] = 0 is consequently not rejected. The non-significant (p > .05), negative correlation is in conflict with the hypothesis that the social norms held by medical students towards practising in urban areas does not influence their intention to choose a rural area to practice in. Social norm held towards practising in an urban area does not explain the variance in intention to practise in an urban area.

Pearson correlation analysis assumed a linear relationship between the variables that are correlated. A matrix scatter plot was requested in SPSS (SPSS, 2016) to determine whether the rather modest correlation between Att_U and Int_U and the statistically insignificant (p<.05) correlation between SN_U and Int_U reported in Table 4.9 could have been due to a violation of this assumption. The resultant matrix scatter plot is shown in Figure 4.4.
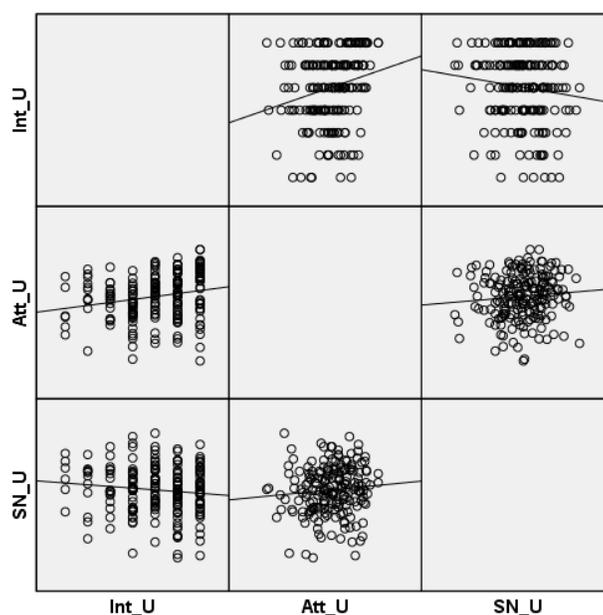
Figure 4.4: **Scatter Plot of the Relationship between Int_U, Att_U and SN_U**

Figure 4.4 echoes the finding derived from Table 4.9 that Int_U and Att_U are only moderately correlated at best and that Int_U and SN_U are negatively but statistically insignificantly correlated. Figure 4.4, in addition, suggests that the assumption that all variables are linearly related is not an unreasonable assumption.

Multiple standard regression analysis makes specific assumptions about the data being analysed (Howell, 1992; Tabachnick & Fidell, 2007). The validity and credibility of the results obtained via the regression analysis depend on the extent to which the data set that was analysed satisfied these assumptions. Failure to report on the extent to which the data satisfies the assumptions made by the analysis creates uncertainty and undermines confidence in the validity of the findings. The following assumptions made by multiple standard regression analysis can be identified (Howell, 1992; Tabachnick & Fidell, 2007):

- Linearity: The relationship between the dependent variable (Y) and the predictor variables (X_i) is linear;

- Normality: The residuals (Y-E[Y|Xi]) should follow a univariate normal distribution (alternatively stated, the conditional Y distributions Y|X should be distributed univariate normal);

- Homoscedasticity: the conditional variance in the residuals should be constant across values of E[Y|Xi] (alternatively stated, the conditional Y variance should be constant across values of E[Y|Xi]).

- Absence of collinearity/singularity: Predictors individually and in combination are not strongly correlated with each other;

- Absence of highly influential observations: observations/cases that exert excessive influence on the regression parameter estimates.

To identify potential influential cases, three characteristics of the observations need to be evaluated, namely the magnitude of the standardised residual for each observation, the leverage each observation has and the influence of each observation (Tabachnick & Fidell, 2007). Observations with large standardised residuals indicate observations that are outliers that substantially fall outside the main mass of observation with regard to the Y-axis. Observations with high leverage, in turn, are observations that substantially fall outside the main mass of observation with regard to the X_i-axes. Influential observations, lastly, are observations that substantially affect the regression model parameter estimates and therefore also $E[Y|X_i]$ when they are deleted from the data set compared to when they are left in (Howell, 1992; Tabachnick & Fidell, 2007).

To evaluate the data for the possible presence of outliers, the calculation of standardised residuals and the calculation of Mahalanobis distances for each observation, based on the fitted regression model defined by equation 1, were requested in SPSS (SPSS 23, 2016). To evaluate leverage, the calculation of the centred leverage value was requested in SPSS (SPSS, 2016). To evaluate the influence each observation exerts on the fitted regression model, Cook's distance, the Standardised DfFit and Standardised DfBeta[s] were calculated in SPSS (SPSS, 2016).

The normal probability plot in which the expected cumulative probabilities associated with the standardised residuals, assuming normality are plotted against the actual cumulative probabilities, is shown in Figure 4.5
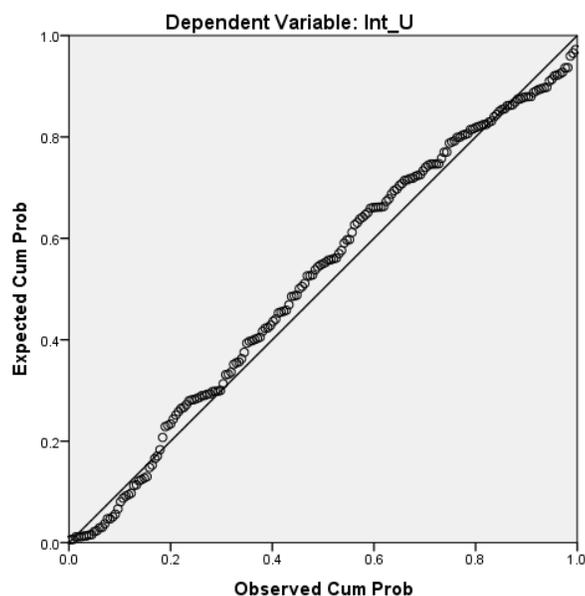
Figure 4.5: **Normal Probability Plot for Int_U**

Figure 4.5 indicates a modest departure from the 45° reference line in the middle of the distribution. To check whether this signals a statistically significant departure from univariate normality, the null hypothesis that the standardised residuals follow a univariate normal distribution was formally tested. Table 4.10 depicts the results for the Kolmogorov Smirnov test of the null hypothesis that the standardised residuals follow a univariate normal distribution.

Table 4.10

Kolmogorov-Smirnov Test of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
SN_U	.049	196	.200[*]	.990	196	.197

Table 4.10 Indicates that the null hypothesis of a univariate normal standardised residual distribution tdid not have to be rejected (p > .05).

Figure 4.6 depicts the standardised residuals plotted against the standardised weighted linear composite of Att_U and SN_U.
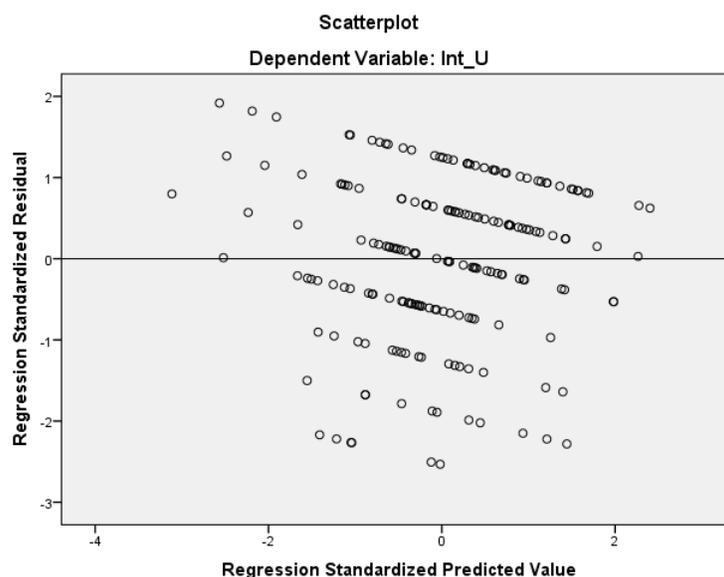
Figure 4.6: **Plot of Standardised Residuals for Int_U as Dependent Variable**

The plot of the standardised residuals was used to evaluate the linearity and homoscedasticity assumptions. The absence of a fan-like structure in the overall shape of the scatter plot indicates that the homoscedasticity assumption had been satisfactorily met. The absence of a clear curved structure in the overall shape of the scatter plot indicates that the linearity assumption had been met (Tabachnick & Fidell, 2007).

Before interpreting the results obtained from the multiple regression analysis aimed at testing path-specific hypothesis 1b, the possibility that the data set contained one or more observations that exerted unduly strong influence on the regression model parameter estimates was examined. The regression

diagnostic statistics (standardised residuals, Mahanalobis distances, exceedance probability associated with the Mahanalobis distances, the centred leverage value, Cook's distance, the standardised DfFit and three standardised DfBetas (one for the intercept estimate and two for the two partial regression slope coefficients (SPSS, 2016) are shown for all 209 cases in Appendix E.

The results depicted in Appendix E indicated no outliers, leverage cases or high influences cases. The critical cut-off values that were used are indicated at the bottom of the table in Appendix E (SPSS, 2016).

The potential problem of collinearity was examined by inspecting the correlation matrix shown in Table 4.9 and the collinearity statistics shown in Table 4.10. Table 4.9 returned a low but statistically insignificant (p >.05) correlation between Att_U and SN_U (r= .097). The tolerance statistic reflects the proportion of variance in each predictor that is not explained by the other predictor in the model ($1-R^2$).

The large tolerance values in Table 4.11 and the small correlation between the two predictors shown in Table 4.9 suggested that multicollinearity was definitely not a problem that plagued the multiple regression analysis aimed at testing overarching hypothesis 1b and path specific hypotheses 2b and 3b.

The fitted regression model as defined by equation 2 was therefore interpreted. Listwise deletion resulted in a loss of 17 observations. The effective sample size in the regression analysis was therefore 192.

4.3.2   Testing overarching hypothesis 1b

The regression output when regressing Int_U on Att_U and SN_U is shown in Table 4.11

Table 4.11

Multiple Standard Linear Regression of Int_U on Att_U and SN_U

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.253a	.064	.054	1.585

Model		Sum of Squares	Df	Mean Square	F	Sig.
	Regression	32.735	2	16.368	6.517	.002b
1	Residual	477.182	190	2.511		
	Total	509.917	192			

Model	Unstandardised Coefficients		Standardised Coefficients	t	Sig.	Correlations			Collinearity Statistics	
	B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1 (Constant)	4.805	.218		22.006	.000					
Att_U	.007	.002	.227	3.217	.002	.214	.227	.226	.992	1.008
SN_U	-.010	.005	-.136	-1.925	.056	-.115	-.138	-.135	.992	1.008

a. Dependent Variable: Int_U

Hypothesis 1b postulates that the Fishbein model as depicted in Figure 2.2, when applied to medical students, provides a valid description of the psychological mechanism that determines the strength of the intention of medical students to practise in urban areas at the outset of their careers. This overarching hypothesis translated to the statistical null hypothesis that the weighted composite of Att_U and SN_U does not statistically significantly (p > .05) explain variance in Int_U:

$$H_{01b}: P^{10}[Att\_U, SN\_U; ItP\_U] = 0$$

$$H_{a1b}: P[Att\_U, SN\_U; ItP\_U] > 0$$

Table 4.11 Indicates that H_{01b} could be rejected in favour of H_{a1} (p < .01). The weighted composite of Att_U and SN_U does statistically significantly (p < .05) explain variance in Int_U. Table 4.11 Indicates that the weighted composite of Att_U and SN_U explains approximately 6% of the variance in intention to practise in urban areas.

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[10] The symbol P is the Greek capital letter rho and denotes the multiple correlations in the parameter.

The hypothesis that the Fishbein model as depicted in Figure 2.2, when applied to medical students, provides a valid description of the psychological mechanism that determines the strength of the intention of medical students to practise in urban areas at the outset of their careers therefore survived an opportunity to be falsified. In that sense, support was obtained for overarching substantive hypothesis 1b.

4.2.3   Testing path-specific hypotheses 2b and 3b

Given that the regression model defined in equation 1 statistically significantly ($p < .05$) fitted the data the one path-specific hypotheses that Att_U statistically significantly explains unique variance in Int_U, not explained by the other predictor in the model, was tested. Path-specific hypothesis 2b that medical students' attitude towards practising in urban areas significantly explains unique variance in their intention to practise in urban areas was translated to the following statistical hypothesis (H_{a2b}):

$$H_{02b}: \beta_1 Att\_U = 0 | \beta_2 SN\_U \neq 0$$

$$H_{a2b}: \beta_1 Att\_U > 0 | \beta_2 SN\_U \neq 0$$

Path-specific hypothesis 3b, that medical students' social or subjective norm towards practising in urban areas, significantly explains unique variance in their intention to practise in urban areas was translated to the following statistical hypothesis (H_{a3b}):

$$H_{03b}: \beta_2 SN\_U = 0 | \beta_1 Att\_U \neq 0$$

$$H_{a3b}: \beta_2 SN\_U > 0 | \beta_1 Att\_U \neq 0$$

Table 4.11 indicates that $b_1 Att\_U$ is statistically significant ($p < .05$) and $b_2 SN\_U$ statistically insignificant ($p > .05$). H_{02b} can therefore be rejected in favour of H_{a2b} and H_{03b} is not rejected in favour of H_{a3b}. Thus attitude towards practising in an urban area is statistically significantly related to the intention to choose

urban practice when controlling for differences in social norm. This finding is compatible with the position that the attitude of medical students towards practising in an urban area will influence their intention to choose urban areas to practise in. This finding is, however, not sufficient to make such a causal conclusion. In addition, social norm towards practising in an urban area is not statistically significantly related to the intention to choose urban practice when controlling for attitude. This finding is in conflict with the position advocated by the Fishbein model that social norm that is held by the medical student towards practising in urban areas should influence whether a medical student chooses an urban area to practise in.

Table 4.11 indicates that Att_U explained $.214^2 = .045796$ of the variance in Int_U when ignoring SN_U, When controlling for the variance that SN_U explained in Att_U and in Int_U, the unique variance in Att_U not shared with SN_U, explained only $.227^2 = .051529$ of the unique variance in Int_U not explained by SN_U. When only controlling for the variance that SN_U explained in Int_U, the unique variance in Att_U, not shared with SN_U, explained only $.226^2 = .051076$ of the total variance in Int_U.

4.4   Discussion and application of the results

Hypothesis 2a stated that medical student's attitude towards practising in rural areas (X_1) significantly explains unique variance in their intention to practise in rural areas (Y_1) that is not explained by their social or subjective norm towards practising in rural areas (X_2). This hypothesis was corroborated. Results from this study show that the intention of medical students to choose a rural area to practise in is influenced by the attitude held by the medical student towards rural areas. This means that, should the medical student have a positive attitude toward rural practice, chances are good that the medical student would choose rural practice. In the case in which medical students' attitude towards rural practice is negative, chances are that the medical student will not choose rural practice.

Hypothesis 2b stated that medical student's attitude towards practising in urban areas (X_3) significantly explains unique variance in their intention to practise in rural areas (Y_1) that is not explained by their social or subjective norm towards practising in urban areas (X_4). This hypothesis was also corroborated. Results from this study show that as attitude towards practicing in an urban area becomes more positive the intention to practice in an urban area increases.

Hypothesis 3a stated that medical students' perceived social norm towards practising in rural areas (X_2) significantly explains unique variance in their intention to practise in rural areas (Y_2) that is not explained by their attitude towards practising in urban area (X_1). This hypothesis was also corroborated. Results from this study show that the intention of medical students to choose a rural area to practise in is influenced by the perceived expectations held by salient reference groups and the student's motivation to comply with the perceived expectation. The intention to practice in a rural area increases as the social norm towards practicing in a rural area becomes more positive.

Hypothesis 3b stated that medical students' perceived social norm towards practising in urban areas (X_4) significantly explains unique variance in their intention to practise in urban areas (Y_2) that is not explained by their attitude towards practising in urban area (X_3). This hypothesis was not corroborated. Results from this study show that the intention of medical students to choose an urban area for practice is not influenced by social norm that medical student perceive towards practicing in urban areas. This means that there is no evidence to support the claim that should the medical student have a positive social norm toward urban practice, chances are good that the medical student would choose urban practice, or in the case where medical students' social norm towards urban practice is negative, that the medical student will not choose urban practice.

As discussed in the literature review, McGrail *et al*. (2011) state that a rural background and the exposure to rural areas will influence medical students to choose practising in rural areas. The current study did not

investigate the validity of this claim. However, assuming this to be the case, should medical students come from a rural background, their attitude towards rural areas might be more positive and that would positively influence their choice of where they will decide to practice. When medical students are exposed to rural areas and that exposure has a positive effect on the attitude of the medical student, this attitude will influence the intention to willingly choose rural practice. Thus, by exposing medical students to areas that experience a shortage of medical practitioners, such as rural areas, the attitude towards these areas can influence medical students to choose such an area in need as an area to practise in, provided the exposure is experienced as positive However, it is important to note that, should the individual's experience of his/her exposure to rural areas be negative, the resultant negative attitude will negatively influence the choice to willingly choose these areas to practise in.

Reid *et al*. (2011) and Doherthy *et al*. (2013) state that educational factors and the availability of clinical training institutions would positively influence medical students to choose an area where such institutions are readily available. This depends on the strength of the medical student's need to study further and be intellectually stimulated. This need strength regarding further studies will influence the intention of medical students to choose a rural area when such institutions area not really available in rural areas. According to Doherthy *et al*. (2013) to pursue further studies might be too idealistic an idea for rural medical practitioners because medical practitioners in rural areas are so busy with day-to-day duties, responsibilities, and administration that there is little time left to actively engage in further studies or even continuous professional development. It is suggested, however, that hospital management grant medical practitioners the opportunity to take time off from work for further studies. It is important to bear in mind that medical students and medical practitioners have the need to be intellectually stimulated, as indicated by earlier studies by De Vries *et al*. (2010). The opportunity to study further will have the positive effect on the attitude of medical students of willingly choosing an area, whether urban or rural. This could also be linked to the social norms factor. Should hospital management consider

further learning and continuous professional development as a priority, there would be positive social pressure on the medical practitioner to continue learning. When hospitals and clinics where the shortage of medical practitioners are serious offer such opportunities, medical students might be positively influenced to choose these areas as areas to practise in.

Personal characteristics such as personal resourcefulness, flexibility, independence, confidence, and resilience have been shown (Cooke *et al.*, 2011; Lehmann *et al.*, 2008; Manahan *et al.*, 2009; Reid, 2011) to play a meaningful role in intention to choose a practice and are strongly linked to the attitudinal factor. As the results of the current study have indicated, attitude does have an influence on medical students' decisions to choose a rural or urban area. The listed characteristics of personal resourcefulness, flexibility, independence, confidence, and resilience all contribute to a positive attitude and when these characteristics are present in medical students, chances are good that this will have a positive influence on their intention to choose areas where shortages are most serious. Other personal characteristics such as altruism, concern for others, ethical concerns, professionalism, and individualism also influence the intention to choose between an urban area or a rural area (Reid *et al.*, 2011) and are also strongly linked to the attitudinal factor and can influence the intention of medical students who need to choose an area to practise in.

Family considerations, as explained by Reid *et al*. (2011), have an influence on medical students when they choose an area in which to practise. This is an example of a how social norms and considerations impact the decision of a medical student. Should the urban area be considered to be a better choice for the family, this might influence the individual to choose that area. Role models and mentors, as described by Reid *et al*. (2011), who influence medical students' intention to choose a certain area is a good example of social norms. The assistance, support and encouragement of mentors and role models will influence medical students to choose the area where these individuals are available, whether it is in an urban or a

rural area. It is interesting to note that the current study indicated that social norms have an influence on the intention of medical students to choose a rural area but does not have an influence on the intention to choose an urban area. Thus, should these strong social factors such as family considerations and role models be present in the rural areas that are most in need of medical practitioners, it might influence medical students to choose rural areas.

As discussed in the literature review, it is clear that many factors can and will influence medical students in their intention to choose rural practice or urban practice. Based on the Fishbein model, the first hypothesis of the current study was that medical students' intention to practice in a rural area is influenced by their attitude towards practising in rural areas. Results from the current study corroborated this hypothesis. Results from the current study also indicated that medical students' intention to choose as urban area is influenced by attitude their attitude towards practicing in an urban area. Thus attitude is a factor that will influence medical students' decisions to willingly choose rural or urban areas.

The second hypothesis of the current study was that medical students' intention can be influenced by social or subjective norm towards practising in rural or urban areas. Results from the current study indicate that social norm influence medical students' to choose rural areas, but that it does not influence the intention to choose urban areas.

Considering model fit, as shown by the statistical analysis, the Fishbein model explains relatively little variance in medical students' intention to practice in rural or urban areas. This implies that there are still numerous additional determinants of intention to practice in a specific area that are not acknowledged by the Fishbein model. However, by adding more factors to the model fit can definitely be improved. This suggestion will be discussed in the following chapter.

CHAPTER FIVE: CONCLUSION, LIMITATIONS OF AND RECOMMENDATIONS FROM THE STUDY

Conclusions discussed here are drawn from the literature study and the empirical research. Subsequently, the limitations of the current study will be discussed, followed by recommendations for similar studies to be undertaken in future.

The research initiating question in the current study was the question why final year medical students vary in their intention to practice in rural and in urban areas. The research initiating question was motivated by the need to strengthen the intention of final year medical students to practice in the rural areas of South Africa so that it exceeds the intention to practice in an urban area. To the extent that the psychological mechanisms that regulate the intention of final year medical students to practice in rural or urban areas are validly understood it opens up the possibility of deriving proactive, but in this instance especially reactive, interventions aimed at strengthening the intention of final year medical students to practice in rural areas. To the extent that the psychological mechanisms that regulate the intention of final year medical students to practice in rural or urban areas are validly understood it more specifically can be used to diagnose why those that currently intend practicing in urban areas do so. The current study attempted to answer the research initiating question in terms of the Fishbein model of reasoned action (Ajzen & Fishbein, 1972).

5.1.   Explaining variance in the intention to practice in rural areas

The current study found support for the hypothesis that the weighted linear composite of attitude towards practising in a rural area (Att_R) and the perceived social norm towards practising in a rural area (SN_R) statistically significantly (p<.05) explains variance in the intention to practising in a rural area

(Int_R). Moreover the current study found that the attitude towards practising in a rural area (Att_R) and the perceived social norm towards practising in a rural area (SN_R) each statistically significantly (p<.05) explain unique variance in the intention to practising in a rural area (Int_R). Although the linear composite explains only a modest proportion of the variance in Int_R, the fact that both Att_R and SN_R statistically significantly (p<.05) explained unique variance in Int_R opens up the possibility of deriving diagnostic explanations for the fact that the majority of final year students intend to practising in urban areas. Although these two options have not been directly pitted against each other, a comparison of the number of students whose intention to practising in an urban area (Int_U) exceeds their intention to practice in a rural area (Int_R) substantially outnumbers those whose intention to practising in a rural area (Int_R) exceeds their intention to practice in an urban area (Int_U). The frequency distribution is shown in Table 5.1.

Table 5.1

Frequency Distribution of Int_R and Int_U

		GROUP			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Int_R < Int_U	104	49.8	56.8	56.8
	Int_R > Int_U	79	37.8	43.2	100.0
	Total	183	87.6	100.0	
Missing	System	26	12.4		
Total		209	100.0		

The Fishbein model argues that attitude towards a specific course of action (like practising in a rural area) is formed from the multiplicative combination of the subjective belief (b_i) that specific salient outcomes will flow from the action and the valence attached to the specific outcomes (e_i), summed over the set of p salient outcomes ($\sum_{i=1}^{p} b_i e_i$). The preceived social norm in turn is conceptualised as the multiplicative

combination of the normative belief (Nb$_i$) that specific reference groups hold a specific expectation regarding the action and the motivation to comply with the expectation (Mc$_i$), summed over the set of q salient reference groups $(\sum_{i=1}^{q} Nb_i Mc_i)$. It therefore follows that a comparison of those that intend practising in a rural area with those that intend practising in an urban area on the beliefs and evaluations regarding the specific eight salient outcomes that were identified in the current study can shed light on the question why final year medical students differ in their intention to practice in rural areas. Likewise, a comparison of those that intend practising in a rural area with those that intend practicing in an urban area on the normative beliefs and motivation to comply regarding the specific four salient referent groups that were identified in the current study also can shed light on the question why final year medical students differ in their intention to practice in rural areas.

To allow this comparison a dichotomous group variable (Group) was created by recoding the responses to questions 7.1 and 7.2 into a new variable such that Int_R > Int_U were coded as Group = 1 and Int_R < Int_U were coded as Group = 0.

5.2. Comparison of beliefs and evaluations comprising the attitude towards practising in a rural area (Att_R) across rural and urban intention groups

One-way multivariate analysis of variance (Manova) was subsequently performed on the eight question comprising Section 1 of the research questionnaire. Section one measures the evaluation of the eight salient outcomes as good or bad. Table 5.2 shows that the column vector of eight evaluation means differed statistically significantly (p<.05) across the two groups.

Table 5.2

One-way Multivariate Analysis of Variance (Manova): Evaluation of Outcome Measures

	Multivariate Tests[a]					
Effect		Value	F	Hypothesis df	Error df	Sig.
Intercept	Pillai's Trace	.823	100.338[b]	8.000	173.000	.000
	Wilks' Lambda	.177	100.338[b]	8.000	173.000	.000
	Hotelling's Trace	4.640	100.338[b]	8.000	173.000	.000
	Roy's Largest Root	4.640	100.338[b]	8.000	173.000	.000
GROUP	Pillai's Trace	.101	2.425[b]	8.000	173.000	.017
	Wilks' Lambda	.899	2.425[b]	8.000	173.000	.017
	Hotelling's Trace	.112	2.425[b]	8.000	173.000	.017
	Roy's Largest Root	.112	2.425[b]	8.000	173.000	.017

The subsequent eight univariate one-way Anovas (Table 5.3) revealed statistically significant ($p < .05$) differences on Q1.2 and Q1.8. Question 1 assesses how good (+3) or bad (-3) the opportunities for further studies and specialization is to the final year medical student and question 1.8 measures how good (+3) or bad (-3) altruism, the need to make a difference in the lives of others, is to the final year medical student.

Table 5.3

Univariate One-way Anovas: Evaluation of Outcome Measures

	Tests of Between-Subjects Effects					
Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	Q1.1	4.132[a]	1	4.132	1.443	.231
	Q1.2	22.161[b]	1	22.161	7.665	.006
	Q1.3	.222[c]	1	.222	.080	.778
	Q1.4	1.760[d]	1	1.760	.623	.431
	Q1.5	.770[e]	1	.770	.355	.552
	Q1.6	2.374[f]	1	2.374	1.114	.293
	Q1.7	1.145[g]	1	1.145	.568	.452
	Q1.8	12.315[h]	1	12.315	8.843	.003
Intercept	Q1.1	242.000	1	242.000	84.498	.000
	Q1.2	338.645	1	338.645	117.131	.000
	Q1.3	212.969	1	212.969	76.919	.000
	Q1.4	306.375	1	306.375	108.512	.000
	Q1.5	252.770	1	252.770	116.589	.000

	Q1.6	443.341	1	443.341	208.066	.000
	Q1.7	349.760	1	349.760	173.459	.000
	Q1.8	851.875	1	851.875	611.688	.000
GROUP	Q1.1	4.132	1	4.132	1.443	.231
	Q1.2	22.161	1	22.161	7.665	.006
	Q1.3	.222	1	.222	.080	.778
	Q1.4	1.760	1	1.760	.623	.431
	Q1.5	.770	1	.770	.355	.552
	Q1.6	2.374	1	2.374	1.114	.293
	Q1.7	1.145	1	1.145	.568	.452
	Q1.8	12.315	1	12.315	8.843	.003
Error	Q1.1	515.516	180	2.864		
	Q1.2	520.410	180	2.891		
	Q1.3	498.372	180	2.769		
	Q1.4	508.218	180	2.823		
	Q1.5	390.247	180	2.168		
	Q1.6	383.538	180	2.131		
	Q1.7	362.949	180	2.016		
	Q1.8	250.679	180	1.393		
Total	Q1.1	776.000	182			
	Q1.2	914.000	182			
	Q1.3	714.000	182			
	Q1.4	816.000	182			
	Q1.5	645.000	182			
	Q1.6	848.000	182			
	Q1.7	727.000	182			
	Q1.8	1103.000	182			
	Q1.1	519.648	181			
	Q1.2	542.571	181			
	Q1.3	498.593	181			
	Q1.4	509.978	181			
	Q1.5	391.016	181			
	Q1.6	385.912	181			
	Q1.7	364.093	181			
	Q1.8	262.995	181			

The descriptive statistics shown in Table 5.4 indicate that medical students that intend to practice in rural areas do not regard further studies as so important as those students that intend practicing in urban areas. Medical students that intend to practice in rural areas experience the need to make a difference in the lives of others as more important than those students that intend practicing in urban areas.

Table 5.4

Descriptive Statistics: Evaluation of Outcome Measures

Dependent Variable	GROUP	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Q1.1	Int_R < Int_U	1.317	.166	.990	1.645
	Int_R > Int_U	1.013	.192	.635	1.391
Q1.2	Int_R < Int_U	1.731	.167	1.402	2.060
	Int_R > Int_U	1.026	.193	.646	1.406
Q1.3	Int_R < Int_U	1.058	.163	.736	1.380
	Int_R > Int_U	1.128	.188	.756	1.500
Q1.4	Int_R < Int_U	1.212	.165	.886	1.537
	Int_R > Int_U	1.410	.190	1.035	1.786
Q1.5	Int_R < Int_U	1.125	.144	.840	1.410
	Int_R > Int_U	1.256	.167	.927	1.585
Q1.6	Int_R < Int_U	1.692	.143	1.410	1.975
	Int_R > Int_U	1.462	.165	1.135	1.788
Q1.7	Int_R < Int_U	1.481	.139	1.206	1.756
	Int_R > Int_U	1.321	.161	1.003	1.638
Q1.8	Int_R < Int_U	1.923	.116	1.695	2.151
	Int_R > Int_U	2.449	.134	2.185	2.712

A Roy-Bargman step-down F-test (Table 5.5) was performed in which the variance that Q1.1 explains in Q1.8 was controlled before evaluating the significance of the difference in the Q1.8 means across the two intention groups. Even when controlling for the shared variance between Q1.1 and Q1.8 the difference in the Q1.8 means remained statistically significant ($p < .05$).

Table 5.5

Roy-Bargman Step-Down F-test: Evaluation of Outcome Measures

		Roy-Bargman Stepdown F - tests				
Variable	Hypoth. MS	Error MS	StepDown F	Hypoth. DF	Error DF	Sig. of F
Q1.2	23.15221	2.88093	8.03636	1	181	.005
Q1.8	10.13655	1.42509	7.11290	1	180	.008

One-way multivariate analysis of variance (Manova) was subsequently performed on the eight question comprising Section 2 of the research questionnaire. Section two measures the belief (or the subjective probability) that practicing in a rural area will result in the each of the eight salient outcomes. Table 5.6 shows that the column vector of eight belief means differs statistically significantly (p<.05) across the two groups.

Table 5.6

One-way Multivariate Analysis of Variance (Manova): Belief Measures Sssociated with Att_R

Effect		Value	F	Hypothesis df	Error df	Sig.
			Multivariate Tests[a]			
Intercept	Pillai's Trace	.972	742.093[b]	8.000	174.000	.000
	Wilks' Lambda	.028	742.093[b]	8.000	174.000	.000
	Hotelling's Trace	34.119	742.093[b]	8.000	174.000	.000
	Roy's Largest Root	34.119	742.093[b]	8.000	174.000	.000
GROUP	Pillai's Trace	.167	4.371[b]	8.000	174.000	.000
	Wilks' Lambda	.833	4.371[b]	8.000	174.000	.000
	Hotelling's Trace	.201	4.371[b]	8.000	174.000	.000
	Roy's Largest Root	.201	4.371[b]	8.000	174.000	.000

The eight subsequent univariate one-way Anovas (Table 5.7) revealed statistically significant differences on Q2.1, Q2.4, Q2.5, Q2.6, Q2.7 and Q2.8 and Q1.8. Question 1 of section 2 assesses how likely it is that when practicing in a rural area that one would find a job opportunity for one's spouse. Questions 4 to 8 assess how likely it is that when practicing in a rural area that one's family would be safe, one would have sufficient support staff, good living conditions, support for career development and the opportunity to affect the lives of others.

Table 5.7

Univariate One-way Anovas: Belief Measures Associated with Att_R

		Tests of Between-Subjects Effects				
Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	Q2.1	42.396[a]	1	42.396	12.473	.001
	Q2.2	4.094[b]	1	4.094	1.113	.293
	Q2.3	3.601[c]	1	3.601	1.363	.244
	Q2.4	24.216[d]	1	24.216	9.843	.002
	Q2.5	10.325[e]	1	10.325	4.290	.040
	Q2.6	15.235[f]	1	15.235	6.848	.010
	Q2.7	39.804[g]	1	39.804	16.296	.000
	Q2.8	9.782[h]	1	9.782	6.677	.011
Intercept	Q2.1	2480.692	1	2480.692	729.827	.000
	Q2.2	2257.121	1	2257.121	613.841	.000
	Q2.3	3663.492	1	3663.492	1386.795	.000
	Q2.4	4220.762	1	4220.762	1715.590	.000
	Q2.5	3406.259	1	3406.259	1415.191	.000
	Q2.6	4089.552	1	4089.552	1838.366	.000
	Q2.7	2998.492	1	2998.492	1227.586	.000
	Q2.8	6700.733	1	6700.733	4574.187	.000
GROUP	Q2.1	42.396	1	42.396	12.473	.001
	Q2.2	4.094	1	4.094	1.113	.293
	Q2.3	3.601	1	3.601	1.363	.244
	Q2.4	24.216	1	24.216	9.843	.002
	Q2.5	10.325	1	10.325	4.290	.040
	Q2.6	15.235	1	15.235	6.848	.010
	Q2.7	39.804	1	39.804	16.296	.000
	Q2.8	9.782	1	9.782	6.677	.011
Error	Q2.1	615.221	181	3.399		
	Q2.2	665.545	181	3.677		
	Q2.3	478.147	181	2.642		
	Q2.4	445.303	181	2.460		
	Q2.5	435.653	181	2.407		
	Q2.6	402.645	181	2.225		
	Q2.7	442.109	181	2.443		
	Q2.8	265.147	181	1.465		
Total	Q2.1	3096.000	183			
	Q2.2	2943.000	183			
	Q2.3	4183.000	183			
	Q2.4	4682.000	183			
	Q2.5	3865.000	183			
	Q2.6	4516.000	183			
	Q2.7	3442.000	183			
	Q2.8	7032.000	183			
Corrected Total	Q2.1	657.617	182			
	Q2.2	669.639	182			

Q2.3	481.749	182
Q2.4	469.519	182
Q2.5	445.978	182
Q2.6	417.880	182
Q2.7	481.913	182
Q2.8	274.929	182

The descriptive statistics shown in Table 5.8 indicated that medical students that intend to practice in rural areas regard all of these outcomes to be more likely to occur when practicing in a rural area than those students that intend practicing in an urban area

Table 5.8

Descriptive Statistics: Belief Measures Associated with Att_R

		GROUP			
Dependent	GROUP	Mean	Std. Error	95% Confidence Interval	
Variable				Lower Bound	Upper Bound
Q2.1	Int_R < Int_U	3.231	.181	2.874	3.587
	Int_R > Int_U	4.203	.207	3.793	4.612
Q2.2	Int_R < Int_U	3.394	.188	3.023	3.765
	Int_R > Int_U	3.696	.216	3.271	4.122
Q2.3	Int_R < Int_U	4.375	.159	4.061	4.689
	Int_R > Int_U	4.658	.183	4.297	5.019
Q2.4	Int_R < Int_U	4.481	.154	4.177	4.784
	Int_R > Int_U	5.215	.176	4.867	5.563
Q2.5	Int_R < Int_U	4.115	.152	3.815	4.416
	Int_R > Int_U	4.595	.175	4.251	4.939
Q2.6	Int_R < Int_U	4.481	.146	4.192	4.769
	Int_R > Int_U	5.063	.168	4.732	5.394
Q2.7	Int_R < Int_U	3.615	.153	3.313	3.918
	Int_R > Int_U	4.557	.176	4.210	4.904
Q2.8	Int_R < Int_U	5.875	.119	5.641	6.109
	Int_R > Int_U	6.342	.136	6.073	6.610

Roy-Bargman step-down F-tests (Table 5.9) indicated that when controlling for earlier questions group membership no longer explain unique variance in questions Q2.4, Q2.5 and Q2.6. The two groups did, however differ on the likelihood that practising in a rural area would allow them to make a difference in the lives of others when controlling for the shared variance with the other five questions. Differences in

Table 5.8 on the themes /questions that were not found to be significant in the step-down F analysis (table 5.9) should be in interpreted with a little bit more circumspection.

Table 5.9

Roy-Bargman Step-down F-tests: Belief Measures Associated with Att_R

			Roy-Bargman Stepdown F - tests				
Variable	Hypoth. MS	Error MS	StepDown F	Hypoth. DF	Error DF	Sig. of F	
Q2.1	42.39645	3.39901	12.47317	1	181	.001	
Q2.8	7.75179	1.46804	5.28037	1	180	.023	
Q2.4	4.49796	2.07226	2.17055	1	179	.142	
Q2.5	.00192	1.79679	.00107	1	178	.974	
Q2.6	.09317	1.25435	.07428	1	177	.786	
Q2.7	11.68827	1.44125	8.10980	1	176	.005	

Taken in conjunction this therefore means that final year medical students that intend practising in rural areas differentiate themselves from their colleagues that prefer to work in urban areas in that they regard the opportunities for further studies and specialization as less important and altruistically serving the interests of other people as more important and they regard it as more likely than their counterparts that working in a rural area will realise the latter outcome. Interestingly they also differentiate themselves from their colleagues that intend practising in urban areas in as far as they see the availability of career opportunities for their spouse, the availability of career support, planning and mentorship as outcomes when practising in a rural area as more likely outcomes than their counterparts.

This line of reasoning would suggest that the one possibility of increasing the number of final year medical students that decide to practise in rural areas is to increase the subjective probability that practicing in a rural area will be instrumental in achieving highly valenced outcomes. In terms of the outcomes that the current study identified as salient, special emphasis should therefore be placed on the bringing across the

message that the outcomes that those that currently intend practicing in urban areas regard as important, namely, further studies and specialisation, good living conditions and safety and the chance to make a difference in the lives of others can with higher likelihood than currently appreciated be achieved when practicing in a rural area.

5.3. Comparison of normative belief and motivation to comply comprising the social norm towards practising in a rural area (SN_R) across rural and urban intention groups

One-way multivariate analysis of variance (Manova) was performed on the four question comprising Section 6 of the research questionnaire. Section 6 measures the motivation to comply with each of the four salient reference groups. Table 5.10 shows that the column vector of four motivation to comply means did not differ statistically significantly (p > .05) across the two groups. The two groups therefore did not differ from each other in terms of the relative influence that salient reference groups exert on their decisions where to practice

Table 5.10

One-way Multivariate Analysis of Variance (Manova): Motivation to Comply Measures

Effect		Value	F	Hypothesis df	Error df	Sig.
Intercept	Pillai's Trace	.684	91.858[b]	4.000	170.000	.000
	Wilks' Lambda	.316	91.858[b]	4.000	170.000	.000
	Hotelling's Trace	2.161	91.858[b]	4.000	170.000	.000
	Roy's Largest Root	2.161	91.858[b]	4.000	170.000	.000
GROUP	Pillai's Trace	.001	.021[b]	4.000	170.000	.999
	Wilks' Lambda	.999	.021[b]	4.000	170.000	.999

Hotelling's Trace	.001	.021[b]	4.000	170.000	.999
Roy's Largest Root	.001	.021[b]	4.000	170.000	.999

No further one-way Anovas were therefore performed on the four separate reference groups.

One-way multivariate analysis of variance (Manova) was subsequently performed on the four question comprising Section 4 of the research questionnaire. Section four measures the strength of the normative belief that the student holds about the expectation that salient reference groups/individuals have toward practicing in rural areas Table 5.11 shows that the column vector of four normative belief means differed statistically significantly (p > .05) across the two groups.

Table 5.11

One-way Multivariate Analysis of Variance (Manova): Normative Belief Measures Associated with SN_R

Effect		Value	F	Hypothesis df	Error df	Sig.
Intercept	Pillai's Trace	.971	1373.602[b]	4.000	164.000	.000
	Wilks' Lambda	.029	1373.602[b]	4.000	164.000	.000
	Hotelling's Trace	33.502	1373.602[b]	4.000	164.000	.000
	Roy's Largest Root	33.502	1373.602[b]	4.000	164.000	.000
GROUP	Pillai's Trace	.251	13.712[b]	4.000	164.000	.000
	Wilks' Lambda	.749	13.712[b]	4.000	164.000	.000
	Hotelling's Trace	.334	13.712[b]	4.000	164.000	.000
	Roy's Largest Root	.334	13.712[b]	4.000	164.000	.000

The four subsequent univariate one-way ANOVAS (Table 5.12) revealed statistically significant differences on Q4.1, Q4.3 and Q4.4. Question 4.1 assessed the influence of medical students who have graduated

and are busy with their internship or hospital years. Question 4.3 assessed the influence of parents and close family and Question 4.4 assessed the influence of a spouse or partner.

Table 5.12

Univariate One-way Anovas: Normative Belief Measures Associated with SN_R

Tests of Between-Subjects Effects						
Source	**Dependent** Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	Q4.1	28.129[a]	1	28.129	14.646	.000
	Q4.2	2.293[b]	1	2.293	1.410	.237
	Q4.3	111.814[c]	1	111.814	40.408	.000
	Q4.4	88.303[d]	1	88.303	28.616	.000
Intercept	Q4.1	4048.011	1	4048.011	2107.716	.000
	Q4.2	4813.275	1	4813.275	2960.972	.000
	Q4.3	3199.909	1	3199.909	1156.390	.000
	Q4.4	2725.818	1	2725.818	883.360	.000
GROUP	Q4.1	28.129	1	28.129	14.646	.000
	Q4.2	2.293	1	2.293	1.410	.237
	Q4.3	111.814	1	111.814	40.408	.000
	Q4.4	88.303	1	88.303	28.616	.000
Error	Q4.1	320.735	167	1.921		
	Q4.2	271.471	167	1.626		
	Q4.3	462.115	167	2.767		
	Q4.4	515.318	167	3.086		
Total	Q4.1	4386.000	169			
	Q4.2	5163.000	169			
	Q4.3	3667.000	169			
	Q4.4	3244.000	169			
Corrected Total	Q4.1	348.864	168			
	Q4.2	273.763	168			
	Q4.3	573.929	168			
	Q4.4	603.621	168			

The descriptive statistics shown in Table 5.13 indicate that medical students that intend to practice in rural areas perceive a stronger normative expectation from medical students who have graduated and are busy with their internship or hospital years that they should practice in rural areas than those students that intend practicing in urban areas (Q4.1). Medical students that intend to practice in rural areas perceive a stronger normative expectation from their parents and or close family members that they

should practice in rural areas than medical students that intent to practice in urban areas do (Q4.3). Medical students that intend to practice in rural areas perceive their spouse or partner to be more in support of practicing in a rural area than medical students that intent to practice in urban areas do (Q4.4). The largest difference was observed on Question 4.3. The group of students that have a stronger intention to practice in a rural area typically perceive all reference groups to be supportive of them practicing in a rural area. Lecturers and parents are seen to be the most supportive of practicing in a rural area. The group of students that have a stronger intention to practice in an urban area also typically perceive their lecturers to be supportive of the idea of practicing in a rural area.

Table 5.13

Descriptive Statistics: Normative Belief Measures Associated with SN_R

Dependent Variable	GROUP	GROUP			
		Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Q4.1	Int_R < Int_U	4.536	.141	4.258	4.814
	Int_R > Int_U	5.361	.163	5.039	5.684
Q4.2	Int_R < Int_U	5.278	.129	5.023	5.534
	Int_R > Int_U	5.514	.150	5.217	5.811
Q4.3	Int_R < Int_U	3.577	.169	3.244	3.911
	Int_R > Int_U	5.222	.196	4.835	5.609
Q4.4	Int_R < Int_U	3.330	.178	2.978	3.682
	Int_R > Int_U	4.792	.207	4.383	5.200

A Roy-Bargman step-down F-test (Table 5.14) was performed in which the variance that Q4.1 explains in Q4.3 was controlled before evaluating the significance of the difference in the Q4.3 means across the two intention groups and where the variance that Q4.1 and Q4.3 explains in Q4.4 was controlled before evaluating the significance of the difference in the Q4.4 means across the two intention groups. Even when controlling for the shared variance between Q4.1 and Q4.3 the difference in the Q4.3 means remained statistically significant (p < .05). When controlling for both Q4.1 and Q4.3 the difference in the mean Q4.4 no longer was statistically significant. The normative belief related to spouse/partner,

therefore does not statistically significantly (p > .05) explain unique variance in group membership (i.e. whether Int_R > Int_U or *vice versa*).

Table 5.14

Roy-Bargman Step-down F-test: Normative Belief Measures Associated with SN_R

Roy-Bargman Stepdown F - tests						
Variable	Hypoth. MS	Error MS	StepDown F	Hypoth. DF	Error DF	Sig. of F
Q4.1	28.12908	1.92057	14.64623	1	167	.000
Q4.3	83.77271	2.71115	30.89929	1	166	.000
Q4.4	9.77314	2.39424	4.08194	1	165	.045

5.4.   Explaining variance in the intention to practise in urban areas

The current study found support for the hypothesis that the weighted linear composite of attitude towards practising in an urban area (Att_U) and the perceived social norm towards practising in an urban area (SN_U) statistically significantly (p<0.05) explains variance in the intention to practice in an urban area (Int_U). Only the attitude towards practising in an urban area (Att_U) statistically significantly (p<.05) explained variance in the intention to practice in an urban area (Int_U). Although the linear composite explains only a modest proportion of the variance in Int_R, the fact that Att_R statistically significantly (p<.05) explained variance in Int_U also opens up the possibility of deriving diagnostic explanations for the fact that the majority of final year students intend to practice in urban areas.

5.5. Comparison of beliefs and evaluations comprising the attitude towards practising in an urban area (Att_U) across Rural and Urban Intention groups

One-way multivariate analysis of variance (Manova) had already been performed on the eight question comprising Section 1 of the research questionnaire to evaluate the extent to which those that intend working in urban areas differ from those that intend practicing in rural areas differ in how good or bad they evaluate the salient outcomes considered in the current study. Tables 5.2, 5.3 and 5.4 document these results Section one measures the evaluation of the eight salient outcomes as good or bad. Table 5.2 showed that the column vector of eight evaluation means differs statistically significantly (p<.05) across the two groups.

One-way multivariate analysis of variance (Manova) was also performed on the eight question comprising Section 3 of the research questionnaire. Section three measures the belief (or the subjective probability) that practicing in an urban area will result in the each of the eight salient outcomes. Table 5.14 shows that the column vector of eight belief means do not differ statistically significantly (p < .05) across the two groups.

Table 5.15

One-way Multivariate Analysis of Variance (Manova): Belief Measures Associated with Att_U

Multivariate Tests[a]						
Effect		Value	F	Hypothesis df	Error df	Sig.
Intercept	Pillai's Trace	.985	1392.184[b]	8.000	173.000	.000
	Wilks' Lambda	.015	1392.184[b]	8.000	173.000	.000
	Hotelling's Trace	64.378	1392.184[b]	8.000	173.000	.000
	Roy's Largest Root	64.378	1392.184[b]	8.000	173.000	.000
GROUP	Pillai's Trace	.080	1.892[b]	8.000	173.000	.064
	Wilks' Lambda	.920	1.892[b]	8.000	173.000	.064
	Hotelling's Trace	.087	1.892[b]	8.000	173.000	.064
	Roy's Largest Root	.087	1.892[b]	8.000	173.000	.064

The eight subsequent univariate one-way ANOVAS (Table 5.15) nonetheless revealed statistically significant differences on Q3.1, Q3.2, Q3.6, Q3.7 and Q3.8. Question 1 of section 3 assesses how likely it is that when practicing in an urban area that one would find a job opportunity for one's spouse. Question 2 assesses how likely further studies and specialisation is when practicing in an urban area. Questions 6 to 8 assess how likely it is that when practicing in a rural area that one would have good living conditions, support for career development and the opportunity to affect the lives of others.

Table 5.16

Univariate One-way Anovas: Belief Measures Associated with Att_U

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	Q3.1	8.974[a]	1	8.974	6.711	.010
	Q3.2	4.308[b]	1	4.308	4.751	.031
	Q3.3	.770[c]	1	.770	.328	.568
	Q3.4	3.154[d]	1	3.154	1.150	.285
	Q3.5	.561[e]	1	.561	.410	.523
	Q3.6	8.222[f]	1	8.222	7.192	.008
	Q3.7	5.847[g]	1	5.847	4.195	.042
	Q3.8	10.718[h]	1	10.718	4.505	.035
Intercept	Q3.1	6681.502	1	6681.502	4996.181	.000
	Q3.2	7068.242	1	7068.242	7795.457	.000
	Q3.3	5098.704	1	5098.704	2169.579	.000
	Q3.4	4107.154	1	4107.154	1496.952	.000
	Q3.5	5153.858	1	5153.858	3763.221	.000
	Q3.6	6329.452	1	6329.452	5537.137	.000
	Q3.7	5780.132	1	5780.132	4147.392	.000
	Q3.8	4079.773	1	4079.773	1714.598	.000
GROUP	Q3.1	8.974	1	8.974	6.711	.010
	Q3.2	4.308	1	4.308	4.751	.031
	Q3.3	.770	1	.770	.328	.568
	Q3.4	3.154	1	3.154	1.150	.285
	Q3.5	.561	1	.561	.410	.523
	Q3.6	8.222	1	8.222	7.192	.008
	Q3.7	5.847	1	5.847	4.195	.042
	Q3.8	10.718	1	10.718	4.505	.035
Error	Q3.1	240.718	180	1.337		
	Q3.2	163.208	180	.907		
	Q3.3	423.016	180	2.350		
	Q3.4	493.862	180	2.744		
	Q3.5	246.516	180	1.370		

	Q3.6	205.756	180	1.143	
	Q3.7	250.862	180	1.394	
	Q3.8	428.298	180	2.379	
Total	Q3.1	7142.000	182		
	Q3.2	7434.000	182		
	Q3.3	5647.000	182		
	Q3.4	4723.000	182		
	Q3.5	5524.000	182		
	Q3.6	6742.000	182		
	Q3.7	6211.000	182		
	Q3.8	4665.000	182		
Corrected Total	Q3.1	249.692	181		
	Q3.2	167.516	181		
	Q3.3	423.786	181		
	Q3.4	497.016	181		
	Q3.5	247.077	181		
	Q3.6	213.978	181		
	Q3.7	256.709	181		
	Q3.8	439.016	181		

The descriptive statistics shown in Table 5.17 indicate that medical students that intend to practice in urban areas regard all of these outcomes to be more likely to occur when practicing in a rural area than those students that intend practicing in a rural area.

Table 5.17

Descriptive Statistics: Belief Measures Associated with Att_U

Dependent Variable	GROUP	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Q3.1	Int_R < Int_U	6.346	.113	6.122	6.570
	Int_R > Int_U	5.897	.131	5.639	6.156
Q3.2	Int_R < Int_U	6.452	.093	6.268	6.636
	Int_R > Int_U	6.141	.108	5.928	6.354
Q3.3	Int_R < Int_U	5.413	.150	5.117	5.710
	Int_R > Int_U	5.282	.174	4.940	5.625
Q3.4	Int_R < Int_U	4.933	.162	4.612	5.253
	Int_R > Int_U	4.667	.188	4.297	5.037
Q3.5	Int_R < Int_U	5.433	.115	5.206	5.659
	Int_R > Int_U	5.321	.133	5.059	5.582
Q3.6	Int_R < Int_U	6.173	.105	5.966	6.380
	Int_R > Int_U	5.744	.121	5.505	5.982
Q3.7	Int_R < Int_U	5.875	.116	5.647	6.103
	Int_R > Int_U	5.513	.134	5.249	5.777

| Q3.8 | Int_R < Int_U | 5.029 | .151 | 4.730 | 5.327 |
| | Int_R > Int_U | 4.538 | .175 | 4.194 | 4.883 |

Roy-Bargman step-down F-tests (Table 5.18) indicated that when controlling for earlier questions group membership no longer explain unique variance in questions Q3.2, Q3.6 and Q3.7. The difference in the likelihood of helping others when practicing in an urban area, however, remains statistically significant, even when controlling for differences in the other four questions.

Table 5.18

Roy-Bargman Step-down F-tests: Belief Measures Associated with Att_U

Roy-Bargman Stepdown F - tests						
Variable	Hypoth. MS	Error MS	StepDown F	Hypoth. DF	Error DF	Sig. of F
Q3.1	8.97436	1.33732	6.71069	1	180	.010
Q3.2	.38720	.60025	.64507	1	179	.423
Q3.6	1.55195	.80091	1.93774	1	178	.166
Q3.7	.01019	.80090	.01273	1	177	.910
Q3.8	9.00766	2.23855	4.02389	1	176	.046

Taken in conjunction this therefore means that final year medical students that intend practicing in urban areas differentiate themselves from their colleagues that prefer to work in rural areas in that they regard the opportunities for further studies and specialisation as more important and altruistically serving the interests of other people as less important and they regard it as more likely than their counterparts that working in an urban area will realise the latter outcome. They also differentiate themselves from their colleagues that intend practicing in rural are in as far as that they see the availability of career opportunities for their spouse, the possibility of further training and specialisation, the availability of career support, good and safe living conditions and planning and mentorship as outcomes when practicing in an urban area to be more likely outcomes than their counterparts.

This line of reasoning would reinforces the earlier suggestion that the one possibility of increasing the number of final year medical students that decide to practice in rural areas is to increase the subjective probability that practicing in a rural area will be instrument in achieving highly valenced outcomes. In terms of the outcomes that the current study identified as salient, special emphasis should be placed on the bringing across the message that the outcomes that those that currently intend practicing in urban areas regard as important, namely, further studies and specialisation, good living conditions and safety and the chance to make a difference in the lives of others can with higher likelihood than currently appreciated be achieved when practicing in a rural area.

5.6. Comparison of normative belief and motivation to comply comprising the social norm towards practising in a urban area (SN_U) across rural and urban intention groups

One-way multivariate analysis of variance (Manova) had already been performed on the four question comprising Section 6 of the research questionnaire. Section six measures the strength of the motivation to comply with the expectation of salient reference groups regarding practicing in a rural or an urban area. Table 5.10 showed that the column vector of four motivation to comply means do not differ statistically significantly (p<.05) across the two groups.

Although the two groups did not differ significantly in terms of the strength of their motivation to comply with the perceived wishes of the salient reference groups as to where they should practice the descriptive statistics shown in Table 5.19 are nonetheless informative in that it indicates that medical students are most strongly motivated to comply with the perceived wishes of their spouse/partner and of their parents.

Table 5.19

Descriptive Statistics: Motivation to Comply Measures

Dependent Variable	GROUP	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Q6.1	Int_R < Int_U	.760	.168	.429	1.091
	Int_R > Int_U	.760	.194	.378	1.142
Q6.2	Int_R < Int_U	.850	.144	.565	1.135
	Int_R > Int_U	.840	.167	.511	1.169
Q6.3	Int_R < Int_U	1.590	.150	1.295	1.885
	Int_R > Int_U	1.627	.173	1.285	1.968
Q6.4	Int_R < Int_U	1.860	.137	1.590	2.130
	Int_R > Int_U	1.920	.158	1.608	2.232

One-way multivariate analysis of variance (Manova) was subsequently performed on the four question comprising Section 5 of the research questionnaire. Section five measures the strength of the normative belief that the student holds about the expectation that salient reference groups/individuals have toward practicing in urban areas Table 5.20 shows that the column vector of four normative belief means regarding practicing in an urban area differed statistically significantly (p > .05) across the two groups.

Table 5.20

One-way Multivariate Analysis of Variance (Manova): Normative Belief Measures Associated with SN_U

Effect		Value	F	Hypothesis df	Error df	Sig.
Intercept	Pillai's Trace	.980	2059.292[b]	4.000	164.000	.000
	Wilks' Lambda	.020	2059.292[b]	4.000	164.000	.000
	Hotelling's Trace	50.227	2059.292[b]	4.000	164.000	.000
	Roy's Largest Root	50.227	2059.292[b]	4.000	164.000	.000
GROUP	Pillai's Trace	.180	8.982[b]	4.000	164.000	.000
	Wilks' Lambda	.820	8.982[b]	4.000	164.000	.000
	Hotelling's Trace	.219	8.982[b]	4.000	164.000	.000
	Roy's Largest Root	.219	8.982[b]	4.000	164.000	.000

The four subsequent univariate one-way ANOVAS (Table 5.21) revealed statistically significant differences on Q5.1, Q5.2, Q5.3 and Q5.4, Question 5.1 assessed the influence of medical students who have graduated and are busy with their internship or hospital years. Question 5.2 assessed the influence of lecturers at Stellenbosch University. Question5.3. assessed the influence of parents and close family and Question 5.4 assessed the influence of a spouse or partner.

Table 5.21

Univariate One-way Anovas: Normative Belief Measures Associated with SN_U

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	Q5.1	5.397[a]	1	5.397	4.157	.043
	Q5.2	6.562[b]	1	6.562	4.207	.042
	Q5.3	34.185[c]	1	34.185	23.681	.000
	Q5.4	13.166[d]	1	13.166	7.904	.006
Intercept	Q5.1	4925.161	1	4925.161	3793.555	.000
	Q5.2	3787.745	1	3787.745	2428.310	.000
	Q5.3	5120.859	1	5120.859	3547.451	.000
	Q5.4	5059.130	1	5059.130	3037.372	.000
GROUP	Q5.1	5.397	1	5.397	4.157	.043
	Q5.2	6.562	1	6.562	4.207	.042
	Q5.3	34.185	1	34.185	23.681	.000
	Q5.4	13.166	1	13.166	7.904	.006
Error	Q5.1	216.816	167	1.298		
	Q5.2	260.491	167	1.560		
	Q5.3	241.070	167	1.444		
	Q5.4	278.160	167	1.666		
Total	Q5.1	5307.000	169			
	Q5.2	4092.000	169			
	Q5.3	5638.000	169			

	Q5.4	5542.000	169
Corrected Total	Q5.1	222.213	168
	Q5.2	267.053	168
	Q5.3	275.254	168
	Q5.4	291.325	168

The descriptive statistics shown in Table 5.22 indicate that medical students that intend to practice in urban areas perceive a stronger normative expectation from medical students who have graduated and are busy with their internship or hospital years that they should practice in urban areas than those students that intend practicing in rural areas (Q4.1). Medical students that intend to practice in urban areas perceive a stronger normative expectation from their parents and or close family members that they should practice in urban areas than medical students that intent to practice in rural areas do (Q4.3). Medical students that intend to practice in urban areas perceive their spouse or partner to be more in support of practicing in an urban area than medical students that intent to practice in rural areas do (Q4.4). In contrast, medical students that intend to practice in urban areas perceive a weaker normative expectation from their lecturers and mentors at Stellenbosch University that they should practice in urban areas than medical students that intent to practice in rural areas do (Q4.2). The largest difference was observed on Question 4.3. Both groups typically perceive all reference groups to be supportive of them practicing in an urban area.

Table 5.22

Descriptive Statistics: Normative Belief Measures Associated with SN_U

Dependent Variable	GROUP	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Q5.1	Int_R < Int_U	5.639	.116	5.411	5.868
	Int_R > Int_U	5.278	.134	5.013	5.543
Q5.2	Int_R < Int_U	4.588	.127	4.337	4.838
	Int_R > Int_U	4.986	.147	4.696	5.277
Q5.3	Int_R < Int_U	6.021	.122	5.780	6.261
	Int_R > Int_U	5.111	.142	4.832	5.391
Q5.4	Int_R < Int_U	5.814	.131	5.556	6.073
	Int_R > Int_U	5.250	.152	4.950	5.550

A Roy-Bargman step-down F-test (Table 5.23) was performed in which the variance that preceding variables explained in variables that follow them was controlled before evaluating the significance of the difference variable means across the two intention groups. Even when controlling for the variance between in Q5.2 explained by Q5.1, and when controlling for the variance in Q5.3 explained by Q5.1 and Q5.2 the difference in the Q5.2 and Q5.3 means remained statistically significant ($p < .05$). When controlling for Q5.1, Q5.2 and Q5.3 the difference in the mean Q5.4 no longer was statistically significant. The normative belief related to spouse/partner, therefore does not statistically significantly ($p > .05$) explain unique variance in group membership (i.e. whether Int_R > Int_U or *vice versa*).

Table 5.23

Roy-Bargman Step-down F-test: Normative Belief Measures Associated with SN_U

	Roy-Bargman Stepdown F - tests					
Variable	Hypoth. MS	Error MS	StepDown F	Hypoth. DF	Error DF	Sig. of F
Q5.1	5.39744	1.29830	4.15732	1	167	.043
Q5.2	11.10958	1.40940	7.88251	1	166	.006
Q5.3	31.14148	1.42402	21.86864	1	165	.000
Q5.4	.63693	1.46169	.43575	1	164	.510

5.7.   Practical recommendations

The ability to influence final year medical students to choose to practice in rural areas where the need for medical practitioners is the greatest depends on the extent to which the psychological mechanism that shapes the intention to practice in rural areas is validly understood. The current study found that the attitude towards practicing in a rural area plays a role in shaping the intention to practice in a rural area. The comparison of those that currently intend practicing in a rural area with those that currently intend practicing in an urban area revealed that especially the belief that practicing in a rural area will make a difference in the lives of others is what distinguishes the two groups. This suggests that the Health Professions Council of South Africa, Provincial Departments of Health and the Medical Science faculties of South African Universities that train medical practitioners should consistently emphasise the substantial impact that medical practitioners practicing in rural areas can have on the lives of people and illustrate it with real-live case studies. The other salient outcomes should in the process not be neglected though. Emphasis should therefore also be placed on the bringing across the message that the outcomes that those that currently intend practicing in urban areas regard as important, namely, further studies and specialisation, and good living conditions can with higher likelihood than currently appreciated be achieved when practicing in a rural area.

The current study found that the social norm towards practicing in a rural area plays a role in shaping the intention to practice in a rural area. Medical students are most strongly motivated to comply with the perceived wishes of their spouse/partner and those of their parents. The intention to practice in rural areas could therefore be enhanced if the attitude of the two reference groups towards practicing in rural areas could be made more positive. This suggests that communication from the aforementioned stakeholder groups should also be directed at partners/spouses and parents.

5.8.   Recommendations for future research

The researcher strongly recommends that the current study be should be replicated on a larger and more representative sample of South Africa final year medical students. The current model only explained a small proportion of the variance in medical students' intention to practice in rural areas. The greater part of the psychological mechanism that regulates the level of final year medical students' intention to practice in rural areas is therefore still not understood. It is critical to identify the influences that determine the intention of medical students to practice in rural areas, and the manner in which these influences structurally combine to determine the strength of the intention, because these students are the future of medical health in a country that is marked by serious shortages of medical practitioners in rural areas where they are much needed.

Perceived behavioural control represents a latent variable that should be considered for inclusion in the in an elaborated explanatory intention to practice structural model. Ajzen (2002) suggested that perceived behavioural control is an important additional variable that shapes intention to act. Perceived behavioural control beliefs about the presence and the power of factors that may further or hinder performance of the behaviour in question (Ajzen, 2002).

5.9.   Limitation of the current study

One of the limitations of this specific study was the representativeness of the study sample that limited the confident generalisation of the results. The sample comprised a group of students from one specific university which cannot be claimed to be representative of all medical students in the country. Should the study include more medical students from other universities in South Africa, the results might have been different. A second limitation was the fact that the questionnaires did not provide the opportunity for medical students to indicate their marital status. The assumption has been made that students are not necessarily married. However, medicine is a long course and it is possible for students to get married while still studying. It is also possible that older individuals who are married commenced their studies at a later stage in their lives. For future studies this is an aspect to take into consideration.

REFERENCES

Àjzen, I. (2002). Perceived Behavioral Control, Self-Efficacy, Locus of Control, and the Theory of Planned Behavior. *Journal of Applied Social Psychology,* 32(*4),* 665-683

Ajzen, I., & Fishbein, M. (1972). Attitudes and normative beliefs as factors influencing behavioral intentions. *Journal of Personality and Social Psychology, 21*(1), 1-9.

Ashmore, J. (2013). 'Going private': a qualitative comparison of medical specialists' job satisfaction in the public and private sectors of South Africa. *Human Resources for Health, 11*(1), 12-16.

Aydin, S., Yaris, F., Dikici, M., & Igde, F. A. (2015). Effect of rural practice observation on the anxiety of medical students. *Rural and Remote Health*, 1-9. Retrieved 5 24, 2015

Bailey, N., Mandeville, K. L., Rhodes, T., Mipando, M., & Muula, A. S. (2012). Postgraduate career intentions of medical students and recent graduates in Malawi: a qualitative interview study. *BMC Medical Education, 12*(87), 1-10.

Bärninghausen, T., & Bloom, D. E. (2009). Financial incentives for the return of service in underserved areas: a systematic review. *BCM Health services Research, 9*(86), 34-46.

Baumgarther, H. R. P., & Bagozzi, R. (2008). Future-oriented emotions: conceptualization and behavioral effects. *European Journal of Social Psychology, 38*, 685-696.

Bee, C. C., & Madrigal, R. (2013). Consumer uncertainty: the influence of anticipatory emotions on ambivalence, attitudes, and intentions. *Journal of Consumer Behavior, 12*, 370-381.

Bonenberger, M., Aikins, M., Akweongo, P., & Wyss, K. (2014). The effects of health worker motivation and job satisfaction on turnover intention in Ghana: a cross-sectional study. *Human Resources for Health, 12*(43).

Botha, T. (2013/2014). *Annual Report.* Western Cape: Western Cape Department of Health.

Burchell, K., R, R., & Patel, K. (2013). Marketing social norms: Social marketing and the 'social norm approach'. *Journal of Consumer Behaviour, 12*, 1-9.

Cialdini, R., Demaine, L. J., Sagarin, B. J., Rhoads, K., & Winter, P. L. (2006). Managing social norms for persuasive impact. *Social Influence, 1*(1), 3-15.

Cooke, R., Couper, I., & Versteeg, M. (2011). The stark reality of a gross shortage of health workers sustains poor health outcomes for rural people and needs immediate attention. *Human Resources for Rural Health, 10*.

Couper, I. D. (2003). Rural hospital focus: defining rural. *Rural and Remote Health, 3*(205), 1-3.

Couper, I. D. (2007). The impotence of being important – reflections on leadership. *Annals of Family Medicine, 5*(3), 261-262.

Couper, I. D., Hugo, J. F., Conradie, H., & Mfeyana, K. (2007). Influences on the choice of health professionals to practise in rural areas. *South African Medical Journal, 97*(11), 1082-1086.

Couper, I., Worley, P. S., & Strasser, R. (2011). Rural longitudinal integrated clerkships: lessons from two programs on different continents. *Rural and Remote Health, 11*(1665), 1-11. Retrieved 5 14, 2015, from http://www.rrh.org.au

Daniels-Felix, D. K., Conradie, H., & Vos, M. (2015). Choosing final-year placement: why students decide not to go rural. *African Journal of Health Professions Education, 7*(1), 111-114.

Darley, W. K., Blankson, C., & Luethge, D. J. (2010). Toward an integrative framework for online consumer behavior and decision making process: a review. *Psychology and Marketing, 27*(2), 94-116.

De Franca, D. X., & Monteiro, M. B. (2013). Social norms and the expression of prejudice: the development of aversive racism in childhood. *European Journal of Social Psychology, 43*(4), 263-271.

De Villiers, M., Conradie, H., Snyman, S., Van Heerden, B., & Van Schalkwyk, S. (2014). Experiences in developing and implementing a community-based education strategy - a case study from South Africa. In W. Talaat, & Z. Ladhani, *Community Based Education in Health Professionals: Global Perspectives* (pp. 179-206). The Eastern Mediterranean Regional Office of the World Health Organization.

De Vries, E., & Reid, S. (2003). Do South African medical students of rural origin return to rural practice? *South African Medical Journal, 93*(10), 189 - 204.

De Vries, E., & Reid, S. (2007). Do South African medical students of rural origin return tot rural practice. *South African Medical Journal, 97*(11), 1082-1086.

De Vries, E., Iram, J., Couper, I., & Kornik, S. A. (2010). Career plans of final-year medical students in South Africa. *South African Medical Journal, 100*(4), 227-228.

Diab, P., Flack, P. S., Mabuza, L. H., & Moolman, H. (2015). Curriculum challenges faced by rural-origin health science students at South African medical schools. *African Journal of Health Professions Education, 7*(1), 51-54.

Doherthy, J. E., Couper, I. D., Campbell, D., & Walker, J. (2013). Transforming rural health systems through clinical academic leadership: lessons from South Africa. *Rural and Remote Health, 13*(2618), 1 - 8.

Dudley, L. D., Young, T. N., Willems, B., Dramowski, A., Goliath, C., Mukinda, F. K., . . . Cameron, N. A. (2015). Fit for purpose? A review of a medical curriculum and its contribution to strengthening health systems in South Africa. *African Journal for Health Professions Education, 7*(1), 81-85.

Du Plessis, R. (2015, 2 22). *Eldis.* Retrieved from http://www.eldis.org/go/home&id=69663&type=Document#.VOmKRmYcQaI

E Medicine Health. (2014, 11 15). Retrieved from http://www.emedicinehealth.com/script/main/art.asp?articlekey=9237

Econex. (2010). Updated GP and specialist numbers for South Africa. *Health Reform Note 7*.

Econex. (2013). Updated GP and specialist numbers for south Africa. *Health Reform Note 8*.

Faculty of Health Sciences. (2013, 11 15). Retrieved from University of Stellenbosch: http://www.sun.ac.za/english/faculty/healthsciences

Franco, L. M., Bennett, S., & Kanfer, R. (2002). Health sector reform and public sector health worker motivation: a conceptual framework. *Social Science and Medicine, 54*, 1255-1266.

Frenk, J., Chen, L., Bhutta, Z. A., Cohen, J., Crisp, N., Evans, T., . . . Serwadda, D. (2010, 12 4). Health professionals for a new century: Transforming education to strengthen health system in an interdependent world. *The Lancet, 376*(9756).

Geldenhuys, M., Laba, K., & Venter, C. M. (2014). Meaningful work, work engagement and organisational commitment. *South African Journal of Industrial Psychology, 40*(1). Retrieved 8 12, 2014, from http://www.sajip.co.za

George, G., Gow, J., & Bachoo, S. (2013). Understanding the factors influencing health-worker employment decisions in South Africa. *Human Resource for Health, 11*(15).

Girasek, E., Eke, E., & Szocska, M. (2010). Analysis of a survey on young doctors' willingness to work in rural Hungary. *Human Resources for Health, 8*(13).

Global Consensus for Social Accountability in Medical Schools (2010). Retrieved 3 4 2015, from http://healthsocialaccountability.org/

Health Professions Council of South Africa. (2006, 8). Retrieved 2 22, 2015, from http://www.hpcsa.co.za/PBPsychology/Guidelines

Health Professions Council of South Africa. (2008, 9 16). Retrieved 2 22, 2015, from http://www.hpcsa.co.za/PBPsychology/Examinations

Health Professions Council of South Africa. (2011, 8). Retrieved 2 22, 2015, from http://www.hpcsa.co.za/PBPsychology/Education

Health Professions Council of South Africa. (2014, 2). Retrieved 2 22, 2015, from http://www.hpcsa.co.za/PBPsychology/Education

Hogg, M., & Reid, S. (2006). Social identity, self-categorization, and the communication of group norms. *Community Theory, 16*, 7-30.

Holst, J., Normann, O., & Herrmann, M. (2015). Strengthening training in rural practice in Germany: New approach for undergraduate medical curriculum towards sustaining rural health care. *Rural and Remote Health, 15*(3563).

Howell, D.C. (1992). *Statistical methods for psychology*. Boston: PWS-Kent Publishing Company.

Institute for international medical education. Retrieved, 15 11 2014, from http://www.iime.org.glossary.htm#physician

Lehmann, U., Dieleman, M., & Martineau. (2008). Staffing remote rural areas in middle- and low-income countries: a literature review of attraction and retention. *BMC Health Service Research, 8*(19).

MacInnis, D. J., & De Mello, G. (2005). The concept of hope and its relevance to product evaluation and choice. *Journal of Marketing, 69*, 1-14.

Manahan, C. M., Hardy, C. L., & Macleod, M. L. (2009). Personal characteristics and experiences of long term allied health professionals in rural and Northern British Columbia. *Rural and Remote Health, 9*(1238).

Matsoso, M. P. (2014). *National Department of Health Annual Report.* Retrieved, 8 7 2014, from http://www.health.gov.za/annualreports.php

McDonald, R. I. (2015). Social norms and social influence. *Current Opinion in Behavioral Sciences, 3*, 147-151.

McGrail, M. R., Humphreys, J. S., & Joyce, C. M. (2011). Nature of association between rural background and practice location: A comparison of general practitioners and specialists. *BMC Health Service Research, 11*(83), 1-8.

Moodley, S. V., Wolvaardt, L., Louw, M., & Hugo, J. (2014). Practice intentions of clinical associate students at the University of Pretoria, South Africa. *Rural and Remote Health, 4*(2381).

Motsoaledi, A. (2012, 11 30). *Progress and changes in the South African health sector.* Retrieved 10 24, 2014, from http://dx.doi.org/10.1016/

Muula, A. S. (2005). "Brain Drain" of health professionals from Africa. *Croat Medical Journal, 46*(1), 21-29.

Muula, A. S. (2007). How do we define 'rurality' in the teaching on medical demography? *Rural and Remote Health, 7*.

Naidu, C., Irlam, J., & Diab, P. N. (2013). Career and practice intentions of health science students at three South African health science faculties. *African Journal of Health Professions Education, 5*(2), 68-71.

Padarath, A., Chamberlain, C., McCoy, D., Ntuli, A., Rowson, M., & Lowenson, R. (2003). Health personnel in South Africa: Confonting maldistribution and brain drain. *Equinet Discussion Paper no 4*.

Palmer, D. (2006). Tackling Malawi's human resource crisis. *Reproductive Health Matters, 14*(27), 27-39.

Rasool, F., Botha, C. J., & Bisschoff, C. A. (2012). Push and pull factors in relation to skills shortages in South Africa. *Journal of Social Science, 30*(1), 11-20.

Reid, S. (2011). Pedagogy for rural health. *Education for Health, 24*(1), 1-10.

Reid, S. (2011). Rural Medicine as a sub-specialty. *CME, 29*(2).

Reid, S. J., & Cakwe, M. (2011). The contribution of South African curricula to prepare health professionals for working in rural or under-served areas in South Africa: A peer review evaluation. *South African Medical Journal, 101*(1), 34-38.

Reid, S. J., Couper, I. D., & Volmink, J. (2011). Educational factors that influence the urban-rural distribution of health professionals in South Africa: a case-control study. *South African Medical Journal, 101*(1), 29-33.

Rhodes, R. E., & Courneya, K. S. (2005). Threshold assessment of attitude, subjective norm, and perceived behavioral control for predicting exercise intention and behavior. *Psychology of Sport and Exercise, 6*, 349–361.

Rouke, J. (1997). In search of a definition of rural. *Canadian Journal of Rural Medicine, 2*, 113-115.

Rourke, J. (2010). How can medical schools contribute to the education, recruitment and retention of rural physicians in their region? *Bulletin of the World Health Organization*, 395-396.

RuDASA. (2014). Retrieved 12 8, 2015, from http://www.rudasa.org.za

Sadovykh, V., Sundaram, D., & Piramuthu, S. (2015). Do decision-making structure and sequence exist in health online social networks? *Decision Support Systems, 74*, 102-120.

Sawang, S., Sun, Y., & Salim, S. A. (2014). It's not only what I think but what they think! The moderating effect of social norms. *Computers & Education, 76*, 182-189.

Schwartz, A. (2011). Medical decision making and medical education. Challenges and opportunities. *Perspectives in Biology and Medicine, 54*(1), 68-74.

Sekiguchi, T., & Nakamura, M. (2011). How inconsistency between attitude and behavior persists through cultural transmission. *Journal of Theoretical Biology, 271*, 124-135.

Sekiguchi, T., & Nakamaru, M. (2014). How intergenerational interaction affects attitude-behavior inconsistency. *Journal of Theoretical Biology, 346*, 54–66.

Serneels, P., Montalvo, J. G., Pettersson, G., Lievens, T., Butera, J. D., & Kidanu, A. (2010). Who wants to work in a rural health post? The role of intrinsic motivation, rural background and faith-based institutions in Ethiopia and Rwanda. *Bulletin of the World Health Organization, 88*, 342-349.

Sheikh, A., Naqvi, S. H., Sheikh, K., Naqvi, S. H., & Bandukda, M. Y. (2012). Physician migration at its roots: a study on the factors contributing towards a career choice abroad amoung students at a medical school in Pakistan. *Globalization and Health, 43*(8), 1-12.

Sibbald, B. (2005). *Putting general practitioners where they are needed: an overview of strategies to correct maldistribution*. Retrieved 7 12 2014, from http://www.population-health.manchester.ac.uk/primarycare/npcrdc-archive/Publications/overview%20of%20strategies%20to%20correct%20maldistribution.pdf

Simon, M. K., & Goes, J. (2014, 11 10). *Ex post facto research.* Retrieved from Dissertation Recipes: http://www.dissertationrecipes.com/resource-links-2-2/

Stoler, J. K. (2013). Commentary: recommendations and remaining questions for health care leadership training programs. *Academic Medicine, 88*(1), 12-15.

Tabachnick, B.G. & Fidell, L.S. (2007). *Using multivariate statistic*s, Fifth Edition. Boston: Pearson Education

Tiliopoulos, N., Pallier, G., & Coxon, A. P. (2010). A circle of traits: a perceptual mapping of the NEO-PI-R. *Personality and Individual Differences, 48*, 34-39.

Tolhurst, H. M., & Adams, J., & Stewart, S. M. (2006). An exploration of when urban background medical students become interested in rural practice. *Rural and Remote Health, 6*(1), 452.

Tredoux, C., & Durrheim, K. (2002). *Numbers, hypotheses & conclusions: A course in statistics for the social sciences.* Cape Town: Lansdowne.

Vallerand, R. J., Cuerrier, P. D., Cuerrier, J-P., Pelletier, L. G., & Mongeau, C. (1992). Ajzen and Fishbein's theory of reasoned action as applied to moral behaviour: a confirmatory analysis. *Journal of Personality and Social Psychology, 62*(1), 98-109.

Van Schalkwyk, S. C., Bezuidenhout, J., Conradie, H., Fish, T., Kok, N., Van Heerden, B. H., & De Villiers, M. R. (2014). 'Going rural': driving change through a rural medical education innovation. *Rural and Remote Health, 14*(2493).

Versteeg, M., Du Toit, L., Couper, I., & Mnqapu, M. (2013). Building consensus on key priorities for rural health care in South Africa using the Delphi technique. *Global Heath Action, 6*, 1-8.

Walker, J. H., De Witt, D. E., Pallant, J. F., & Cunningham, C. E. (2012). Rural origin plus a rural clinical school placement is a significant predictor of medical students' intentions to practice rurally: a multi-university study. *Rural and Remote Health, 12*, 1-9. Retrieved 5 23, 2015, from http://www.rrh.org.au/articles/defaultnew.asp?IssueNo=12x

Wilson, N. W., Couper, I. D., De Vries, E., Reid, S., Fish, T., & Marais, B. J. (2009). A critical review of interventions to redress the inequitable distribution of healthcare professionals to rural and remote areas. *Rural and Remote Health, 9*(2), 1060-1081.

Wits Centre for Rural Health Strategy. (2008). Retrieved 5 5, 2015, from University of the Witwatersrand: http://www.wits.ac.za/ruralhealth/10095/ruralhealth.html

Witter, S., Thu, H. B., Shengalia, B., & Vujicic, M. (2011). Understanding the 'four directions of travel'. Qualitative research into the factor affecting recruitment and retention of doctors in rural Vietnam. *Human Resources for Health, 9*(20).

World Health Organisation (1946). *The World Health Report.* New York: World Health Organisation.

World Health Organisation. (2006). *The World Health Report.* Geneva: World Health Organisation.

World Health Organisation. (2010). *Increasing access to health workers in remote and rural areas through improved retention.* Geneva: World Health Organisation.

World Health Organisation. (2013). *Transforning and scaling up health professionals' education and training.* Geneva: World Health Organisation.

Yang, H., & Yoo, Y. (2004). It's all about attitude: revisiting the technology acceptance model. *Decision Support Systems, 38*(1), 19-31.

APPENDIX A
INFORMED CONSENT FORMS

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CONSENT TO PARTICIPATE IN THIS RESEARCH STUDY

DEVELOPMENT AND EMPIRICAL TESTING OF A THEORETICAL MODEL EXPLAINING MEDICAL STUDENTS' INTENTION TO PRACTISE IN URBAN OR RURAL SOUTH AFRICA.

PRINCIPAL INVESTIGATOR: MS WILLIEN MEIRING

SUPERVISOR: MS MICHELLE VISSER

CO-INVESTIGATOR: PROF. CALLIE THERON

You are invited to take part in a research project. Please take some time to read the information presented here, which will explain the details of this project. Please feel free to ask the investigator if any aspect of the study would not be clear. It is very important that you clearly understand the purpose of the research and the nature of your involvement in it. Your participation is **entirely voluntary** and you are free to decline to participate. If you decline the invitation to participate this decision will in no way be held against you. You are also free to withdraw from the study at any point, even if you do agree to take part.

This study has been approved by the **Research Ethics Committee (REC) of Stellenbosch University** and will be conducted according to the ethical guidelines and principles of Stellenbosch University.

PURPOSE OF THE STUDY

The objective of the research is to better understand and explain the factors that influence a medical student's intention to choose to practice in an urban or a rural area in South Africa. The study will examine whether the intention to choose a specific area of practice can be explained by the Fishbein model. The Fishbein model explains variance in the intention to act in terms of variance in the attitude towards the act and variance in the perceived social norm regarding the act. The purpose of the research is to derive practical recommendations that will assist in increasing the number of medical practitioners practicing in rural areas.

PROCEDURES

If you voluntarily agree to participate in this research study you would be requested to respond to a set of question as part of an **interview.** The interview will follow the structure of a focus group interview where 10 students will be interviewed by the investigator simultaneously. This session is estimated to take about **60 minutes.** For the purposes of record keeping for the means of this study, the investigator will take notes during the interview and the interview will be recorded. If you are uncomfortable with this procedure you may withdraw from the study *(See section on Participation and Withdrawal)*. After the interview you will have the right to see the transcripts of the focus group interview in order to validate the content thereof. Amendments can then be made if the participant is not satisfied with what the researcher wrote. Your personal information and responses to the interview questions will in no way be linked to a specific person and this information will by no means be distributed to any person in a management position at the institution who can make decisions regarding how placements in the community year will be made.

WHY HAVE YOU BEEN INVITED TO TAKE PART IN THIS STUDY

The study seeks to better understand and explain the factors that influence a medical student's intention to choose to practice in an urban or rural area in South Africa.

Because you are a fifth year medical student your participation will provide valuable information on this matter.

RESPONSIBLILTY OF THE PARTICIPANT

The participant has no responsibility except for answering the questions as honestly and accurately as possible.

BENEFITS FROM TAKING PART IN THIS RESEARCH

There are no direct benefits for you as the participant. This study does, however, hold benefits to society and the profession in terms of the fact that findings from this research study will assist in explaining why medical students, at the onset of their careers, choose to practice in an urban or a rural area. By explaining this intention, interventions can be planned in order to provide underserved areas with competent medical practitioners in future.

RISKS AND DISCOMFORT INVOLVED IN TAKING PART IN THIS RESEACRCH

No risks for you as the participant are anticipated as a direct result of taking part in this research study. The only discomfort anticipated is the time that you will need to set aside to take part in the study. All information obtained in this study will be treated as confidential at all times and will in no manner be used against you as the participant.

PARTICIPATION AND WITHDRAWAL

Participation is completely voluntary thus you may choose to withdraw from the study should you wish to do so. Participants have no obligation to answer all the questions and will still remain in the study even if not all the questions were answered.

You may choose not to take part in this study without any consequences.

COMPENSATION FOR PARTICIPATION AND COSTS INVOLVED

You will not be compensated or get paid for taking part. There is also no fee involved in order to take part in this research.

IS THERE ANY THING ELSE THAT YOU SHOULD KNOW OR DO?

You can contact the Health Research Ethics Committee (Dr Barsdorf - 021-938 9075) if you have any concerns or complaints that have not been adequately addressed by your investigator.

You will receive a copy of this information and consent form for your own records

CONFIDENTIALITY

Any information that is obtained in connection with this study and that can be identified with you will remain confidential and will be disclosed only with your permission or as required by law. Anonymity will be maintained by means of using pseudonyms during the focus group. The results of this study will be published in the form of a completed dissertation as well as in an accredited journal, but confidentiality will be maintained. Participant's names will not be published.

RIGHTS OF RESEARCH SUBJECTS

You may withdraw your consent at any time and discontinue participation without penalty. You are not waiving any legal claims, rights, or remedies because of your participation in this research study. If you have questions regarding your rights as a research subject, contact Ms Maléne Fouché [mfouche@sun.ac.za; 021 808 4622] at the Division for Research Development, Stellenbosch University.

ADDESS ANY QUESTIONS TO THE FOLLOWING INDIVIDUALS:

Principal investigator: Ms Willien Meiring (+264 81 324 4811)

Supervisor: Ms Michelle Visser (021- 808 2961; mvis@sun.ac.za)

Co-Investigator: Prof. Callie Theron (021-808 3009; ccth@sun.ac.za)

Declaration by participant

I declare that:

I have read or had read to me this information and consent form and it is written in a language with which I am fluent and comfortable.

I have had a chance to ask questions and all my questions have been adequately answered.

I understand that taking part in this study is **voluntary** and I have not been pressurised to take part.

I understand that the interview will be taped and the transcribed interview sheet will be made available to me to validate the content, if I should wish to view it.

I may choose to leave the study at any time and will not be penalised or prejudiced in any way.

I voluntarily **consent** to take part in this study   ☐

I voluntarily **decline** the invitation to take part in this study   ☐

Declaration by investigator

I, Willien Meiring declare that:

I explained the information in this document to all the participants

I encouraged participants to ask questions and took adequate time to answer them.

I am satisfied that participants adequately understand all aspects of the research, as discussed above.

_____   _____

    Signature of investigator   **Date**

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CONSENT TO PARTICIPATE IN THIS RESEARCH STUDY

DEVELOPMENT AND EMPIRICAL TESTING OF A THEORETICAL MODEL EXPLAINING MEDICAL STUDENTS' INTENTION TO PRACTISE IN URBAN OR RURAL SOUTH AFRICA.

PRINCIPAL INVESTIGATOR: MS WILLIEN MEIRING

SUPERVISOR: MS MICHELLE VISSER

CO-INVESTIGATOR: PROF. CALLIE THERON

You are invited to take part in a research project. Please take some time to read the information presented here, which will explain the details of this project. Please feel free to ask the investigator if any aspect of the study would not be clear. It is very important that you clearly understand the purpose of the research and the nature of your involvement in it. Your participation is **entirely voluntary** and you are free to decline to participate. If you decline the invitation to participate this decision will in no way be held against you. You are also free to withdraw from the study at any point, even if you do agree to take part.

This study has been approved by the **Research Ethics Committee (REC) of Stellenbosch University** and will be conducted according to the ethical guidelines and principles of Stellenbosch University.

PURPOSE OF THE STUDY

The objective of the research is to better understand and explain the factors that influence a medical student's intention to choose to practice in an urban or a rural area in South Africa. The study will examine whether the intention to choose a specific area of practice can be explained by the Fishbein model. The Fishbein model explains variance in the intention to act in terms of variance in the attitude towards the act and variance in the perceived social norm regarding the act. The purpose of the research is to derive practical recommendations that will assist in increasing the number of medical practitioners practicing in rural areas.

PROCEDURES

If you voluntarily agree to participate in this research study you would be requested to respond to a set of **questions** as objectively and accurately as possible. The questionnaire will only take **15 minutes** to complete. The questionnaire will comprise of seven sections which will be measured on a 7 point horizontal graphic rating scale. In total there are 35 questions to be answered.

WHY HAVE YOU BEEN INVITED TO TAKE PART IN THIS STUDY

The study seeks to better understand and explain the factors that influence a medical student's intention to choose to practice in an urban or rural area in South Africa. Because you are a fifth year medical student your participation will provide valuable information on this matter.

RESPONSIBLILTY OF THE PARTICIPANT

The participant has no responsibility except for answering the questions as honestly and accurately as possible.

BENEFITS FROM TAKING PART IN THIS RESEARCH

There are no direct benefits for you as the participant. This study does, however, hold benefits to society and the profession in terms of the fact that findings from this research

study will assist in explaining why medical students, at the onset of their careers, choose to practice in an urban or a rural area. By explaining this intention, interventions can be planned in order to provide underserved areas with competent medical practitioners in future.

RISKS AND DISCOMFORT INVOLVED IN TAKING PART IN THIS RESEACRCH

No risks for you as the participant are anticipated as a direct result of taking part in this research study. The only discomfort anticipated is the time that you will need to set aside to take part in the study. All information obtained in this study will be treated as confidential at all times and will in no manner be used against you as the participant.

PARTICIPATION AND WITHDRAWAL

Participation is completely voluntary thus you may choose to withdraw from the study should you wish to do so. Participants have no obligation to answer all the questions and will still remain in the study even if not all the questions were answered.

You may choose not to take part in this study without any consequences.

COMPENSATION FOR PARTICIPATION AND COSTS INVOLVED

You will not be compensated or get paid for taking part. There is also no fee involved in order to take part in this research.

Is there any thing else that you should know or do?

You can contact the Health Research Ethics Committee (Dr Barsdorf - 021-938 9075) if you have any concerns or complaints that have not been adequately addressed by your investigator.

You will receive a copy of this information and consent form for your own records.

CONFIDENTIALITY

Any information that is obtained in connection with this study and that can be identified with you will remain confidential and will be disclosed only with your permission or as required by law.   Anonymity will be maintained by the fact that no participant is requested to provide a name, student number or contact details. The results of this study will be published in the form of a completed dissertation as well as in an accredited journal, but confidentiality will be maintained. Participant's names will not be published.

RIGHTS OF RESEARCH SUBJECTS

You may withdraw your consent at any time and discontinue participation without penalty. You are not waiving any legal claims, rights, or remedies because of your participation in this research study. If you have questions regarding your rights as a research subject, contact Ms Maléne Fouché [mfouche@sun.ac.za; 021 808 4622] at the Division for Research Development, Stellenbosch University.

Addess any questions to the following individuals:

Principal investigator: Ms Willien Meiring (+264 81 324 4811)

Supervisor: Ms Michelle Visser (021- 808 2961; mvis@sun.ac.za)

Co-Investigator: Prof Callie Theron (021-808 3009; ccth@sun.ac.za)

Declaration by participant

I declare that:

I have read or had read to me this information and consent form and it is written in a language with which I am fluent and comfortable.

I have had a chance to ask questions and all my questions have been adequately answered.

I understand that taking part in this study is **voluntary** and I have not been pressurised to take part.

I may choose to leave the study at any time and will not be penalised or prejudiced in any way.

I voluntarily **consent** to take part in this study   ☐

I voluntarily **decline** the invitation to take part in this study   ☐

Declaration by investigator

I Willien Meiring declare that:

I explained the information in this document to all the participants

I encouraged participants to ask questions and took adequate time to answer them.

I am satisfied that participants adequately understand all aspects of the research, as discussed above

_____   _____

      Signature of investigator   **Date**

APPENDIX B
INTERVIEW QUESTIONS

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INTERVIEW ON MEDICAL STUDENTS' INTENTION TO PRACTISE IN URBAN OR RURAL SOUTH AFRICA

BACKGROUND INFORMATION: This forms part of a study in which you will be asked questions with regards to medical students' intention to practice in rural or urban South Africa. The purpose of the study is to develop and empirically test a theoretical model explaining medical students' intention to practice in urban or rural South Africa. All information will be kept confidential and only myself and my promoter will have access to the information provided. Data obtained from this interview will only be used for study purposes. Please read through the informed consent form attached with all the necessary detail regarding this study.

INSTRUCTIONS: A short interview will follow where 10 questions will be asked. The interview should not take longer than 60 minutes. Please listen to all the questions and answer as accurately and thoroughly as possible. If you feel at any stage that you do not want to continue, please inform me. You are under no obligation to take part in this research when it makes you uncomfortable.

BIOGRAPHICAL INFORMATION

Please take the time to fill out the biographical information as thoroughly and accurately as possible by filling in the appropriate block.

DATE OF BIRTH										AGE		

148

YEAR OF STUDY											GENDER		M	F
RACE														
HOME LANGUAGE														

Rural areas can be classified as settings outside large metropolitan areas such as cities and provincial capital cities in South Africa (De Vries & Reid, 2003). Examples of such areas are Garies, in the Northern Cape and Montague in the Western Cape province.

What is your definition of a rural area?

An urban area refers to an area which contains a certain population within fixed boundaries, usually referred to as cities or towns (World Health organisation, 2006). Examples of such areas in South Africa are Johannesburg and Pretoria in the Gauteng province.

What is your definition of an urban area?

Which outcome (factor) consideration would influence your choice to practice in a rural area?

Which outcome consideration would influence your choice to practice in an urban area?

Which negative outcomes do you associate with working in a rural area as a medical practitioner?

Which negative outcomes do you associate with working in an urban area as a medical practitioner?

Which positive outcomes do you associate with working in a rural area as a medical practitioner?

Which positive outcomes do you associate with working in an urban area as a medical practitioner?

The end. Thank you for participating in the research.

APPENDIX C
QUESTIONNAIRE

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QUESTIONNAIRE ON MEDICAL STUDENTS' INTENTION TO PRACTISE IN URBAN OR RURAL SOUTH AFRICA

BACKGROUND INFORMATION: This forms part of a study in which you will be asked questions with regards to medical students' intention to practice in rural or urban South Africa. The purpose of the study is to develop and empirically test a theoretical model explaining medical students' intention to practice in urban or rural South Africa. Please note that the information is used for research purposes only and only myself and my promoter will have access to the data. All information will be kept confidential Data obtained from this interview will only be used for study purposes. Please read through the informed consent form attached with all the necessary detail regarding this study.

INSTRUCTIONS: Please read through all the questions in each of the seven sections and answer as accurately and thoroughly as possible. The questionnaire will not take longer than **15 minutes** to complete. The questionnaire comprise of seven sections which are measured on a 7 point horizontal graphic rating scale. Questions tap into medical students' intention to practice in rural or urban areas in South Arica. Section 1 comprise of 7 questions, Section 2 comprise of 7 questions, Section 3 comprise of 7 questions, Section 4 comprise of 4 questions, Section 5 comprise of 4 questions, Section 6 comprise of 4 questions and Section 7 comprise of 2 questions. In total there are 35 questions to be answered.

BIOGRAPHICAL INFORMATION

Please take the time to fill out the biographical information as thoroughly and accurately as possible.

DATE OF BIRTH										AGE			
YEAR OF STUDY										GENDER		M	F
RACE													
HOME LANGUAGE													

SECTION 1: SALIENT OUTCOMES

Please read through the statements below and indicate how good (+3) or bad (-3) are each of the following outcomes is in terms the area of practice (i.e. urban practice or rural practice)?

1.1   Job opportunities for spouses

> Very bad   -3   -2   -1   0   +1   +2   +3   Very good

1.2   Opportunities for further studies and specialization

> Very bad   -3   -2   -1   0   +1   +2   +3   Very good

1.3   Financial and non-financial incentives

> Very bad   -3   -2   -1   0   +1   +2   +3   Very good

1.4   Safety for the family

> Very bad   -3   -2   -1   0   +1   +2   +3   Very good

1.5   Availability and support of staff in the workplace

> Very bad   -3   -2   -1   0   +1   +2   +3   Very good

1.6   Good living conditions providing in basic needs

Very bad   -3   -2   -1   0   +1   +2   +3   Very good

1.7   Availability of career support and planning and mentorship

Very bad   -3   -2   -1   0   +1   +2   +3   Very good

1.8   Altruism - the need to make a difference in the lives of others

Very bad   -3   -2   -1   0   +1   +2   +3   Very good

SECTION 2: BELIEF STRENGTH THAT PRACTICING IN A RURAL AREA WILL RESULT IN EACH OF THE FOLLOWING SALIENT OUTCOMES

Rural areas can be classified as settings outside large metropolitan areas such as cities and provincial capital cities in South Africa (De Vries & Reid, 2003). Examples of such areas are Garies, in the Northern Cape and Montague in the Western Cape province.

How likely is each of the following outcomes given that you will choose to practice in a rural area in South Africa?

2.1   Job opportunities for spouses

Extremely unlikely   1   2   3   4   5   6   7   Extremely likely

2.2   Opportunities for further studies and specialization

Extremely unlikely   1   2   3   4   5   6   7   Extremely likely

2.3   Financial and non-financial incentives

Extremely unlikely   1   2   3   4   5   6   7   Extremely likely

2.4   Safety for the family

Extremely unlikely   1   2   3   4   5   6   7   Extremely likely

2.5   Availability and support of staff in the workplace

Extremely unlikely   1   2   3   4   5   6   7   Extremely likely

2.6   Good living conditions providing in basic needs

Extremely unlikely   1   2   3   4   5   6   7   Extremely likely

2.7   Availability of career support and planning and mentorship

Extremely unlikely   1   2   3   4   5   6   7   Extremely likely

2.8   Altruism - the need to make a difference in the lives of others

Extremely unlikely   1   2   3   4   5   6   7   Extremely likely

SECTION 3: BELIEF STRENGTH THAT PRACTICING IN A URBAN AREA WILL RESULT IN EACH OF THE FOLLOWING SALIENT OUTCOMES

An urban area refers to an area which contains a certain population within fixed boundaries, usually referred to as cities or towns (World Health organisation, 2006). Examples of such areas in South Africa are Johannesburg and Pretoria in the Gauteng province.

How likely is each of the following outcomes given that you will choose to practice in an urban area in South Africa?

3.1   Job opportunities for spouses

Extremely unlikely   1   2   3   4   5   6   7   Extremely likely

3.2   Opportunities for further studies and specialization

Extremely unlikely   1   2   3   4   5   6   7   Extremely likely

3.3   Financial and non-financial incentives

Extremely unlikely   1   2   3   4   5   6   7   Extremely likely

3.4   Safety for the family

Extremely unlikely   1   2   3   4   5   6   7   Extremely likely

3.5   Availability and support of staff in the workplace

Extremely unlikely   1   2   3   4   5   6   7   Extremely likely

3.6   Good living conditions providing in basic needs

Extremely unlikely   1   2   3   4   5   6   7   Extremely likely

3.7   Availability of career support and planning and mentorship

Extremely unlikely   1   2   3   4   5   6   7   Extremely likely

3.8   Altruism - the need to make a difference in the lives of others

Extremely unlikely   1   2   3   4   5   6   7   Extremely likely

SECTION 4: NORMATIVE BELIEF STRENGTH OF THE EXPECTATION HELD BY SALIENT REFERENCE GROUPS/INDIVIDUALS TOWARDS PRACTICING IN RURAL AREAS

Rural areas can be classified as settings outside large metropolitan areas such as cities and provincial capital cities in South Africa (De Vries & Reid, 2003). Examples of such areas are Garies, in the Northern Cape and Montague in the Western Cape Province.

How supportive/opposed are each of the following referent groups or individuals to you practicing in a rural area in South Africa?

4.1   Medical students who have graduated and are busy with their internship or hospital years in rural area?

Extremely opposed   1   2   3   4   5   6   7   Extremely in favour

4.2   Your lecturers and or mentors at the University of Stellenbosch?

Extremely opposed   1   2   3   4   5   6   7   Extremely in favour

4.3   Your parents and or close family members?

Extremely opposed   1   2   3   4   5   6   7   Extremely in favour

4.4   Your spouse / partner?

Extremely opposed   1   2   3   4   5   6   7   Extremely in favour

SECTION 5: NORMATIVE BELIEF STRENGTH OF THE EXPECTATION HELD BY SALIENT REFERENCE GROUPS/INDIVIDUALS TOWARDS PRACTICING IN URBAN AREAS

An urban area refers to an area which contains a certain population within fixed boundaries, usually referred to as cities or towns (World Health organisation, 2006). Examples of such areas in South Africa are Johannesburg and Pretoria in the Gauteng province.

How supportive/opposed are each of the following referent groups or individuals to you practicing in an urban area in South Africa?

5.1　Medical students who have graduated and are busy with their internship or hospital years in an urban area?

　　　Extremely opposed　　1　　2　　3　　4　　5　　6　　7　　Extremely in favour

5.2　Your lecturers and or mentors at the University of Stellenbosch?

　　　Extremely opposed　　1　　2　　3　　4　　5　　6　　7　　Extremely in favour

5.3　Your parents and or close family members?

　　　Extremely opposed　　1　　2　　3　　4　　5　　6　　7　　Extremely in favour

5.4　Your spouse / partner?

　　　Extremely opposed　　1　　2　　3　　4　　5　　6　　7　　Extremely in favour

SECTION 6: MEDICAL STUDENTS' MOTIVATION TO COMPLY WITH THE EXPECTATIONS OF REFERENT OTHERS.

How much do you want to comply with the expectations of …

5.1　Medical students who have graduated and are busy with their internship or hospital years in an urban area?

　　　Not at all　　-3　　-2　　-1　　0　　+1　　+2　　+3　　Very much

5.2　Your lecturers and or mentors at the University of Stellenbosch?

　　　Not at all　　-3　　-2　　-1　　0　　+1　　+2　　+3　　Very much

5.3   Your parents and or close family members?

        Not at all   -3   -2   -1   0   +1   +2   +3   Very much

5.4   Your spouse / partner?

        Not at all   -3   -2   -1   0   +1   +2   +3   Very much

SECTION 7: BEHAVIOURAL INTENTION TO PRACTICE IN A RURAL AREA IN SOUTH AFRICA AND IN AN URBAN AREA VIA TWO SINGLE-INDICATOR ITEMS

7.1   All things considered how likely is it that you will choose to practice in a rural area in South Africa at the outset of your medical career?

        Extremely unlikely   1   2   3   4   5   6   7   Extremely likely

7.2   All things considered how likely is it that you will choose to practice in an urban area in South Africa at the outset of your medical career?

        Extremely unlikely   1   2   3   4   5   6   7   Extremely likely

The end. Thank you for participating in the research.

APPENDIX D
REGRESSION DIAGNOSTICS
REGRESSION MODEL 1

Regression model 1

Questionnaire_number	Standardized Residual	Mahalanobis Distance	Cook's Distance	Centered Leverage Value	Standardized DFFIT	Standardized DFBETA Intercept	Standardized DFBETA Att_R	Standardized DFBETA SN_R	Prob_Mah
1	.	.	.	.	.	.	.	.	.
2	.48703	.86980	.00079	.00455	.04850	-.01969	-.00928	.03312	.64733
3	.	.	.	.	.	.	.	.	.
4	.01329	3.26585	.00000	.01710	.00203	-.00004	.00177	-.00044	.19536
5	.81770	3.37344	.00534	.01766	.12645	-.06897	-.05375	.10806	.18513
6	-1.59300	2.18248	.01455	.01143	-.20982	-.11823	.16060	.02152	.33580
7	-.69899	.18998	.00102	.00099	-.05532	-.03247	-.00651	.02214	.90938
8	-2.54676	1.00122	.02307	.00524	-.26707	.09253	-.14042	-.08477	.60616
9	.44530	1.91797	.00104	.01004	.05572	.05159	-.01406	-.03768	.38328
10	1.27134	.57423	.00450	.00301	.11638	.08138	-.04675	-.03829	.75043
11	.82174	.28570	.00153	.00150	.06768	.00270	-.02664	.02413	.86688
12	-.22406	1.71190	.00024	.00896	-.02699	.01312	.00873	-.02122	.42488
13	-1.26884	2.42535	.00996	.01270	-.17318	-.08002	-.12346	.10769	.29740
14	-1.74601	.51677	.00817	.00271	-.15744	-.10728	.06232	.04871	.77230
15	-.84442	1.63707	.00337	.00857	-.10043	-.09123	-.00268	.07702	.44108
16	.78179	3.40055	.00491	.01780	.12127	.07654	.07471	-.09328	.18263
17	-.54893	.64416	.00088	.00337	-.05119	-.03754	-.01100	.03199	.72464
18	.38855	8.53965	.00278	.04471	.09117	-.04354	.07541	.02034	.01398
19	.39090	6.23302	.00208	.03263	.07886	-.04568	.05603	.03053	.04431
20	1.59437	.16231	.00520	.00085	.12537	.05477	.03520	-.03933	.92205
21	1.36748	.82379	.00605	.00431	.13504	.10564	-.05060	-.05930	.66239
22	-.02952	.34972	.00000	.00183	-.00249	-.00166	-.00036	.00127	.83957
23	-1.84859	.55234	.00938	.00289	-.16884	-.08394	.09416	.00982	.75868
24	.59080	3.74330	.00303	.01960	.09526	-.05513	.05923	.04255	.15387
25	.56022	1.59689	.00146	.00836	.06604	.03563	.04041	-.04205	.45003
26	1.18697	.35490	.00337	.00186	.10060	-.02621	.01808	.04176	.83740
27	1.13358	.26380	.00286	.00138	.09270	.05844	.01230	-.04243	.87643
28	.83463	.02195	.00125	.00011	.06117	.00763	-.00165	.00896	.98908
29	.24547	.16694	.00012	.00087	.01921	.00181	-.00613	.00542	.91992
30	.03323	1.10858	.00000	.00580	.00352	.00178	-.00241	-.00016	.57448
31	-1.14860	.23307	.00286	.00122	-.09277	.01607	-.01557	-.03181	.89000

32	1.05564	1.20991	.00439	.00633	.11478	.03037	-.08499	.02510	.54610
33	.19274	2.09135	.00021	.01095	.02484	-.01335	.01293	.01182	.35145
34	-.31148	.15432	.00020	.00081	-.02425	-.00631	-.00870	.00405	.92574
35	.48533	4.76593	.00252	.02495	.08673	-.06154	-.01692	.07878	.09228
36	-.73003	2.85284	.00373	.01494	-.10562	-.01811	.09041	-.03357	.24017
37	-1.01091	2.23008	.00595	.01168	-.13363	-.09501	-.06576	.10385	.32790
38	.43304	.07469	.00035	.00039	.03252	.01591	.00188	-.00858	.96334
39	-1.80052	1.33990	.01354	.00702	-.20276	-.08604	.15057	-.01077	.51173
40	-.76696	2.09817	.00328	.01099	-.09910	-.01692	.08097	-.03150	.35026
41	.00797	2.66385	.00000	.01395	.00112	.00059	.00077	-.00076	.26397
42	.64348	.42012	.00104	.00220	.05571	.03971	-.01475	-.02165	.81054
43	1.46013	.18513	.00444	.00097	.11583	.02523	.04566	-.01645	.91159
44	-.17785	2.76899	.00022	.01450	-.02540	-.00893	-.01989	.01387	.25045
45	.74253	1.13289	.00209	.00593	.07916	.06142	.02268	-.05724	.56754
46	-.12857	.34110	.00004	.00179	-.01080	-.00459	.00526	-.00001	.84320
47	-.71307	.46420	.00131	.00243	-.06272	-.03422	-.02450	.03113	.79287
48	2.10085	1.35704	.01857	.00710	.23823	.20014	-.09811	-.12046	.50737
49	.83580	.01994	.00125	.00010	.06120	.00874	.00552	.00486	.99008
50	-1.32448	3.48043	.01437	.01822	-.20804	.02910	-.18115	.02021	.17548
51	-1.00556	.25153	.00223	.00132	-.08177	.00008	.02746	-.03083	.88182
52	.	.	.	.	.	.	.	.	.
53	-.29504	.39674	.00021	.00208	-.02531	-.00377	.01293	-.00723	.82007
54	.52332	.35440	.00065	.00186	.04421	.02262	-.02026	-.00439	.83761
55	-.22871	4.62797	.00054	.02423	-.04033	.03088	-.00485	-.03367	.09887
56	.68680	3.83088	.00418	.02006	.11184	.10719	.00621	-.09752	.14728
57	.87101	1.44405	.00331	.00756	.09964	-.05421	.03326	.05773	.48577
58	-1.71902	.80337	.00945	.00421	-.16927	.00566	-.11076	.00721	.66919
59	-2.27771	.98351	.01829	.00515	-.23692	-.00770	-.16663	.03289	.61155
60	.74611	.13983	.00112	.00073	.05778	.00028	.01638	.00717	.93247
61	.	.	.	.	.	.	.	.	.
62	.79652	.04294	.00116	.00022	.05898	.00414	.00562	.00872	.97876
63	-1.06661	4.10735	.01069	.02150	-.17919	-.15964	.09296	.10170	.12826
64	.88849	2.08278	.00438	.01090	.11457	.09323	.03865	-.09315	.35296
65	-.62451	2.61630	.00255	.01370	-.08739	-.02490	.07436	-.01795	.27032
66	.80305	3.92007	.00583	.02052	.13210	-.07081	-.06219	.11319	.14085
67	1.33351	.78213	.00562	.00409	.13010	.00603	.08604	-.01626	.67633

68	1.01580	.94603	.00357	.00495	.10346	-.04248	.04286	.04463	.62312
69	-.53960	3.39426	.00234	.01777	-.08357	-.08085	.00281	.07004	.18321
70	-1.35794	1.68426	.00887	.00882	-.16349	-.06646	-.11473	.08870	.43079
71	-1.72010	7.87410	.05036	.04123	-.39090	.28707	-.20725	-.23831	.01951
72	-.66498	.75749	.00138	.00397	-.06419	-.02764	.04117	-.00200	.68472
73	.88557	1.21144	.00309	.00634	.09624	.08570	-.00927	-.06569	.54568
74	.55097	3.49688	.00250	.01831	.08637	-.06194	-.00078	.07366	.17405
75	.	.	.	.	.	.	.	.	.
76	-.71717	.49031	.00135	.00257	-.06365	-.03422	-.02605	.03168	.78258
77	.15694	.08758	.00005	.00046	.01185	-.00022	-.00017	.00329	.95715
78	-.14202	.92416	.00007	.00484	-.01434	.00499	-.00713	-.00479	.62997
79	.46938	.18314	.00046	.00096	.03701	.02021	.00677	-.01427	.91250
80	-.86717	1.35429	.00316	.00709	-.09730	.05243	.00751	-.07285	.50807
81	1.45723	1.60611	.00991	.00841	.17293	.00136	-.12722	.07992	.44796
82	1.03456	.99891	.00380	.00523	.10684	-.03932	.05338	.03742	.60686
83	-.20824	1.23946	.00017	.00649	-.02273	.01115	.00394	-.01692	.53809
84	.30643	.14615	.00019	.00077	.02377	.00472	-.00816	.00449	.92953
85	.88674	1.27484	.00319	.00667	.09777	.08702	-.00162	-.07018	.52866
86	-.28679	1.58035	.00038	.00827	-.03367	.01843	.00518	-.02631	.45377
87	.58837	.50028	.00092	.00262	.05238	.03547	.01276	-.02988	.77869
88	-.92994	.08001	.00164	.00042	-.07013	-.01068	.01640	-.01386	.96079
89	.38791	.27458	.00034	.00144	.03176	.00967	-.01477	.00382	.87172
90	.69802	2.15159	.00277	.01126	.09097	.04098	-.07316	.00259	.34103
91	.42547	.82189	.00059	.00430	.04180	-.01906	.00442	.02559	.66302
92	.89147	.78654	.00252	.00412	.08686	.02287	.05575	-.02922	.67485
93	.19099	1.79854	.00018	.00942	.02338	-.01442	.00416	.01652	.40687
94	-.23410	.10145	.00011	.00053	-.01779	-.00689	-.00432	.00429	.95054
95	1.17519	.55489	.00380	.00291	.10683	.07002	.03249	-.06172	.75772
96	-.23583	1.60994	.00026	.00843	-.02785	-.00345	.02144	-.01000	.44710
97	.	.	.	.	.	.	.	.	.
98	.91614	4.09075	.00786	.02142	.15352	.00125	-.13235	.07185	.12933
99	-.45863	1.67375	.00101	.00876	-.05486	-.03049	.04019	.00521	.43306
100	.35625	.03812	.00023	.00020	.02628	.00850	-.00493	.00027	.98112
101	1.44251	1.38623	.00887	.00726	.16357	.12142	-.09240	-.05627	.50002
102	.38317	1.63686	.00069	.00857	.04550	.04071	-.01475	-.02760	.44112
103	-.52894	.20113	.00059	.00105	-.04204	.00661	-.00198	-.01598	.90433

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104	-1.09526	.54611	.00328	.00286	-.09923	.00166	-.05723	.00113	.76105
105	-1.41364	1.93295	.01053	.01012	-.17823	-.14592	.09446	.08066	.38042
106	-2.91487	2.88662	.05997	.01511	-.43307	.28767	.05197	-.37033	.23615
107	-1.86384	.31160	.00803	.00163	-.15625	-.08482	.06399	.02304	.85573
108	.23854	6.52900	.00081	.03418	.04916	-.03820	-.00416	.04507	.03822
109	1.43961	.31847	.00482	.00167	.12055	.02278	.05920	-.02000	.85280
110	-.99448	.89697	.00333	.00470	-.09996	-.08531	.00754	.06394	.63860
111	.83235	2.88626	.00489	.01511	.12102	-.06705	-.04504	.10273	.23619
112	-1.71964	.51433	.00791	.00269	-.15489	-.11960	.00394	.08603	.77324
113	.47123	3.79198	.00195	.01985	.07636	-.05458	.02636	.05337	.15017
114	-1.18024	.57943	.00389	.00303	-.10816	.02801	.03108	-.06398	.74848
115	1.74616	2.95011	.02189	.01545	.25769	.21802	-.14317	-.12649	.22877
116	.61072	.88003	.00124	.00461	.06101	-.01628	-.02538	.03877	.64403
117	-.97462	5.97226	.01244	.03127	-.19318	-.17751	-.04484	.17884	.05048
118	-1.07660	3.96445	.01057	.02076	-.17819	-.17249	-.00198	.15409	.13776
119	-.04997	.58313	.00001	.00305	-.00457	.00155	.00060	-.00277	.74709
120	.22082	.48802	.00013	.00256	.01956	.00316	.01120	-.00363	.78348
121	.71568	2.20472	.00296	.01154	.09409	-.06163	.01490	.06994	.33209
122	-.62165	4.19861	.00370	.02198	-.10520	-.04633	-.08112	.06849	.12254
123	-.58994	1.52962	.00157	.00801	-.06861	-.02852	.05248	-.00443	.46542
124	1.15000	4.88748	.01445	.02559	.20843	-.00865	.18997	-.04783	.08684
125	.	.	.	.	.	.	.	.	.
126	-1.12633	.51327	.00339	.00269	-.10095	.00700	-.05494	-.00582	.77365
127	.04912	2.86546	.00002	.01500	.00711	-.00435	.00353	.00388	.23866
128	.85107	2.20350	.00418	.01154	.11193	-.05014	.07227	.03703	.33229
129	1.35983	2.21996	.01073	.01162	.17986	.12385	.09301	-.13754	.32957
130	-.35779	.31847	.00030	.00167	-.02980	-.00563	-.01464	.00494	.85280
131	.41489	1.80042	.00086	.00943	.05082	.00864	-.04041	.01612	.40648
132	-.40298	1.39262	.00069	.00729	-.04552	-.03637	-.01323	.03451	.49842
133	.23913	7.43601	.00092	.03893	.05243	-.03940	-.01107	.04919	.02428
134	-1.28115	3.91343	.01481	.02049	-.21118	-.14750	.15728	.05840	.14132
135	.00051	4.78681	.00000	.02506	.00009	-.00006	-.00003	.00008	.09132
136	2.11663	4.57538	.04621	.02395	.37595	.25374	.22322	-.30757	.10150
137	.43187	.05592	.00035	.00029	.03214	.01530	-.00183	-.00644	.97243
138	1.09791	4.67032	.01266	.02445	.19499	-.05979	-.14096	.14079	.09680
139	.83575	.98796	.00247	.00517	.08598	.07363	-.01948	-.05022	.61019

140	.23084	1.79702	.00027	.00941	.02825	-.01505	.01336	.01409	.40718
141	.53801	4.59840	.00300	.02408	.09467	.01619	-.08552	.02984	.10034
142	.	.	.	.	.	.	.	.	.
143	.46530	2.46157	.00135	.01289	.06362	-.01213	.05184	-.00034	.29206
144	.	.	.	.	.	.	.	.	.
145	.	.	.	.	.	.	.	.	.
146	-.43865	3.59429	.00162	.01882	-.06952	.02945	-.05286	-.01628	.16577
147	-.53778	5.08005	.00327	.02660	-.09887	-.00436	-.09009	.03140	.07886
148	-.42752	.77987	.00058	.00408	-.04151	.00280	.02303	-.02064	.67710
149	-1.03718	3.91754	.00972	.02051	-.17077	.01950	.13879	-.09788	.14103
150	-.68263	2.30119	.00278	.01205	-.09112	-.08617	.01954	.06573	.31645
151	1.75559	.48882	.00811	.00256	.15682	.08299	-.08105	-.01617	.78316
152	.05794	3.20275	.00003	.01677	.00876	-.00584	-.00144	.00763	.20162
153	-2.26533	8.07052	.08948	.04225	-.52427	.07285	.45458	-.30905	.01768
154	-.11513	2.41647	.00008	.01265	-.01563	-.01340	.00792	.00801	.29872
155	.89968	5.28709	.00949	.02768	.16864	.07161	-.15113	.00836	.07111
156	1.29771	.57076	.00468	.00299	.11868	.09360	-.00453	-.06773	.75173
157	-.73117	1.27317	.00217	.00667	-.08053	.03341	.02714	-.05917	.52910
158	-1.15510	.82615	.00432	.00433	-.11398	-.08013	-.03775	.07449	.66161
159	-.62095	3.74888	.00336	.01963	-.10019	.05934	-.06054	-.04685	.15344
160	.56671	2.60630	.00210	.01365	.07917	-.00639	.06692	-.01045	.27167
161	-.25518	1.02830	.00023	.00538	-.02648	-.00368	.01842	-.00886	.59801
162	-1.78939	.41193	.00798	.00216	-.15563	-.09990	.05951	.04159	.81386
163	-.33261	3.37459	.00088	.01767	-.05136	-.01052	-.04374	.02240	.18502
164	1.37983	.11843	.00374	.00062	.10622	.00051	-.01774	.03341	.94250
165	-1.85739	.21082	.00735	.00110	-.14949	-.08997	.03526	.04037	.89996
166	.89550	5.02398	.00898	.02630	.16406	.15785	-.05815	-.11769	.08111
167	-.15497	.79051	.00008	.00414	-.01509	-.00699	-.00836	.00758	.67351
168	.49288	.60923	.00069	.00319	.04546	-.01664	.01180	.02135	.73741
169	.52917	.20954	.00060	.00110	.04221	.02635	.00222	-.01743	.90053
170	1.26315	2.95989	.01148	.01550	.18591	.00411	.16079	-.04657	.22765
171	-1.14284	3.39119	.01047	.01775	-.17741	-.17136	.00369	.14934	.18349
172	.81697	5.75106	.00844	.03011	.15903	.12837	-.10634	-.06928	.05639
173	.	.	.	.	.	.	.	.	.
174	-1.72368	.57957	.00830	.00303	-.15864	.02990	.05997	-.08853	.74842
175	-.63862	.64798	.00119	.00339	-.05965	-.03723	-.02263	.03480	.72326

176	.62766	.55209	.00108	.00289	.05686	.03572	-.02688	-.01285	.75878
177	.58254	1.41007	.00146	.00738	.06608	.02634	-.04994	.00542	.49409
178	.32634	.64789	.00031	.00339	.03045	.00954	.01805	-.01091	.72329
179	.63055	3.45561	.00324	.01809	.09839	.08532	-.05330	-.05172	.17767
180	.99470	.91543	.00337	.00479	.10048	-.04803	.01548	.06125	.63273
181	.12469	.51035	.00004	.00267	.01113	.00016	.00634	-.00042	.77478
182	.	.	.	.	.	.	.	.	.
183	-.32084	.36137	.00025	.00189	-.02716	-.00312	.01304	-.00843	.83470
184	.92778	1.36071	.00363	.00712	.10428	.09383	-.01998	-.06861	.50644
185	-.66741	5.12617	.00508	.02684	-.12326	-.09729	-.05703	.10899	.07707
186	1.78547	.39722	.00786	.00208	.15445	.10602	.02355	-.08249	.81987
187	.72211	3.54844	.00434	.01858	.11394	-.01643	-.08965	.06807	.16962
188	1.92264	.63473	.01069	.00332	.18043	.14544	-.01290	-.10439	.72806
189	.00340	2.94742	.00000	.01543	.00050	-.00033	.00019	.00032	.22907
190	.	.	.	.	.	.	.	.	.
191	-.29380	5.40509	.00103	.02830	-.05551	.03974	-.02665	-.03483	.06703
192	.	.	.	.	.	.	.	.	.
193	-1.55788	3.71996	.02099	.01948	-.25196	-.16592	-.15035	.19983	.15568
194	.00226	13.17833	.00000	.06900	.00066	-.00013	-.00058	.00042	.00138
195	-.68432	.40824	.00116	.00214	-.05900	-.02830	.02971	.00309	.81536
196	-1.57483	1.77970	.01237	.00932	-.19338	-.03288	-.15258	.06627	.41072
197	-.68784	4.42586	.00474	.02317	-.11910	.00978	-.10736	.02140	.10938
198	.62008	.33863	.00091	.00177	.05209	-.00993	.01689	.01488	.84424
199	1.08614	.78328	.00373	.00410	.10583	-.03454	.04910	.03535	.67595
200	-.98383	5.30021	.01137	.02775	-.18470	.01479	.15835	-.10037	.07064
201	.	.	.	.	.	.	.	.	.
202	.	.	.	.	.	.	.	.	.
203	-.55066	1.58472	.00140	.00830	-.06475	-.02955	.04925	-.00129	.45277
204	-.17846	1.80496	.00016	.00945	-.02187	-.02034	.00352	.01565	.40556
205	.35091	1.76789	.00061	.00926	.04272	.03824	.00484	-.03390	.41315
206	.	.	.	.	.	.	.	.	.
207	-1.33918	2.09177	.00998	.01095	-.17342	-.07085	-.12605	.09816	.35138
208	-1.03023	.90184	.00358	.00472	-.10371	-.07808	.04694	.03951	.63704
209	.50049	.78473	.00079	.00411	.04867	-.01478	.02393	.01457	.67546
Total N	192	192	192	192	192	192	192	192	192
Minimum	-2.91487	.01994	.00000	.00010	-.52427	-.17751	-.20725	.00138	.00

Maximum	2.11663	13.17833	.08948	.06900	.37595	.28767	.45458	.99008	.99
Critical cut-off	|3.00|	-	1	1	1	1	1	1	<.001

APPENDIX E
REGRESSION DIAGNOSTICS
REGRESSION MODEL 2

Regression model 2

	Standardized Residual	Mahalanobis Distance	Cook's Distance	Centered Leverage Value	Standardized DFFIT	Standardized DFBETA Intercept	Standardized DFBETA Att_U	Standardized DFBETA SN_U	Prob_Mah
1	1.52389	2.17908	.01323	.01135	.19994	.18445	-.15812	-.03484	.336
2	.41591	1.37607	.00073	.00717	.04669	.03092	.00883	-.03512	.503
3	1.25470	1.73350	.00767	.00903	.15196	-.04931	.05318	.10354	.420
4	.19211	.64133	.00011	.00334	.01784	.00864	-.00887	.00757	.726
5	.65619	6.63817	.00619	.03457	.13605	.04308	.07278	-.11013	.036
6	1.17049	1.22409	.00540	.00638	.12743	-.03602	.06430	.06331	.542
7	-.57843	1.14378	.00127	.00596	-.06163	-.06024	.02935	.03139	.564
8	.57683	.02735	.00060	.00014	.04224	.02164	.00493	-.00527	.986
9	-.11823	.40505	.00003	.00211	-.01014	-.00011	-.00500	-.00172	.817
10	.95943	1.79501	.00459	.00935	.11734	-.02723	.09342	.00286	.408
11	-.55247	1.42825	.00132	.00744	-.06274	-.06206	.03353	.03139	.490
12	-.24665	1.24236	.00024	.00647	-.02687	-.01456	-.00895	.01866	.537
13	.33496	1.45778	.00049	.00759	.03826	-.00494	.02949	-.00325	.482
14	1.12125	3.50387	.01030	.01825	.17588	.15306	-.03181	-.14840	.173
15	.83918	2.51440	.00445	.01310	.11548	-.00451	.09205	-.04112	.284
16	1.17138	1.57479	.00629	.00820	.13749	-.04674	.07022	.07484	.455
17	.09502	.37067	.00002	.00193	.00805	.00685	-.00394	-.00107	.831
18	.37591	.91542	.00048	.00477	.03779	.01236	.01978	-.01885	.633
19	-.53007	4.21232	.00268	.02194	-.08956	-.01576	-.06004	.05895	.122

20	.66410	.83624	.00143	.00436	.06538	.06253	-.02731	-.03210	.658
21	.32318	1.47212	.00046	.00767	.03702	.01333	.01906	-.02297	.479
22	1.09064	3.77517	.01036	.01966	.17639	-.09171	.11139	.09992	.151
23	.57778	.04796	.00061	.00025	.04274	.02530	.00279	-.00895	.976
24	.66396	.17277	.00090	.00090	.05202	.04204	-.01580	-.01079	.917
25	.00244	.27895	.00000	.00145	.00020	.00017	-.00005	-.00007	.870
26	1.06026	1.90763	.00584	.00994	.13241	-.04872	.09165	.04731	.385
27	.85921	4.53952	.00752	.02364	.15011	-.07106	.12900	.03100	.103
28	1.41747	2.22661	.01162	.01160	.18726	.18613	-.12383	-.08269	
29	.41455	8.18189	.00302	.04261	.09497	.07931	-.01737	-.08603	.328
30	.81418	2.82418	.00458	.01471	.11706	-.00581	.09448	-.04318	.017
31	.28400	2.03597	.00044	.01060	.03617	-.00699	.02964	-.00318	.244
32	-.19263	3.29352	.00029	.01715	-.02937	.01451	-.01952	-.01493	.361
33	.89915	1.20967	.00317	.00630	.09742	.06478	-.06940	.02603	.193
34	.	3.92837	.	.02035	.	.	.	.	.546
35	.06968	.82932	.00002	.00432	.00684	-.00041	.00053	.00451	
36	.48894	.40378	.00059	.00210	.04195	.02509	.00923	-.02132	.140
37	.41733	1.12693	.00066	.00587	.04426	-.00851	.03093	.00631	.661
38	.69858	2.96349	.00350	.01543	.10228	.10145	-.05370	-.06516	.817
39	1.17254	.19605	.00288	.00102	.09301	.01474	.03511	.01059	.569
40	.50809	7.89832	.00438	.04114	.11444	.10168	-.03400	-.09883	.227
41	.14543	2.73652	.00014	.01425	.02062	-.00592	.00167	.01736	.907

42	.24517	2.19955	.00034	.01146	.03208	-.00334	.02606	-.00776	.019
43	1.33967	1.80256	.00898	.00939	.16445	.16356	-.08839	-.08959	.255
44	1.09535	2.83143	.00830	.01475	.15787	-.07369	.10014	.08223	.333
45	1.36521	.22578	.00400	.00118	.10980	.05083	-.03215	.03737	.406
46	.44766	3.95949	.00182	.02062	.07366	.06155	-.00897	-.06415	.243
47	1.08752	.49601	.00311	.00258	.09663	.04922	.03165	-.04857	.893
48	.22971	3.20819	.00040	.01671	.03466	-.00776	-.00229	.03028	.138
49	.89403	2.19331	.00457	.01142	.11709	.04050	.06228	-.07988	.780
50	1.24503	.41368	.00385	.00215	.10759	.09394	-.02526	-.05003	.201
51	.15102	3.81773	.00020	.01988	.02446	.00735	.01386	-.01800	.334
52	.53650	2.77657	.00196	.01446	.07656	.06927	-.01832	-.06115	.813
53	.46196	.36338	.00051	.00189	.03905	.01005	.01895	-.00869	.148
54	-.14875	.38918	.00005	.00203	-.01269	-.00109	-.00669	-.00014	.250
55	-1.35585	.58739	.00513	.00306	-.12439	-.09911	.00416	.07498	.834
56	1.03834	4.20287	.01028	.02189	.17565	.15286	-.15500	-.01613	.823
57	.99261	2.81882	.00679	.01468	.14273	-.06190	.10921	.04577	.746
58	-.10501	.34618	.00003	.00180	-.00881	-.00613	-.00077	.00446	.122
59	-1.13892	2.65003	.00853	.01380	-.16009	-.16009	.09775	.08599	.244
60	.73816	.82393	.00175	.00429	.07244	.06868	-.04115	-.02230	.841
61	1.81896	4.88676	.03595	.02545	.33054	.11776	-.24606	.19556	.266
62	.13311	1.09713	.00007	.00571	.01401	.01345	-.00873	-.00435	.662
63	-.27069	4.09985	.00068	.02135	-.04519	.00484	.01256	-.03952	.087

64	.36304	1.28037	.00053	.00667	.03990	.01885	.01623	-.02653	.578
65	.91761	1.32309	.00347	.00689	.10201	.05533	-.06828	.04182	.129
66	1.43566	.51978	.00551	.00271	.12889	.08178	-.07062	.03305	.527
67	-.38209	2.05753	.00080	.01072	-.04884	.00140	-.03816	.01574	.516
68	-.16053	.70785	.00008	.00369	-.01521	-.01013	-.00258	.00966	.771
69	-2.26665	3.46156	.04166	.01803	-.35758	-.34760	.27541	.12748	.357
70	-.81566	.65571	.00194	.00342	-.07622	-.04279	-.02211	.04448	.702
71	1.14788	1.09835	.00489	.00572	.12128	.10069	-.00809	-.08638	.177
72	-.35142	3.46208	.00100	.01803	-.05469	-.05249	.04337	.01699	.720
73	-.52891	5.91289	.00361	.03080	-.10387	-.04423	-.04438	.08893	.577
74	.41658	.60026	.00049	.00313	.03820	.00801	.02159	-.01105	.177
75	.01247	7.80380	.00000	.04064	.00279	.00205	-.00263	.00030	.052
76	1.74620	5.09852	.03441	.02655	.32312	.26415	-.29430	-.00039	.741
77	-.73492	1.32654	.00223	.00691	-.08170	-.07036	.01007	.05976	.020
78	1.01318	1.16845	.00394	.00609	.10878	-.01510	.07949	.00131	.078
79	.62301	9.08827	.00757	.04733	.15045	.06321	.06223	-.13370	.515
80	.92218	1.43329	.00368	.00747	.10499	.04228	-.06202	.05701	.558
81	.24687	2.95006	.00044	.01536	.03604	-.01169	.03093	.00096	
82	.41079	1.53818	.00076	.00801	.04771	-.01395	.03419	.01143	.011
83	1.91755	8.22736	.06496	.04285	.44484	.33082	-.42015	.04166	.488
84	1.15014	4.25410	.01274	.02216	.19570	.11199	-.16655	.07239	.229
85	.06553	1.01368	.00002	.00528	.00675	.00657	-.00336	-.00311	.463

86	-.64894	.28873	.00095	.00150	-.05334	-.04471	.01070	.02185	.016
87	.02790	6.14107	.00001	.03198	.00557	.00149	.00326	-.00430	
88	.66574	.03820	.00080	.00020	.04902	.03018	-.00936	.00197	.119
89	-1.67619	2.19575	.01609	.01144	-.22081	.02456	.03038	-.18266	.602
90	.85390	2.64756	.00479	.01379	.11980	-.02328	.10163	-.01940	.866
91	-1.67598	.94740	.00967	.00493	-.17112	-.05311	.07382	-.10033	.046
92	-.36852	1.14546	.00052	.00597	-.03926	-.01820	.02329	-.01886	.981
93	1.27011	.81712	.00517	.00426	.12477	.11775	-.04460	-.06657	
94	-1.12653	.71034	.00382	.00370	-.10719	-.01445	.01857	-.06806	.334
95	-.97113	2.37845	.00572	.01239	-.13101	-.06427	-.05075	.10182	
96	.80743	4.31632	.00636	.02248	.13799	-.05470	.12308	.00678	.266
97	-2.02161	1.48958	.01809	.00776	-.23494	.07729	-.13583	-.10814	.623
98	-1.87703	.57531	.00976	.00300	-.17231	.00746	-.03317	-.09545	.564
99	-.48693	.47487	.00061	.00247	-.04284	-.03376	.02434	-.00140	.665
100	-2.28206	4.42069	.05185	.02302	-.39901	-.23336	-.10139	.35375	.701
101	-.74269	.21672	.00117	.00113	-.05930	-.01070	-.02480	-.00148	.304
102	-.18016	.41284	.00008	.00215	-.01550	-.00409	-.00770	.00402	.116
103	.15388	1.63230	.00011	.00850	.01820	-.00220	-.00078	.01434	.475
104	-1.29610	1.01526	.00599	.00529	-.13427	.02955	-.04999	-.07639	.750
105	1.45862	1.07969	.00783	.00562	.15374	.02248	-.04468	.10516	.789
106	-1.04470	1.18222	.00422	.00616	-.11255	-.09719	.08201	.00485	.110
107	-1.58770	1.72404	.01224	.00898	-.19244	.02779	-.15303	.02201	.897

108	-1.02304	3.22062	.00801	.01677	-.15502	.03282	.01326	-.13550	.813
109	-.11359	.38218	.00003	.00199	-.00966	-.00021	-.00464	-.00167	.442
110	1.21451	.64402	.00427	.00335	.11332	.09951	-.02139	-.06551	.602
111	-1.89161	.02817	.00642	.00015	-.13978	-.09179	.01678	.01441	.583
112	.35405	3.56106	.00104	.01855	.05573	.03994	.00469	-.04927	.554
113	-2.26427	1.09806	.01904	.00572	-.24170	-.14020	.15883	-.08780	.422
114	-1.15358	2.04098	.00724	.01063	-.14752	.03740	-.01673	-.11778	.200
115	.86644	1.70849	.00362	.00890	.10421	.00383	-.02814	.08016	.826
116	-.62885	.27069	.00088	.00141	-.05131	-.00546	-.00833	-.02137	.725
117	-.03674	.30094	.00000	.00157	-.00303	-.00016	-.00087	-.00109	.986
118	-1.31436	.02271	.00308	.00012	-.09638	-.04594	-.01278	.00777	.169
119	-1.32914	.05953	.00327	.00031	-.09924	-.05490	-.01223	.02119	.578
120	1.05495	.61653	.00317	.00321	.09749	.00890	.05965	-.01429	.360
121	.17651	.68681	.00009	.00358	.01662	.01334	-.01062	.00067	
122	-.52373	5.22058	.00316	.02719	-.09720	.04521	-.02356	-.08340	.426
123	-.52876	.26836	.00062	.00140	-.04309	-.01629	.01043	-.01778	.873
124	-.31791	3.43474	.00081	.01789	-.04931	.00562	.01160	-.04273	.860
125	.66451	1.19929	.00172	.00625	.07175	-.01465	.01605	.04889	.989
126	1.16409	.69095	.00404	.00360	.11015	-.01575	.05407	.04015	.971
127	.59536	.01488	.00063	.00008	.04333	.02444	.00165	-.00512	.735
128	-2.16998	2.35713	.02838	.01228	-.29478	-.06674	.15757	-.20403	.709
129	-.03409	1.01526	.00000	.00529	-.00352	.00077	-.00131	-.00200	.074

130	-1.20596	.09635	.00279	.00050	-.09155	-.06343	.02713	-.00046	
131	-.56385	.11193	.00062	.00058	-.04298	-.02905	.01364	-.00219	.874
132	-1.16611	.25972	.00300	.00135	-.09497	-.07383	.04281	.00197	.180
133	.12622	.69387	.00005	.00361	.01191	.00139	-.00171	.00757	.549
134	1.41045	.87350	.00658	.00455	.14088	.01298	-.02419	.09505	.708
135	1.26473	6.56624	.02275	.03420	.26173	.06545	-.18307	.17717	.993
136	1.52750	1.59846	.01079	.00833	.18061	.15238	-.14120	-.00008	.308
137	.10967	.26299	.00003	.00137	.00891	.00387	-.00260	.00336	.602
138	-.37276	1.90831	.00072	.00994	-.04643	-.00503	-.03289	.02125	.953
139	-.07769	1.74604	.00003	.00909	-.00939	.00338	-.00460	-.00548	.946
140	-1.40041	.32217	.00455	.00168	-.11709	-.06457	-.02976	.05218	.878
141	-.57604	9.52046	.00678	.04959	-.14237	-.13502	.07150	.10807	.707
142	.58888	.02812	.00062	.00015	.04314	.02524	.00181	-.00706	.646
143	-.54504	1.60565	.00138	.00836	-.06418	-.06373	.03532	.03263	.038
144	.06600	.66449	.00001	.00346	.00617	-.00003	.00035	.00384	.450
145	-.66959	.25218	.00098	.00131	-.05424	-.00469	-.01510	-.01770	.877
146	-.43434	.80556	.00060	.00420	-.04237	-.01329	.01696	-.02416	.385
147	.64407	1.77539	.00205	.00925	.07838	-.02469	.02420	.05545	.418
148	-.25161	2.74431	.00043	.01429	-.03572	-.02753	.03058	-.00407	.851
149	-.58422	.07323	.00064	.00038	-.04374	-.02960	.01141	-.00007	
150	-.60650	.02403	.00066	.00013	-.04434	-.02261	.00451	-.00549	.009
151	.51646	.49865	.00070	.00260	.04582	-.00230	.02304	.01090	.986

152	-.19494	.49471	.00010	.00258	-.01726	-.00566	-.00824	.00630	.448
153	-.57053	.45323	.00083	.00236	-.04984	-.00434	-.00107	-.02765	.717
154	-.26164	.91015	.00023	.00474	-.02626	-.00507	-.01610	.00981	.882
155	.84041	3.35134	.00558	.01745	.12928	.05301	.06002	-.10142	.668
156	.93368	1.46896	.00383	.00765	.10711	.00909	.07574	-.03999	.412
157	.90937	1.36378	.00347	.00710	.10200	.07294	-.07631	.02076	.254
158	.11954	2.16542	.00008	.01128	.01555	-.00398	.00152	.01259	.964
159	-.54464	.73670	.00091	.00384	-.05210	-.00019	-.00036	-.03381	.988
160	-1.63913	3.12721	.02008	.01629	-.24658	-.12315	-.09142	.20187	.779
161	-.43699	.63618	.00055	.00331	-.04053	-.02515	.02344	-.01167	.781
162	-.90326	2.15232	.00461	.01121	-.11752	-.04220	.07400	-.06948	.797
163	-.55342	1.19480	.00119	.00622	-.05967	-.05860	.03148	.02787	
164	-.25830	2.82025	.00046	.01469	-.03706	.01631	-.02789	-.01280	.634
165	.42007	2.92733	.00125	.01525	.06116	.04023	-.05141	.01681	.187
166	.38776	1.00726	.00053	.00525	.03992	-.00297	.02831	-.00192	.480
167	-.24023	5.29534	.00067	.02758	-.04484	-.04146	.03850	.01095	.506
168	.93252	2.39146	.00530	.01246	.12603	-.04003	.10387	.01111	.339
169	-2.22060	1.82719	.02488	.00952	-.27617	-.21905	.22219	-.02405	.692
170	.73952	1.40567	.00234	.00732	.08364	-.01249	.00427	.06321	.209
171	.56907	4.99249	.00359	.02600	.10354	.04859	-.08461	.04974	.728
172	-1.21353	.23763	.00319	.00124	-.09798	-.02131	.00150	-.04295	.341
173	1.23133	4.59734	.01562	.02394	.21677	-.11257	.09471	.16288	.550

174	.95023	1.57062	.00413	.00818	.11130	-.01401	.08695	-.01273	.244
175	-1.78526	.38696	.00776	.00202	-.15345	-.04089	.02937	-.07807	.231
176	-1.98734	1.35646	.01652	.00706	-.22444	.06886	-.11524	-.11461	
177	.54835	.93817	.00103	.00489	.05548	.04788	-.00737	-.03711	.604
178	-2.53237	2.83239	.04436	.01475	-.37028	.15765	-.14155	-.27128	.071
179	.14394	.39837	.00005	.00207	.01232	.00558	-.00471	.00501	
180	-.42384	1.30594	.00074	.00680	-.04686	-.04243	.03405	.00617	.302
181	-.03027	.34123	.00000	.00178	-.00254	-.00008	-.00071	-.00100	.401
182	-2.22204	2.21981	.02850	.01156	-.29558	-.14643	-.11331	.22734	.495
183	-.10985	.24005	.00003	.00125	-.00884	-.00128	-.00379	-.00057	.082
184	-.69595	1.95007	.00255	.01016	-.08742	-.08063	.02293	.06497	.888
185	-.95136	1.55864	.00412	.00812	-.11117	-.05307	.07317	-.05327	.100
186	-.21012	2.77425	.00030	.01445	-.02995	-.01494	.02282	-.01384	.456
187	-.62373	1.73582	.00190	.00904	-.07534	-.07315	.03040	.04882	.824
188	.59971	.90140	.00121	.00469	.06009	-.01146	.02148	.03333	.508
189	.56612	3.64040	.00271	.01896	.08998	-.04454	.04341	.06266	.626
190	.79846	10.78729	.01480	.05618	.21055	.03265	-.14121	.15596	.243
191	-.72546	2.79716	.00361	.01457	-.10388	.04754	-.05464	-.06526	
192	-2.50532	.92341	.02133	.00481	-.25659	.03988	-.06004	-.16144	.819
193	-1.50122	6.68827	.03262	.03483	-.31394	-.29628	.26312	.10421	.520
194	-2.15024	1.46159	.02023	.00761	-.24880	.05593	-.18759	-.02327	.843
Total N	193	194	193	194	193	193	193	193	194

Minimum	-2.53237	.01488	.00000	.00008	-.39901	-.34760	-.42015	-.27128	.005
Maximum	1.91755	10.78729	.06496	.05618	.44484	.33082	.27541	.35375	.993
Critical cut-off	|3.00|	-	1	1	1	1	1	1	<.001