STRUCTURAL MODELLING OF THE INTERRELATIONSHIPS BETWEEN CHRISTIAN FAITH, RELIGIOUS ORIENTATION AND LOVE STYLES

Submitted by

Jacques Eugene Raubenheimer

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Promoter: Prof. G.K. Huysamen
Co-promoter: Dr. A. Le Roux

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Dedicated to

Daleen,

The one the Lord
has given me
to love

Soli Deo Gloria

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Chapter 1
Introduction

> [18]There are three things that are too amazing for me, four that I do not understand: [19]the way of an eagle in the sky, the way of a snake on a rock, the way of a ship on the high seas, and the way of a man with a maiden.
>
> **Prov 30:18-19 (New International Version[1])**

Love. What is it? How does it work? How do we recognise it? These are questions which have puzzled the greatest philosophers, people of faith, and even some of the greatest minds in Psychology. That love is so often mention in the Bible is fitting, as another question which has also vexed some of the greatest minds in Psychology is how to fit religion into the study of the human psyche. The same questions asked about love, may be asked about religion. And then the questions may be combined when one enquires into the nature of the relationship between faith and romantic love. What is that relationship? How does it work?

1.1 Problem Statement

Although love and religion are not the same thing, one would be hard pressed to say that they are not related. If one were to bear in mind that love and religion are both central aspects of almost all people's existence, then the influences they have on people will be hard to separate. Hendrick and Hendrick (1987a, p. 397) describe the relationship between religion and love as follows:

> Historically, one of the greatest celebrations of love is customarily done in a religious context (i.e., the marriage ceremony). In the Bible man-woman love is dealt with in considerable detail in both the Old and New Testaments. Both religious belief and love are important and intensely personal experiences.

To deny any link between religious faith and love is to deny the fullness of human experience.

[1] All quotations from the Bible (unless otherwise specified) are taken from the New International Version (NIV).

The question remains, then: What is the relationship between Christian faith and love? Does being a Christian influence the way in which one acts towards other people, specifically in terms of love? While it can be (and is) argued that it *should*, the question a psychological researcher must ask is whether it actually *does*? Also, is there any way in which the precedence of Christian faith can be identified in its relationship with romantic love? Or does being in love open one up for religious experiences in a similar way to crisis experiences? Also, if that relationship does exist, how can it be quantified? How should we, as psychological researchers and counsellors, view it?

1.2 Aim of this research

In an attempt to uncover answers to the questions mentioned above, this research study has been designed with a dual aim. The first is to establish the conceptual and statistical appropriateness of the measurement instruments which will be used in this study. The conceptual appropriateness will be established through an examination of what qualities the literature would deem necessary for such instruments. The statistical appropriateness will be determined by means of statistical analyses.

The second aim of this study will be to examine a possible conceptualisation of the relationship between Christian faith and romantic love by using statistical methods.

1.3 Necessity of this study

Despite the long and illustrious history of the psychology of religion, and the relatively recent, but by no means negligible, advent of the psychology of love, it seems as if the relationship between Christian faith (or any religious faith, for that matter) and love has been sorely neglected. Theologians have always made much of the centrality of love to the Christian experience. A.G. Herbert stated categorically that "there can be no right answer to the question, 'What is Christianity?' except by a clear view of the real meaning of the Agape[2] of the New Testament, and its difference from pagan Eros[3]" (in Coates ,1951, p. vi). Indeed, the Christian Church should be characterised by those attributes which define the very nature of their Lord and Master, Jesus Christ. One of these is love (1 Jhn 4:8, 16). On the other hand, in both the study of religious faith, and the study of love, psychologists have made at best only passing forays into this potentially fertile field of research.

[2] A self-sacrificing form of love.

[3] A sensual, self-centred form of love.

A clear understanding of important influences such as love and religion, as well as a clear understanding of the relationships between these variables, is very important to the development of psychology. As our knowledge of factors such as these, and others, increases, we may well see the results of this expansion of knowledge in several areas. Therapists may be able to incorporate in a more meaningful way the combined and interrelated influences involved in the daily processes of their clients' lives. Researchers may better understand the complex web of interrelations that constitute human psychological functioning, and hone their study of psychology. Theorists might be able to grasp the influence of more variables, both combined and independent, and they may be in the position to explore new ground by predicting the development of these factors. Even outside of psychology, an understanding of the relationship between Christian faith and love is necessary. Theology can compare the current state of affairs (as determined by research such as this) with the demands of Scripture, and guide culture along the path indicated in God's Word. Even lay people can understand the way in which different areas of their lives influence (and ought to influence) each other. In the end, both the faith and the love of the believer can be enhanced by an understanding of the relationship between Christian faith and love.

1.4 Definition of key concepts

1.4.1 Christian faith

Although the psychology of religion has included the study of almost every religion know to man, the vast body of work to date has been on what is currently the largest world religion: Christianity. However, the scope of the work done is so broad, that a more precise definition of what is involved in this study is required. Although different researchers in the psychology of religion use different terminology, it should be borne in mind that references to religion in this study always refer to Evangelical Christian faith, unless explicitly stated otherwise.

Evangelical Christian faith is difficult to define, but in essence it refers to a knowledge of, belief in, and action based upon the revelation of God in Jesus Christ. It rests on the basic premises that Jesus Christ alone brings salvation to the believer through His grace, and that only by faith, and also that the Bible, as the only revealed Word of God, is the sole guide for faith and practice.

There are many other groups which also acknowledge Jesus without acknowledging Him as God and sole Saviour. This study uses a narrow definition of Christian faith, and excludes such groups. It is intended that the results of this study are applicable only to Evangelical Christians.

1.4.2 Religious orientation

Any religion, Christianity included, has adherents who are devout, and who "religiously" follow the tenets of their faith, while also having nominal adherents who are members of that religion by name only. The former sacrifice themselves for their faith. The latter expect their faith to sacrifice itself for their own benefit. The Religious Orientation Scale was developed by Allport and Ross (1967) to measure these two attitudes towards religion: The intrinsic, self-sacrificial religious orientation, and the extrinsic, subservient religious orientation.

1.4.3 Love styles

Many researchers have produced many theories of love. The theory which has sparked the most psychological research is that of Lee (1977). He conceptualised love as consisting of several different "styles," all of which are discernible in any individual's way of loving. The best existing measurement of Lee's love styles is Hendrick and Hendrick's (1986) Love Attitudes Scale. The different love styles represent different aspects of love, such as the physical aspect (eros), friendship (storge), practicality (pragma), self-sacrificing love (agape), emotional love (mania), and love as a conquest (ludus).

1.4.4 Structural equation modelling

Structural equation modelling refers to a broad class of analysis techniques, of which factor analysis and regression analysis may be seen as special cases. Essentially, it involves the testing of a covariance (or in some instances a correlation) matrix obtained from a sufficiently large sample against a covariance matrix implied by a model specifying the hypothesised relationships between the relevant variables, and reproduced by one of a variety of fitting functions from the sample covariance matrix. It allows the researcher to specify directional (not causal) relationships between unmeasured variables, which are presumed to underlie the measured variables of the covariance matrix.

1.5 Layout of this research study

Chapters 2 and 3 will discuss Christian faith and love respectively. As the investigation of the relationship between Christian faith and love proceeds in terms of the respective scales used to measure these variables, these scales will be introduced at the relevant points in these chapters. On the basis of the literature reviewed in chapters 2 and 3, Chapter 4 will present the postulates to be tested in this study. Chapter 5 will discuss the statistical methods used to gather and analyse the data. Chapter 6 will describe the sample used in this study, and will give detailed representations and explanations of the results obtained. The last chapter (7) will discuss the results, as well as propose future directions of study.

Chapter 2
Religion and Christian faith

Religion, being such a central issue to human culture since time immemorial, has received attention from psychologists almost from the very inception of psychology (Wulff, 1991). As Kilpatrick (1985, p. 178) put it: "The truth is that psychologists have never been able to keep their nose [sic] out of religion." Furthermore, the relationship between psychology and religion has not been static. While the psychology of religion enjoyed a unique status in the early days of psychology, it has since fallen from favour in many psychological circles (Beit-Hallahmi, 1974). At present, the attitude of psychologists towards religion varies greatly, from those who view it with a Nietzsche-esque disdain, to those who are ardent followers of some or other faith. As a whole, though, it would seem as if psychologists tend towards some form of agnosticism or scepticism (Clay, 1996a), although various researchers (Beit-Hallahmi, 1977; 1996b; Jones, 1994) have shown that psychologists who investigate religion do tend to be religious themselves.

The single most important factor which simultaneously widens the divide between "religious" and "a-religious" psychologists, and complicates any attempt at resolution, is that of definition. It would seem as if neither those supporting, nor those negating the existence of religion, are able to agree (amongst themselves or across the divide) about precisely what it is they so zealously affirm or decry.

It should thus be noted that it is not the purpose of this work to establish whether or not religion truly exists. Rather, it is a foundational assumption of this work that it *does* exist, that it has many different and varied forms and flavours, and that at least some of these forms are discernible, especially also the form in question, viz., (Biblical) Evangelical Christianity.

After an examination of the problems and associated considerations involved in measuring Christian faith, a working definition of Christian faith will be given, and the scales selected to measure it will be discussed.

2.1 Problems in measuring Christian faith

Most of the problems encountered in psychologically measuring religion centre around three key concepts: The theoretical and the methodological assumptions made by the researcher, and the inherent aspects of the particular religion of interest which make it difficult to measure.

2.1.1 Problematic theoretical assumptions

Psychologists have turned their thoughts to religion since the very beginnings of psychology (Beit-Hallahmi, 1974), and psychology has made many numerous and varied investigations into a number of areas of religious practice and experience (Homans, 1968; Wulff, 1991). However, very little agreement has been reached in psychological circles as to the value and meaning of religion (Drakeford, 1964), and most psychologists would even hold to vastly different definitions of what religion entails (Clay, 1996a). Probably the greatest cause for this lack of agreement is that each researcher attempts to define religion from his/her particular perspective on the relative value or liability of religion, while purporting to represent the opinion of all researchers in the field.

The methodology of psychological enquiry in the field of religion is particularly prone to the Achilles' heel of preconceived notions and assumptions made, but not declared, by the researchers involved. Consequently, the interpretation of religious behaviour is riddled with philosophical problems (Basinger, 1990). Gorsuch (1988, p. 218) notes that

> psychologists generally have strong pro- or antireligious convictions, which they bring with them to their investigations and interpretations.... In the worst cases, investigators have ignored or proceeded beyond the data to draw conclusions in keeping with their own philosophical positions.

The solution to this problem is not to attempt to distance oneself from one's convictions under the fallacious notion that that will lead to better science, but rather to explicitly state them and conduct good science from that position. Gorsuch (p. 219) continues: "Encouraging objectivity in psychology hardly means that the personal interests and values of the investigator must be left out of psychology as a science."

Hood (1989) went even further, contending that the ontological question of God also needs to be incorporated into the thinking and theorising of psychologists of religion. The psychology of religion is not only the study of the rise and state humankind's idea of God, but of God's role in human experience. It is not viable to study something which is presumed not to exist.

This lack of clear definition in previous work in the psychology of religion is very apparent, but it seems as if few researchers have done anything to remedy it as yet. On the contrary, it would seem as if the study of religion has been chronically plagued by both poor definition and poor methodology. Heirich (1977, p. 673), speaking of studies on religious conversion, stated that "the inability of classical arguments from the social sciences to account statistically for religious conversion stems from a fundamental misconception of the process involved." The necessity of clear definition is also demonstrated by Poppleton and Pilkington (1963, p. 31), who found that "to include together as members of one group a number of different Protestant denominations... can obscure important differences." Few researchers have heeded their advice in the 39 years which have passed since the publication of their article.

Possibly the root cause of this is an obstinate self-centred focus. This can result in one of two extremes, both of which can pave the way for a single definition of religion being held forth as sufficient for all religions (cf. Gorsuch, 1988, p. 202). Either religiously devoted researchers can conduct their research as if from the belief that the religion to which they hold (and are thus studying) is the only religion (or at least the only religion worth mentioning), causing them to equate their own faith with universal religious experience. Thus their particular religion is absolutised and generalised to all other religious experiences. This researcher firmly believes in the absolute truth of Christianity, but that fact does not imply that there are no other religions. By the same token, this study hopes to deliver results which will be applicable only to the Evangelical Christian faith, and not necessarily any other religion. At the other extreme, a-religious researchers can conclude that all religions are either falsifications, or are all equal in their experience and influence, and can thus be considered to be exactly the same. It is ironical that Clay (1996a; 1996b) notes that while a large proportion of the American public is religious, a significantly larger proportion of American psychologists are a-religious. Nevertheless, psychologists, whether researchers or counsellors, have to deal with religious people, and must take the views of such people into account.

The most significant and also most unfortunate result of this is that almost no research findings on "religion" are directly comparable, as each set of findings does not reveal anything about religion in general, but actually discloses some characteristic of a certain facet of one or other subset of religion. This would not, in and of itself, be a problem if the researchers did not hold their findings to be true of all religions.

As an example, Reed and Meyers (1991) correlated religious orientation with sexual functioning, but they included a very broad spectrum of religious figures (priests, pastors and rabbis) in their sample, making it hard to determine what the differences would be *between* these people. This is an especially important consideration in light of their research topic, since, for example, pastors and rabbis are not required to be celibate as Roman Catholic priests are! Furthermore, in a meta-analytic review, Donahue

(1985a, p. 404) found the particular religious background of a specific study's sample to be an important moderator variable. Hunsberger (1976) also found important religious differences between Mennonite, United Church and Roman Catholic students. Griffin, Gorsuch and Davis (1987, p. 365), after finding elements of prejudice distinct to Seventh Day Adventists in the Caribbean, recommended that "theorists and researchers must take account of the particular cultural and religious context involved."

A better approach would be to provide a general semantic definition of religion, such as "man's belief in the supernatural" (even such a simple definition is fraught with danger – this researcher's aim here is not to provide the definition, but merely to show the necessity of it). Once this is done, research topics should be narrowed down to subsets of religion, e.g., Christianity or Islam, etc. To any reasoning researcher, the multiplicity of religions, cults and sects existing in the world today (Martin, 1968; McConnell, 1995; van Baalen, 1962) should clearly indicate that a generally applicable model for research on religion is a total impossibility. It just cannot be assumed that *any* person who belongs to *any* religious group will display certain traits or characteristics simply because that person is "religious." The pitfall of making this assumption is most often entered into when researchers compare the results of their studies with findings made by other researchers in other studies amongst members of different religious groupings. It can be expected that people who adhere to radically different faiths will also display radically different traits on most, if not all variables. And if any similarities do exist, it should be evident that they need to be confirmed, and not assumed.

It is therefore vital that researchers define clearly what subset of which religion they are dealing with in their studies (good examples of the correct specification and use of different samples may be found in Nielsen's (1995b) comparison of a Mormon concept with Allport's concept of religious orientation (cf. 2.3.2, p. 28) and Batson's quest concept (cf. 2.3.2.5, p. 33) in a variety of samples), and that they refrain from assuming that all other religious people would be similar to the participants included in their studies. If similarity between different religious groupings is to be referred to, then the referring study should have the explicit aim of proving/disproving that similarity. At the very least, generalisations should be limited to members of the particular faith and denomination from which the sample is drawn (and the sample should not span more than one faith), and perhaps even better to the particular culture as well.

2.1.2 Problematic methodological assumptions

Batson (1977, p. 413) concluded that "for all intents and purposes an experimental psychology of religion does not exist." However, much of the non-experimental research on religion is also plagued by other problems, leaving empirical research on religion in a fair state of disarray.

Related to the problem of poor definition is the problem caused by the many researchers who have taken indices such as church membership or single-item self-report scales to determine various aspects of religious standing. Regarding the use of church attendance as a measure of religious devotion, Sloan et al. (2000, p. 1913) express their concern that

> broad generalizations are being made on the basis of limited, narrowly focused, and methodologically flawed studies of the place of religion.... These generalizations fail to... distinguish between superficial indexes of religiousness, such as self-reports of church attendance, and personal religious motivation.

Allen and Spilka (1967, p. 192), referring to the use of variables such as church attendance, and other similar "biographical" indicators to measure religious devotion, found that "some of the equivocality evidenced in relating the research literature may well be principally due to the use of such gross, single indices of religion." These "gross, single indices of religion" are so incomparable that much research on religion, including that correlating it with love, is rendered practically useless. Researchers cannot measure Christian faith against only church membership or even church attendance. The Bible is extremely clear in stating that not all who belong to the Church are saved (Matt 7:15-23; 13:24-30, 36-43; 25:1-46; Phil 3:18; 1 Tim 4:1-2; 6:5; Tit 1:10, 15; 1 Pet 2:1; Rev 20:11-15). Cline and Richards (1963) also found that while their different measures of religious devotion were highly intercorrelated, they had almost no correlation with commonly accepted measures of "religiosity" (p. 569) such as church attendance, prayer frequency, tithing, etc. Even on a purely methodological level it should be obvious that a well-constructed multiple-item scale can provide a more reliable and valid measure than a single-item scale (cf. Huysamen, 1989, pp. 69, 123-124). Gorsuch and McFarland (1972) investigated the relative efficiency of single-item and multiple-item scales of religious values, and gave clear guidelines as to the very limited scope within which single-item scales should be used (chiefly, when cost is paramount and when religion is an incidental rather than central variable to the research question, and the researcher does not need to distinguish between respondents of a homogenous sample). This last consideration is very important, since, as was pointed out in the previous section, researchers *should* select relatively homogenous samples (as far as faith content is concerned) in order to derive any meaningful information about the specific religion under examination, but the practice has been that researchers have tended to select religiously heterogeneous samples. In a later review of the psychology of religion, Gorsuch (1988, p. 209) explicitly stated his concern that

> there has been heavy reliance upon either religious membership or religious preference as a single-item measure of religiousness. The fact that such measures combine the religiously inactive who have behaviorally rejected their faith with the religiously active suggests that they are relatively insensitive.

Gorsuch (p. 219) went on to state what he considered to be the minimum sufficient requirements for measuring Christian faith: Religious orientation (Intrinsic vs. Extrinsic) combined with a measure of church attendance.

This methodological problem is exacerbated even more when researchers combine the use of such indices across different religions in a single study, as they can have vastly different forms and meanings in different religions. However, even just considering Christian faith as an example, it can easily be demonstrated theoretically why these simple measures fail to provide accurate information. Researchers investigating Christian faith can classify their respondents on each of two continuums. The first distinction is that of the presence or absence of faith – not all people who claim to be Christians, are Christians. The second distinction concerns the working-out of that faith in the lives of those who are truly Christians (i.e., only the first group according to the previous distinction), between the so-called "mature" and "worldly" Christians (indicating the extent to which the tenets of the Christian faith are applied in their daily lives). Applying these two distinctions simultaneously to those in the Church will deliver three groups (mature Christians, worldly Christians, non-Christians).

However, knowing about these three groups may help the prospective researcher in planning a study, but it does not make the practical task any easier. The problem with the distinction between Christians and non-Christians is that it is virtually impossible to accurately distinguish between the truly saved and the unsaved. As Bassett et al. (1981, p.346) noted: "only God has the prerogative and the ability to separate definitively 'the sheep from the goats.'" MacArthur (n.d.; 1992b) emphasised that determining the state of one's salvation is, by and large, a matter of self-examination. Even though the researcher must attempt to make this distinction, it must be acknowledged that any such attempt will be flawed. As for the distinction between devout and worldly Christians, it may be better not to attempt a classification into two groups, but to view all the respondents in terms of a continuum, ranging from very committed to poorly committed.

2.1.3 Problems inherent to Christianity

As has been shown, the prospective researcher is faced with a Pandora's box of problems which seem inherent to the study of religion. However, apart from the many methodological problems (both ideological and practical, subjective and objective) in which the researcher can become entangled, each religion has its own internal problems with which the researcher must also contend. These problems are, to a large extent, unique for every religion, but all religions have an array of such problems. Christian faith also has its own set of problems which the researcher must overcome.

2.1.3.1 The many Christian churches

There are literally thousands of Christian denominations in existence. Even limiting a study to the Christians found within one specific culture or country could leave one with a vast number of denominations, each with its own doctrinal beliefs. Even if a researcher were to choose only a few representatives from each denomination in the sample in order to achieve a degree of generalisability and representativeness, this would more often than not result in a sample of such dimensions that all considerations of power would have been exceeded (Cohen, 1977; 1990; 1994). Even South Africa, in 1990, had 185 different Christian denominations (with 31 436 congregations), excluding the ± 4017 other denominations or groups (e.g., Jehovah's Witnesses, New/Old Apostles, Roman Catholics, Zionists, etc.) which name the name of Jesus, but are not considered part of orthodox Evangelical Christianity (Johnstone, 1993).

A definition of Christian faith must satisfy those only denominations which the researcher wishes to include in his/her definition of "Christian," and the researcher should explicitly specify which denominations were included and excluded. Researchers should rather delimit their study to specific related denominational clusters than attempt a general definition which becomes vague in its attempt to span too wide a doctrinal base.

2.1.3.2 False faiths

An additional problem with which the researcher has to deal is the occurrence of "false faiths." It has only limited relevance to the accommodationist approaches towards religions such as Hinduism, Pantheism, Animism and New Age, to name but a few, as they tend to allow an almost "anything goes" philosophy to encompass grossly contradictory beliefs (Maharaj, 1978). However, this problem is especially relevant to monotheistic religions such as Christianity, Islam and Judaism, with their more narrowly defined doctrines. In Christianity, the problem presents itself in a plethora of false "faiths" which name the name of Jesus, and is complicated even further by the many different (but still legitimate) denominations of Christianity. Jesus Himself said (Matt 7:21-23) that

> [21]Not everyone who says to Me, 'Lord, Lord,' will enter the kingdom of heaven, but only he who does the will of My Father who is in heaven. [22]Many will say to Me on that day, 'Lord, Lord, did we not prophesy in Your name, and in Your name drive out demons and perform many miracles?' [23]Then I will tell them plainly, 'I never knew you. Away from Me, you evildoers!'

The two main causes of this phenomenon are nominalism and the prevalence of cults. Johnstone (1993, p. 653) estimates that "in many nations only 10 – 40% of Evangelicals... may have a valid conversion and also regularly attend church services." Colemann (cited in Davies, 1995, p. 20) warns that:

> The new religious movements represent, worldwide, a challenge to the mainline Christian denominations.... Currently they comprise 2.2 per cent of the world population, some 96 million.... Various sociological studies indicate that the new religions in Europe and North America are more successful in recruiting young members and especially in gaining adherents among those whose background is unchurched.

While some assume that the lines between orthodox Christianity and Christian cults (which are thus not true Christian groups) are clear-cut, this is most certainly not the case, and never has been (Davies, 1995; McConnell, 1995, pp. 16-18). From the earliest times, most aberrations and heresies have entered the Church from within, and not from without (McConnell, 1995). Again, the Bible clearly points out that heresy and false doctrine will arise from *within* the Church (Acts 20:29-30; 1 Tim 4:1-2; 2 Tim 4:1-4; 2 Pet 2:1-2; 1 Jhn 2:19).

This presents the researcher who wishes to study Christianity with a serious problem. While most Evangelical leaders are agreed that many members of these cult-infiltrated Churches are indeed Christians, they also agree that they have been seriously deceived (Hanegraaff, 1993; MacArthur, 1992a; McConnell, 1995). Equally so, it is very possible that many in those "Churches" simply are not devout Christians. How is the researcher to differentiate between them?

This problem is further exacerbated by the fact that these cults are sometimes even externally indistinguishable from evangelical Christian groups. McConnell (1995, p. xvii) states that: "the most successful cults... today use the same terminology, the same phraseology, and the same proof-texts as evangelical Christians." Martin (1968, pp. 18-23) placed especial emphasis on the problems which arise from the semantic similarities between cultic and church jargon. Cultists use the very same words as other Christians do, but attach *very* different meanings to them. A classic example of this is the vastly different ideas Mormons, Jehovah's Witnesses and evangelical Christians have when they speak of the person and work of Jesus Christ. Basinger (1990, pp. 5-8) also pointed out the unique linguistic problems in religious measurement.

The best safeguard for the researcher is to provide a clear definition of Christian faith, and *also* the doctrinal and denominational boundaries in which this definition may be accepted, and thus to select research participants accordingly.

2.1.3.3 Problematic characteristics of Christian faith

Apart from the fact that not all people who *call* themselves Christians *are* Christians, there are research-related problems even amongst only those who are truly Christians. These problems arise simply by virtue of all that being a Christian entails.

2.1.3.3.1 Christian conversion and election

Christianity is, in many ways, a very distinctive religion. It is one of the largest religions on earth (Johnstone, 1993). Yet initiation into Christianity is unique. A Hindu is born as a Hindu, and the saying "I was born a Hindu and I will die a Hindu" is very common amongst Indians (Maharaj, 1978). Westerners may also become Hindus, but the basis for such a proselytisation is merely the acceptance and performance of Hindu religious rituals (Maharaj, 1978). Equally so, any person who recites the Islamic statement of faith (the *shahada*) in Arabic is considered a Muslim, even though adherence to Islam entails many other obediences (Marsh, 1975).

In essence, then, conversion to most religions involves the *doing* of something. If a person were to do a certain thing, say a certain thing, or perform a certain ritual, then that person would have been successfully initiated into that religion. Christianity, however, is unique in that the initiator of the relationship between God and the Christian is not the Christian, but God. This is the premise of the doctrine of election (Harrison, Bromley & Henry, 1960), and is a matter which the Church has defended vigorously (e.g., Synod of Dordrecht, 1618/2000). As one person put it (in McDowell & Wilson, 1990, p. 15): "Christianity is not a religion. Religion is humans trying to work their way to God through good works. Christianity is God coming to men and women through Jesus Christ, offering them a relationship with Himself." The epitome of this is found in Eph 2:8-9 (cf. also Tit 3:3-7): "For it is by grace you have been saved, through faith – and this is not from yourselves, it is the gift of God – not by works, so that no-one can boast."

Scientifically measuring what is believed by Evangelical Christians to be a sovereign work of God (viz., salvation) is understandably problematic. How does one measure something in which the person under question has not played the primary role? Also, Christian faith, by its very nature, involves "the inherently private nature of internal states of mind" (Basinger, 1990, pp. 8-9). The best solution that this researcher can propose is to look at both the claims the person makes and the life the person leads as evidences of the work which God has already done in that person's life. It is clear from the Bible that either one of these alone is not sufficient evidence of salvation (cf. Matt 7:15-23; 25:31-46), but that both together provide a good indication of the presence of salvation (cf. Matt 3:10; Lk 3:8; Acts 26:20). It would seem, then, that a combined measure, which measures both lifestyle and profession, would constitute a better means of distinguishing true Christians.

2.1.3.3.2 Variability in Christian devotion

The researcher has to deal with the reality that devotion to the Christian faith, even amongst born-again believers, may vary. This is complicated even further when the researcher realises that observable religious behaviour is essentially equivocal in its nature – the same behaviour can have vastly different meaning to different people (Basinger, 1990, p. 9). When it is hypothesised that a certain variable (such as, in this study, love) correlates with Christian faith, it is not unreasonable to put forward that the degree of commitment to the Christian faith will correspond (either positively or negatively) to the strength of the hypothesised variable. As such, the researcher needs to take these fluctuations in commitment into consideration when dealing with a sample of Christians. The researcher needs to obtain a representative sample of Christians, both those who are highly committed, and those whose commitment may not be so strong. In fact, restricting the study to highly committed Christians only may be to the researcher's detriment, since this may bring about an accompanying restriction in range which may in turn weaken the correlation between the variables under observation.

2.2 A working definition of religion and Christian faith

A study involving the element of Christian faith is without question a study in the psychology of religion, and as such, a clear definition of religion is required. Job (1982, p. 1017) defines religion as follows: "The word 'religion' came into English from the Vulgate, where *religio* is in a 13th-century paraphrase of Jas 1:26f.... It denotes... the outward expression of belief, not the content, as when we contrast the Christian religion with Buddhism." The word translated as "religion" in Jas 1:26-27 is the Greek word *threskeia* (also found in Acts 26:5 as "religion" and in Col 2:18 as "worship"). It is defined as "appropriate beliefs and devout practice of obligations relating to supernatural persons and powers" (Louw & Nida, 1989, p. 531). It is instructive to note that Louw and Nida (p. 532) make mention of the fact that "in a number of languages there is no specific term equivalent to 'religion,' but one may always speak of this phase of culture by some phrase such as 'how to act toward God'." Thus, while there may not always be a specific word for "religion," as far as could be established, no language on earth does not have a name for deity. Religion is an extremely pervasive aspect of human life. From the earliest of times, humanity has recognised that the world we live in contains divinely created order – an order and design which becomes only more evident with the advances of science (Wilder-Smith, 1970), and, as such, has given recognition of that fact in the worship of deity. Even though the use of the word "religion" in the Bible is reasonably uncommon, it should be noted that the entire Bible is about God's dealings with humanity, and about humanity's response to God. This, in the broadest sense, is what religion is about.

However, a study cannot simply be described as being "a religious study." The definition of religion is far too general to be of practical use in a research study. There are many kinds of religion, and, despite some arguments to the contrary, they are not all the same – their basic tenets are not the same, their views of God are not the same, and their core beliefs are not the same (Lutzer, 1994; MacArthur, 1994). It is for this reason that Job (1982, p. 1017) notes that

> hesitance today in using the word 'religion' either of the content of the Christian faith or of its expression in worship and service, is due to the conviction that Christianity is not simply one amongst many religions, but differs from all others in that its content is divinely revealed and its outward expression by believers is not an attempt to secure salvation but a thank-offering for it.

Thus it is necessary, for the purposes of this study, to define not only religion, but also that precise form of religion which is being studied: Evangelical Christianity. This definition of Evangelical Christian faith will form the boundaries which will delimit the scope of this study. This study should thus be appraised against its definition of Evangelical Christian faith, not its definition of religion.

2.2.1 Christians

The first task in defining Evangelical Christian faith, however, is to come to a clear definition of that over-generalised word "Christians." Who are Christians? The name "Christians" itself derives from the very earliest days of the Christian Church (hereafter, the Church), when followers (literally "disciples") of Christ were called "Christians" by the people of Antioch (Acts 11:26). The word "Christian" is used only two other times in the NT – in Acts 26:28 and 1 Pet 4:16. Although Walls (1982, p. 186) notes that it appears as if "there were other names which Christians themselves used, and perhaps preferred," it was the name "Christian" that stuck. Walls (p. 187) continues that "it had a certain appropriateness: it concentrated attention on the fact that the distinctive element in this new religion was that it centred in the Person, Christ." A Christian, thus, is a disciple of Christ, and so it has been for two millennia.

However, therein lies the rub. Many people today claim that name, but it is evident that they cannot be summarily grouped together as such (Johnstone, 1993, pp. 16, 656-657). The vast array of beliefs and behaviours perpetrated in the name of Christ broadcast clearly the fact that claiming to be a Christian does not mean that one truly is a disciple of Christ (as mentioned in 2.1.3.2, p. 11). For a serious researcher, even as for any inquirer into religion, the name "Christian" is the last characteristic which is assimilated into the complete picture, not the first. As will become evident in the following sections, determining a person's Christian status (impossible as it may be to determine this definitively – cf. 2.1.3.3.1, p. 13) depends on far more than the single profession "I am a Christian."

A better approach would be to examine those aspects that are fundamental to being a Christian. The most important aspect underlying Christianity is faith (Morris, 1982, p. 367). In fact, the Reformers were so convinced of its absolute importance that they maintained that it was the only fundamental underlying Christianity (de Bräs, 1561/2000; Synod of Dordrecht, 1618/2000). Thus examining the true nature of what being a Christian entails requires an examination of Christian faith, or what Christians believe, and how that belief forms and influences their lives. Therefore, this study will examine the nature of Evangelical Christian faith, and throughout, the reference to "Christians" in this study will apply to those people (regardless of race, gender, nationality, etc.) who hold to the definition of Christian faith as espoused in the following sections.

Thus defining Christians will require a definition of Christian faith, firstly as a form of religion (although some would object to this, as will be mentioned in the next section), and secondly in terms of its own unique content.

2.2.2 Defining Evangelical Christian faith

The existence such a large profusion of religions and "variants" of the Christian faith itself means that properly defining Evangelical Christian faith will necessitate an exposition of those beliefs and behaviours which make it unique. Even so, defining Christian faith is complicated by the great variety found *within* the Church. Johnstone (1993, p. 656) notes that there are in excess of 24 000 different Christian denominations world-wide, and Time magazine (quoting from the *World Christian Encyclopaedia*) reports that there are 33 820 "Christian denominations or similar distinct organizations" (2001, p. 14). A working definition of Christianity needs to be distilled which will span an acceptable breadth within the Church (no definition will span the entire breadth and still function properly in research). This can only be done by working around all the differences that these different denominations may have, and finding a common ground in which a definition of Christian faith can be forged.

It is evident from the history and teaching of the Church that coming to a clear definition of Christian faith will not involve an examination of the various rituals and rites enacted by "Christians" (and which vary far too greatly to allow their use as a measure of faith), but will centre on the actual content of the Christian faith. What people believe will influence what they do, and will influence how they define their specific religion. This extends to the next crucial unique aspect of Christianity: It makes Christ the pivotal point in *Christ*ian faith. Christian faith places the emphasis, not on acting to please God, but on *believing* in Christ.

Vander Stelt (1981, pp. 127-128) also spelled out the necessity of a clear definition of faith, as well as the pitfall many make of defining faith in theoretical and not practical terms. He described Christian faith as having four elements (pp. 128-130): Firstly, it is a "divine gift of grace through which sinners are

converted and enabled to believe the right things again." Faith is the result of God's divine work in the human heart. Secondly, it refers to "a conscious, intentional human act of believing or confessing something or someone nondependent or self-existent." Faith is believing and confessing in God. Thirdly, faith can refer to the "content of what is believed." Many people can believe many things, but it is essential to believe the faith (and gospel) given by God for salvation. Fourthly, faith can be understood as "the pistical aspect of all created reality." Faith thus also refers to the revelation of God in all of creation. Manning (2000, p. 28) goes on to note that

> The majority would define faith as belief in the existence of God. In earlier times it did not take faith to believe that God existed – almost everybody took that for granted. Rather, faith had to do with one's relationship to God – whether one trusted in God. The difference between faith as "belief in something that may or may not exist" and faith as "trusting in God" is enormous. The first is a matter of the head, the second a matter of the heart. The first can leave us unchanged, the second intrinsically brings change.

Thus a truly basic definition of Evangelical Christian faith encompassing the elements mentioned above, would be as follows: A belief in God as Divine Creator of the entire world, an understanding of humankind's irredeemable depravity, demonstrated in continual sin against God. Also, a belief that God has revealed Himself to humankind primarily in two ways: Through the written Word inscripturated by the prophets of God – the Bible, and in Jesus Christ who is God in human flesh. Furthermore that Jesus Christ came, not only as the complete revelation of God, but also as the atoning sacrifice, doing that which no-one in the entire history of humanity has ever been able to do – free humankind from its own sinful nature and restore it into relationship with God. Lastly, that the indwelling presence of the Holy Spirit in a believer's life is both the present proof of this restored relationship with God, and also the future promise of the ultimate fulfilment of it when God recreates the entire world. In short, faith should be seen as the belief of a person, by the grace of God, in the revelation of God. The emphasis should always be on the gift and the belief. As Morris (1982, p. 368) summarised it:

> Faith is clearly one of the most important concepts in the whole NT. Everywhere it is required and its importance insisted upon. Faith means abandoning all trust in one's own resources. Faith means casting oneself unreservedly on the mercy of God. Faith means laying hold of the promises of God in Christ, relying entirely on the finished work of Christ for salvation, and on the power of the indwelling Holy Spirit of God for daily strength. Faith implies complete reliance on God and full obedience to God.

2.2.2.1 Quantifying Christian faith

Defining Christian faith entails coming to a suitably condensed explanation so as to make it understandable for the reader. However, while definitions may reduce difficult concepts to a more manageable minimum, they do not necessarily help the researcher who needs quantifiable indicators against which to measure the defined construct. Thus defining Christian faith from a researcher's point of view will entail enumerating those things which are both observable or reportable, and which examine both the content of an individual's faith, and the behaviour resulting from that faith.

This might profitably be done through an examination of how the Bible defines faith. Although a thorough biblical definition of Christian faith would entail an examination of the entire Bible, it is so that the Bible deals with faith in greater depth in certain places, and the researcher might justifiably limit his/her study to those sections only. For example, the Bible book of Hebrews expounds faith in great details, especially in its eleventh chapter. From this text, it may be seen that faith is potentially observable, and hence quantifiable, in terms of the following:

- **Repentance** (Heb 6:1), which MacArthur (1988) notes is even used as synonymous with faith. This is a conscious confession of, and turning from, one's sin.
- **Belief in Christ** (Heb 10:38), which, as Aitken (1924, p. 49) pointed out, is an absolute necessity for Christian faith.
- **Conviction** of the certainty of God's promises given in the Bible (Heb 11:1). This is not just an intellectual assent to Christian doctrine, but a conviction which determines a lifestyle of faith (Calvin, 1559/1960, pp. 560-562; Gill, 1809-2000), and that conviction itself is supported by faith (Calvin, 1559/1960, p. 588).
- **Hope in God** (Heb 3:6; 6:11, 18-19; 7:19; 10:23; 11:1). This is not a temporal hope focused on earthly circumstances, but a God-given, spiritual hope focused on spiritual realities.
- **Knowledge** (Heb 11:1). Christian faith has a certain amount of knowledge as prerequisite (Calvin, 1559/1960, pp. 544), but it also brings a unique new knowledge to the believer (Morris, 1982, p. 367).
- **Righteousness** (Heb 11:4). This is not a holier-than-thou attitude, but the redemption offered to the sinful person which has been appropriated through faith (Finlayson, 1924, p. 11).
- **Worship** (Heb 11:4; 12:28; 13:15). Worship itself is a contentious proof of true faith, since it is clear that not all acts of worship are true worship (Matt 15:8-9). The difference, rather, is that to a true believer, worship is a selfless act of supplication before God, while the unbeliever, should he/she engage in an act of worship, does so for selfish ends.

- **Relationship** (Heb 11:5-6). Specifically, Christians experience a restored relationship with God (evidenced, amongst others, in prayer), which influences even their relationships with their fellow human beings. The life of the Christian believer must visibly reflect the fact that a relationship has been initiated by God between God and that believer.

- **Mercy** (Heb 11:5). Although not overtly visible, the believer is internally aware of having received God's grace and mercy and being freed from God's judgement (Packer, 1973, p. 143).

- **Faithful attitude towards God** (Heb 11:6). Many people believe in "a god," or "the Big Man upstairs," but their actions show that this is more of a cursory superstition than an active belief. As Morris (1982, p. 367) explains, faith "denotes not simply a belief that carries an intellectual assent, but one wherein the believer cleaves to his Saviour with all his heart."

- **Testimony** (Heb 11:7). This refers to the changed life of the believer in general, a life which now stands in stark contrast to its surrounding culture, and even its own history (1 Pet 4:1-4). This changed life is brought about by the righteousness which God dispenses in response to faith, resulting in Christian believers living out that righteousness here on earth in the midst of their world (cf. Psalm 37:6; Matt 5:16; Phil 2:15).

- **Reverence** – a holy fear of God (Heb 11:7). It should also be noted that those who fear God, lose their fear of what people might do to them because of their faith (Luk 12:4-5; 1 Pet 3:14). As the Apostles in Acts stood their ground, refusing to fear the Sanhedrin (Acts 4:19; 5:29), so also God calls all believers not to fear other people, but to revere Him (Isa 51:4-8).

- **Obedience** (Heb 11:8). Since the believer fears God, it follows that the believer will obey God. For today's believer, obedience means living in accordance with the Bible, God's revelation to humanity.

- **Dissociation with the world** (Heb 11:8-21). The believer who, in faith, fears God, will not live a life focused on earthly things (Col 3:1-2; 1 Jhn 2:15-17), but will instead be focussed on spiritual realities (Matt 5:19-34).

- **Absolute trust in God** (Heb 11:11-12, 17-19). This flows from the conviction of the certainty of God's promises, but should not be equated with it. Rather, where conviction refers to the content of faith, trust refers to the action prompted by that belief.

- **Divine empowering** (Heb 11:34; 2 Cor 12:9-10). One specific way in which the faithful also see the Lord working on their behalf is through His empowering presence, especially evident in the trials of life (Retief, 2000).

- **Perseverance** (Heb 3:14; 10:36; 11:27). All believers, knowing that they can trust in God under even the most trying circumstances and rely on His divine strength at all times (Heb 11:35-39), can learn to persevere under any circumstances (Jas 1:2-4). Also, true faith is not a passing fad, it endures through all obstacles. Faith cannot be "lost" (Calvin, 1559/1960, pp. 587-588; Morris, 1982, p. 367).

- **Persecution** (Heb 11:35-39; Matt 5:10-12; 10:16-23). This does, of course, not mean that Christians are to be masochists, looking for suffering and persecution, nor does it mean that the absence of persecution is indicative of an absence of faith. Suffering is not a characteristic of faith, but often may accompany faith. What is characteristic of faith is the response of acceptance and perseverance when faced with suffering.

- **Action**. In Heb 10:38-11:31 the author uses the Greek word *pisteo* 24 times (translated 23 times as "by faith" and once as "through faith" (v. 33) in the NIV). Each time he recounts some faith-prompted action of a faithful person. The last, and primary evidence of faith is action (Jas 2:26). Faith can be measured by the deeds a Christian does in gratitude to God for the salvation He has provided (Jas 2:15-16, 21, 25; 1 Jhn 3:17-18).

- **The limitlessness of faith**. It is evident from Heb 11 that faith is never measured in terms of the works God does on behalf of the believer. Faith is not a matter of size or potency, but of presence or absence. The writer to the Hebrews sees no limits to what can be done "by [or through] faith," or, more precisely, as a result of faith.

- **The object of faith**. Faith is not an object in and of itself. Rather, true Christian faith, as the Reformers (e.g., Calvin, 1559/1960, pp. 542-544) insisted, is focused solely on Christ.

  Aitken (1924, p. 56) said of faith:

  > But it is most important to bear in mind that our faith is addressed primarily not to a *fact* or to a *doctrine*, not even to such a fact as Calvary, or such a doctrine as the atonement, but to a PERSON who is what He is and does what He does in virtue of that wondrous fact, and of all that is involved in that mysterious but all-important doctrine.

2.2.3 Christian devotion

Faith, thus, is the presence (as opposed to the absence) of "the attitude whereby a man abandons all reliance in his own efforts to obtain salvation.... It is the attitude of complete trust in Christ, of reliance on Him alone for all that salvation means" (Morris, 1982, pp. 366-367). However, Morris (p. 367) also points out that the word "faith" can be used in two ways: Firstly as the act of believing, and secondly it can refer to "the whole body of Christian teaching."

Researchers cannot measure Christian faith in a dichotomous manner (present/absent) and still plumb the depths of its relationship with other variables. It may be so that in the sight of God, salvation is not dependent on the strength or fervency of one's faith, but on its presence or absence (as was pointed out in the preceding section). The presence or absence of faith, however, is not particularly informative to the researcher. Researchers need a measure of the strength and content of a person's faith, and how that faith influences behaviour, not to judge respondents in any way, but to better investigate the relationship between Christian faith and any other variable.

Fortunately this is not a new precedent created by psychological researchers – it is as old as the Church itself. Although the Bible is abundantly clear that faith is important in its presence or absence, it is also extremely lucid in its call to all Christians to increase the strength of their faith (e.g., Col 2:7; Jude 20), also showing the differences in behaviour brought about by having either weak or strong faith (Rom 14). The best way to view this dualism is perhaps not to refer to the relative strength of a person's faith (although, technically, this would not be incorrect) but to refer to the relative Christian maturity of those in the faith (cf. 1 Cor 3:1-2; Eph 4:13; Heb 5:11-6:1).

Thus researchers need to distinguish, firstly, between Christians and non-Christians, and secondly between the relative maturity of those who are Christians. In other words, researchers need to be able to distinguish, not only between those who truly believe and those who do not, but also between those who believe and live accordingly, and those who believe, but do not live accordingly. This latter task is far closer to the realm of possibility than the former, since it involves the measurement of actions and behaviours, and is not limited to the realm of beliefs. Those who believe but do not act out their faith will still find that many of their old "unsaved" beliefs linger on (cf. Col 2:18). It would thus, to an extent, be possible to distinguish them from those whose beliefs and actions are integrated, but it is much harder to distinguish them from the unsaved purely on the basis of their beliefs. The Bible is adamant in its assertion that true transformation comes from within, and that righteous living starts in the mind (Rom 12:1-2).

The writer to the Hebrews shows that through the constant studying and application of the Word of God (the Bible), the lives of mature Christians can be transformed (Heb 5:14). Jas 1: 22-25 explains the process in greater detail:

> [22]Do not merely listen to the word, and so deceive yourselves. Do what it says. [23]Anyone who listens to the word but does not do what it says is like a man who looks at his face in a mirror [24]and, after looking at himself, goes away and immediately forgets what he looks like. [25]But the man who looks intently into the perfect law that gives freedom, and continues to do this, not forgetting what he has heard, but doing it—he will be blessed in what he does.

In an ideal world, every Church would be filled with strong, mature Christians, and every researcher would have only mature Christians to work with. However, the Church will always have its hodgepodge of members, ranging from giants in the faith to little infants, and any attempt to exclude one section of the church stratum is not justifiable.

Measuring devotion to the Christian faith can be conducted in one, or both, of two ways (positively and negatively): Agreement with, and adherence to, the basic tenets of the Christian faith, and dissociation with practices evident in the world but forbidden by the Bible (sin), or, in different terms, by the degree of obedience, and/or the lack of disobedience. In other words, compliance to the content Christian faith can provide a positive indication of the strength of a Christian's faith, while non-compliance can provide a negative indication of the same.

2.2.3.1 Compliance to the Christian faith

The basic requirement for Christian living is to live in accordance with the commands of the Bible (Deut 17:18-19; Josh 1:7-8; Ezra 7:10; 1 Thes 4:7; 2 Thes 3:6). Thus the degree to which individuals put into practice the commands of the Bible should provide a measurable indication of their devotion to their faith.

However, faith can also be measured in terms of the acquiescence of the individual to the doctrines of the Christian faith, firstly because of the importance of correct doctrine (1 Tim 1:3; 2:9; 4:1-5, 13-16, 6:3-5; 2 Tim 3:16-4:4; Tit 1:9; 2:1), and secondly because there is a clear link between doctrine and behaviour (e.g., Tit 1:10-16).

2.2.3.2 Non-compliance to the Christian faith

Many people in the Church are truly saved, but are still, as it were, hanging on to the world. Paul described them as being "worldly" and "infants in Christ" (1 Cor 3:1, cf. also Heb 5:11-14). When Paul accuses the Corinthian Christians of being "worldly," he is bringing against them the charge that their actions are no different to the actions of the rest of the unredeemed world (2 Cor 6:17; Eph 4:17 ff.; Jas 4:2; 1 Pet 2:11-12, 4:1-4; 1 Jhn 2:15-17; Rev 18:4). All Christians are involved in a lifelong and inescapable struggle with the fallen evilness of their human flesh. Some, however, are still so steeped in that nature that their consciences have been blunted by the large-scale and repetitious presence of many sins. They may even be largely unaware of the presence of various sins in their lives, and as a result live lives which are virtually indistinguishable from the world. While they may very well be saved, there is little evidence (barely enough for the researcher to measure) of that salvation in their day-to-day living.

2.3 Scales used to Measure Christian Faith

Based on the preceding discussion, this researcher selected two measurement instruments to measure two aspects of Christian faith: Its presence (the Shepherd Scale), and its level of maturity (the Religious Orientation Scale).

2.3.1 The Shepherd Scale

In their review of research measuring Christianity, Bassett et al. (1981) found that none of the 138 reviewed scales had used the Bible as a source for their items. They set out to correct this gross oversight, and constructed the first scale which taps the Bible as its sole source of items – the Shepherd Scale (SS). They divided the New Testament into five sections, each researcher studying a section and extracting any references in that section which might describe "the qualifications, characteristics and/or behaviour of a Christian" (Bassett et al., 1981, p. 342). These were then pooled and sorted into five categories: "basic beliefs, personal growth, relationship to God, relationships with Christians, and relationships with the world" (p. 342). During the scale revision it was, however, decided to collapse the five categories to two, viz., Belief (which tapped intellectual assent to Christian doctrine) and Christian Walk (which reflected values, attitudes and behaviour – i.e., a more affective-conative component). The two subscale scores could be summed to provide a total score of the strength of the participants' Christian faith. They found the scale to have good reliabilities, and they also found it to correlate reasonably well with two other measures of Christianity (the Dimensions of Religious Commitment scale of Glock and Stark and a variation (with less items) of King and Hunt's religious measurement), thus apparently confirming its validity.

Although they found initial evidence that it could be a good discriminator between Christians and non-Christians, the scale does still have several weaknesses. Firstly they themselves admitted that the final scale had not been subjected to any factor analysis in its development (their samples in the reliability and validation studies were relatively small). This means that the subscales are mere conceptual divisions, and are not based on statistical discrimination. Secondly, they could suggest no cut-off score for identifying Christians, as the nature of a person's walk with God may influence that person's score in unpredictable ways. It can, however, still be assumed that a relatively high score is indicative of a strong Christian faith. However, while acknowledging that "only God has the prerogative and the ability to separate definitively 'the sheep from the goats'" (1981, p. 346) they did feel that for the purposes of research, the Shepherd Scale does seem to differentiate between true Christians and non-Christians.

The SS, being a relatively new scale, is slowly being brought into use by various researchers. Foster and LaForce (1999) used the SS and the Religious Orientation Scale to investigate moral, religious and

identity development, Mangis (1995) used it to investigate dogmatism and sexist attitudes toward women, and Morrow, Worthington and McCullough (1993) used it to separate high and low Christian belief groups in investigating perceptions of counsellors dealing with religious issues. An Afrikaans version of the SS, translated by le Roux (1998), has also been used in South Africa (Halgryn, 1993; Raubenheimer, 1994; 1997). The scale has also been recommended as a possible clinical instrument (Butman, 1990).

2.3.1.1 Structure and psychometric properties of the Shepherd Scale

Bassett et al. (1981) constructed the SS so that items 1 to 13 tapped Belief, and items 14 to 38, Christian Walk. Although the SS has not undergone extensive psychometric evaluations, some initial data do exist on the psychometric characteristics of the scale.

2.3.1.1.1 Reliability of the Shepherd Scale

Reliabilities for the SS in the literature were computed for the total scale, and not for the subscales. Bassett et al. (1981) determined the reliability (using a sample of psychology students from a Christian college) as follows: .82 for test-retest (N=36); .83 for split-half (N=61); .86 for Cronbach's alpha (N=61). Pecnik and Epperson (1985) found a coefficient alpha of .94 with a sample of 238 psychology students from an American state university. Using a sample of 144 students from the University of the Free State in South Africa, Raubenheimer (1997) also found the SS to have a very high reliability (alpha = .91).

2.3.1.1.2 Validity of the Shepherd Scale

The SS was shown by Bassett et al. (1981) and by Pecnik and Epperson (1985) to have satisfactory criterion-related validity. However, whereas their precise definition of their samples in terms of religious groupings is commendable, both groups of researchers defined Christianity as including both Roman Catholics and Protestants. This, however, is a definition many Christian leaders (cf. Ankerberg, n.d.) would object to. In fact, Bassett et al. (1981, p. 345) mention that "the greatest discrepancy between Protestants and Catholics was the item suggesting that because of God's favour we are no longer condemned by God's laws... [which] may reflect the traditional Protestant emphasis on salvation by grace." Ironically, the "Protestant emphasis on salvation by grace" is one of the essential, non-negotiable aspects of Evangelical Christianity (de Bräs, 1561/2000; Synod of Dordrecht, 1618/2000; Ursinus & Olevianus, 1563/2000). It should thus be expected of a valid measure of Evangelical Christian faith to differentiate between Evangelicals and Roman Catholics, and it is uncertain to what extent the SS succeeds in this regard. Despite the "discrepancy" mentioned above, Bassett et al. (1981) concluded that the SS does not differentiate between the Protestant and Roman Catholic respondents in their sample. In

a later study, Bassett and his associates (Bassett et al., 1991, p. 89), using a number of measures of the Christian faith (including the SS), found statistically significant differences in the SS scores between the Roman Catholics and Protestants. However, in a dogged ecumenism-at-all-costs drive, they ignored the opportunity to test the ability of the SS to differentiate between the different groupings, and rather offered a number of contrived explanations to explain away the differences they had found. They contended (p. 90) that "the tendency of many of the instruments we used to differentiate between Catholics and Protestants was disturbing. Presumably, an adequate measure of Christian maturity would avoid sectarian distinctions and be meaningful to the entire range of committed Christians." Bassett et al.'s insistence that the SS should not "differentiate between Catholics and Protestants," especially when it has been shown that theology has a definite impact on the beliefs, attitudes and behaviours of people (Donahue, 1989), is completely unfounded. Doctrinally, Evangelical Christianity and Roman Catholicism are (more than) sufficiently far apart for them to be classified as different faiths. Indeed, many Evangelical leaders do define them as such (cf. Ankerberg, n.d.; Berkhouwer, 1957, pp. 118-119; MacArthur, 1992b, p. 10). This is a very problematic situation, since, as Johnstone (1993, p. 653) points out, world-wide, "an increasing number of Catholics, Orthodox and others have a clear testimony of a personal meeting with the Lord and hold an evangelical position regarding the Bible." Nevertheless, it would seem, based on both doctrinal and Biblical definitions of faith (cf. 2.2.2, p. 16), and the current doctrines of the Evangelical and Roman Catholic communities, that the best approach would be for researchers to treat these two groupings as distinct (as was pointed out in 2.1.3.2, p. 11).

Although Bassett et al. (1981) did not include factor-analytic methods in their development of the SS, this crucial oversight (Briggs & Cheeck, 1986, p. 111) was later corrected by Pecnik and Epperson (1985). They found a two-factor solution to be the best, but the two factors were not defined by the respective items originally intended by Bassett et al. The first factor was labelled by Pecnik and Epperson as Christian beliefs, values and behaviours, which, although it had the same description as the second factor of Bassett et al., included 12 of the original 13 SS items from the Belief subscale, as well as eleven items from the Christian Walk subscale. The second factor defined by Pecnik and Epperson was Identification with the Christian community, which consisted of a further nine items from the Christian Walk subscale of the SS. However, their conclusion that this two-factor solution best described the SS is questionable. Their second factor accounted for only 10.13% of the variance, against the 67.89% of the first factor. According to the guidelines given by Gorsuch (1983; 1997a), it would have been far better to assume only one factor in their solution. Pecnik and Epperson also provided confirmation of the reliability and validity of the SS, leading them to the conclusion that it does seem to give a valid assessment of Christian faith.

2.3.1.2 The Shepherd Scale and the construct of Christianity

The SS measures Christian faith by tapping aspects of doctrine, personal experience and belief, and behaviour. Examples of doctrine are: "I believe that God raised Jesus from the dead" (Item 6) and "Because of God's favour to us, through Jesus Christ, we are no longer condemned by God's laws" (Item 10). Personal experience/belief is reflected in items such as: "Because of my personal commitment to Jesus Christ, I have eternal life" (Item 11) and "I have turned from my sin and believed in Jesus Christ" (Item 37). Behaviour items include: "I respect and obey the rules and regulations of the civil authorities which govern me" (Item 22) and "My belief, trust, and loyalty to God can be seen by other people through my actions and behaviour" (Item 31). It must, however, be noted that these "classifications" are presented only for the benefit of demonstrating the general nature of the scale. Many of the items span more than one of the mentioned aspects. For example, Item 6, listed here as an example of a doctrinal item, can equally be listed as an item of belief. The essence of the item is that it measures the belief the individual has in a certain essential doctrine. The behaviour items are also based on certain doctrines and beliefs. Furthermore, the SS measures those aspects defined by this researcher as being key components of faith, as shown in It is apparent that the SS is intended as a measurement scale that is directly related to Christianity. The content of a large proportion of the items is explicitly Christian, and followers of other religions should find little to agree with in these items. However, any person who is nominal in the Christian faith may also agree wholeheartedly with the Shepherd Scale, and even in the behaviour items such a person might answer very positively, despite not actually demonstrating the reported behaviour patterns, but rather merely because of acquiescence and social desirability (Taylor et al., 2000, pp. 162-168). As such the SS should be relied on only to provide an indication of the absence or presence of Christian faith (albeit a relatively continuous indication), and not an indication of the relative maturity evident in that faith. Furthermore, the SS was found to be a poor predictor of an important non-religious variable: prejudice (Boivin, Donkin & Darling, 1990), again casting doubt on its suitability as the sole measurement of Christian faith in studies dealing with both religious and non-religious variables. For an added dimension to this measurement, an additional component is needed. This researcher has selected the Religious Orientation Scale to provide this added dimension of measurement.

Table 1 (for convenience, the SS items are sorted according to the order of presentation of the components of faith provided in 2.2.2.1, p. 18).

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Table 1 *Examples of SS Items Tapping Various Components of Faith*

Faith component	Item no.	Item wording
Repentance	35	I realise a need to admit my wrongs to God.
Belief in Christ	11	Because of my personal commitment to Jesus Christ, I have eternal life.
Conviction	7	I believe that God will judge me for all my actions and behaviours.
Hope in God	5	I believe that by following the teachings of Jesus Christ and incorporating them into my daily life, I receive such things as peace, confidence and hope.
Knowledge	32	I can see daily growth in the areas of knowledge of Jesus Christ, self-control, patience and virtue.
Righteousness	27	I speak the truth with love to Christians.
Worship	30	I enjoy spending time with Christians.
Relationship	4	I believe that it is possible to have a personal relationship with God through Christ.
Mercy	10	Because of God's favour to us, through Jesus Christ, we are no longer condemned by God's laws.
Faithful attitude towards God	12	The only means by which I may know God is through my personal commitment to Jesus Christ.
Testimony	36	I have told others that I serve Jesus Christ.
Reverence	33	Because of my love for God, I obey His commandments.
Obedience	8	I believe that by submitting myself to Christ, He frees me to obey Him in a way I never could before.
Dissociation with the world	17	Status and material possessions are not of primary importance to me.
Absolute trust in God	9	I believe in miracles as a result of my confidence in God to perform such things.
Divine empowering	34	I attribute my accomplishments to God's presence in my life.
Perseverance	3	I believe that there are certain required duties to maintaining a strong Christian lifestyle (i.e., prayer, doing good deeds, and helping others).
Action	38	I daily use and apply what I have learned by following Jesus Christ.

Note: The specific Scripture verses from which Bassett et al. (1981) derived the SS items are shown in Appendix A.

2.3.2 The Religious Orientation Scale

Based on much prior work done by Allport and his associates, Allport and Ross (1967) developed the Religious Orientation Scale (ROS), which was intended to differentiate between those who have an intrinsic and those who have an extrinsic attitude toward religion. However, they almost exclusively used Christians in their samples, and while it was thought that the ROS would function well amongst different religious groups, this was not tested in their development of the scale. Nevertheless, the ROS found a large amount of support amongst researchers studying religion. Leak (1993, p. 315) is of the opinion that the ROS is one of "the most popular and important measures in the psychology of religion," and Hall et al. (1994, p. 396) note that "there is considerable agreement that Allport's... concepts of Intrinsic... and Extrinsic... religiousness have been the most widely researched dimensions of religiousness in the empirical study of religiosity." Kirkpatrick and Hood (1990, p. 442) also noted that Allport and Ross' 1967 article was "probably the most frequently cited reference" in religious research, providing the "backbone of empirical research in the psychology of religion" (cf. also Donahue, 1985a, p. 400; Spilka, Kojetin & McIntosh, 1985).

2.3.2.1 Defining religious orientation

Before continuing, it is important to understand what Allport's intention was with the intrinsic/extrinsic distinction. Allport's theory was developed over a reasonably long period of time, and the ideas were adjusted slightly as they took shape in his thinking (Kahoe, 1985), and elaborated through his collaboration with several of his students (Trimble, 1997, pp. 973-975; Warren, 1977, pp. 94-95). The definitions elaborated here are those as espoused by Allport at the end of the process, presumably when the concepts were fully formed.

The best simple explanation of the intrinsic/extrinsic distinction is that "the extrinsically motivated person *uses* his religion, whereas the intrinsically motivated *lives* his religion" (Allport & Ross, 1967, p. 434). Extrinsically oriented people see religion as something through which they can profit. To these people, religion is instrumental, a means to an end. They do not see the necessity of abandoning the self in turning to God. Intrinsically oriented people, on the other hand, see religion as something which makes certain demands from them, as something which is costly but also valuable. To them religion is not the means, but the end, and religious beliefs enjoy priority over all other beliefs. Allport intended his typology of intrinsic faith to be that kind of faith which is marked by maturity (Hood, 1985).

Donahue (1985a, p. 400) described the intrinsic/extrinsic distinction as follows: "*Intrinsic* religiousness is religion as a meaning-endowed framework in terms of which all of life is understood... *Extrinsic* religiousness... is the religion of comfort and social convention, a self-serving, instrumental approach

shaped to suit oneself." He also added that "extrinsic religiousness... does a good job of measuring the sort of religion that gives religion a bad name" (p. 416).

Thus, the two ROS subscales appear to measure two different *approaches* to religion, not two different *kinds* of religion. Donahue (1985a) has commented that the extrinsic subscale "measures not so much religiousness per se as an attitude toward religion" (p. 405), while the intrinsic subscale "serves as an excellent measure of religious commitment" (p. 415).

2.3.2.2 Religious orientation groupings

Allport (Allport & Ross, 1967) originally did not see intrinsically and extrinsically oriented people as forming two distinct groups, but thought that all people lay on a continuum between the two extremes. He thus intended the ROS to provide only a total score (with the scoring of the Intrinsic items reversed), indicating the degree of extrinsicness. However, although some researchers continued in this approach (e.g., Hoge, 1972), subsequent research found this bipolar (and thus unidimensional) hypothesis to be incorrect (e.g., Hood, 1971; Kahoe, 1976; 1985; Thompson, 1974). In fact, Allport ended up defining four distinct groups by splitting the sample along the median scores for the two subscales. These are: consistently intrinsic (high intrinsic and low extrinsic scores), consistently extrinsic (high extrinsic and low intrinsic scores), indiscriminately pro-religious (high intrinsic and extrinsic scores), and indiscriminately anti-religious (low intrinsic and extrinsic scores). Although Allport and Ross (1967) found definite evidence for the existence of the first three groups just mentioned, they did not find any for the fourth (indiscriminately anti-religious). However, their sample only included churchgoers, which, they concluded, would by its very nature preclude the presence of indiscriminately anti-religious participants.

Allport and Ross (1967) stressed the necessity of making the distinction between not only the intrinsic and the extrinsic, but between all four groups. They found big differences in the prejudice scores of the three groups in their sample. However, when Allport and Ross made only the intrinsic/extrinsic distinction, (i.e., with the indiscriminately pro-religious mixed into the two remaining groups), all their results were seriously muddled. In terms of prejudice, it was interesting to note that the indiscriminately pro-religious were significantly *more* prejudiced than the consistently extrinsic, who were again significantly more prejudiced than the consistently intrinsic participants.

Although Allport and Ross (1967) advocated the median split of the ROS, and although a number of researchers subsequently applied the median split in their studies, the method has not escaped controversy (Donahue, 1985a; Kirkpatrick & Hood, 1990; Masters, 1991). Hood, however, noted that the chief problem in research is that whereas the four religious orientation groupings may be "conceptually and empirically useful" (1978, p. 429), the methodology used to distinguish these four groups is

psychometrically problematic. Donahue (1985a) showed that the best way of splitting samples into the four groups would be to do so along the scale midpoints[4] of the two scales. This would, as Donahue has pointed out, facilitate comparisons across studies, which is not possible when sample medians are used, as, depending on the value of the sample medians for the specific sample, individuals with identical scores on both scales may fall into different groups in different studies (cf. also Gorsuch, 1984, p. 232; Kirkpatrick & Hood, 1990). There is no theoretical justification for such a course of action.

However, the ROS divisions are confounded even further by the fact that most researchers report not finding any (or finding very few) indiscriminately anti-religious participants in their samples, when the samples are split on the scale midpoint (Donahue, 1985a). Even the original Allport and Ross study (1967) had none such participants. The proper identification of the indiscriminately pro-religious participants has also proved problematic (Donahue, 1985a), so much so that Pargament et al. (1987) have proposed an alternative scale to identify only those individuals.

Lastly, the process of dividing the research sample into four groups involves, at least implicitly, dichotomising the intrinsic and extrinsic variables and using that dichotomy as a means of classifying respondents. Generally, strategies such as this result in a net loss of information, statistical power and reliability, and are best avoided (MacCallum, Zhang, Preacher & Rucker, 2002).

2.3.2.3 The Religious Orientation Scale in research

Although the ROS has some methodological problems (Donahue, 1985a; Genia, 1993; Hood, 1971; Kirkpatrick & Hood, 1990), it has still been put to good use by many researchers and, as the above-mentioned researchers have shown, it does provide useful results when used correctly. It has further been found that the extrinsic religious orientation generally correlates well with non-religious variables, whereas the intrinsic religious orientation generally correlates well with religious variables (Donahue, 1985a; Schaefer & Gorsuch, 1991).

The ROS has also found a wide range of applications in research. Relevant to this study are, firstly, its use both within a variety of cultures (e.g., Australia (Leong & Zachar, 1990); the Caribbean (Griffin et al., 1987); Korean Americans (Park, Murgatroyd, Raynock & Spillett, 1998); Sweden and Poland (Hovemyr, 1996a; 1996b); South Africa (Raubenheimer, 1997; Struempfer, 1997)), and also in cross-cultural and cross-religion studies[5] (e.g., comparing Thai Buddhists with Canadian Christians (Tapanya,

[4] Although this is, in the various discussions of the ROS splits, normally referred to as the "theoretical median," it was felt that the term "scale midpoint" was more correct.

[5] Even though the study of Griffin et al. (1987) is titled "A cross-cultural investigation of religious orientation, social norms and prejudice," their sample consisted of only English-speaking, Black West Indian Seventh Day Adventists (Griffin et al., 1987, p. 360) (their description of "cross-cultural" is based on the comparisons they made with previous work on the same topic done by them in the USA), and thus their study is not listed here as cross-cultural.

Nicki & Jarusawad, 1997), English-speaking Christians and Asian non-Christians (Gorsuch, Mylvaganam, Gorsuch, Johnson, Darvill & Danko in Gorsuch, 1994)) and that despite Thompson's (1974, p. 477) warning that the content of the ROS items was not necessarily suitable to groups outside of "conservative and moderate mainline Protestantism."

Allport and Ross (1967) originally used the ROS in a study of prejudice, and this is also the area where it seems to have been used most (e.g., Allen & Spilka, 1967; Batson, Flink & Schoenrade, 1986; Fulton, 1997; Gorsuch, 1988, pp. 212-216; Griffin et al., 1987; Kirkpatrick, 1993; Morris, Hood & Watson, 1989). However, it has found much broader application than originally conceived.

Self-evidently, the ROS has been used in important studies of various aspects of religious faith and behaviour, such as religious development (Kahoe & Meadow, 1981), type of conversion and belief system (Paloutzian, Jackson & Crandall, 1978; Schaefer & Gorsuch, 1991), prayer experience (Hood, Morris & Watson, 1987), belief in science (e.g., Nielsen, 1995b; Williams, Taylor & Hintze, 1989), and the experience of mysticism such as that of Hood (Gorsuch, 1988, pp. 210-211; Hood, 1970) and the paranormal (Williams et al., 1989).

It has also been used in the study of the relationship between religious faith and various "indicators" of mental health or psychological wellbeing (e.g., Baker & Gorsuch, 1982; Bergin, Masters & Richards, 1987; Genia & Shaw, 1991; Gill & Thornton, 1989; Hettler & Cohen, 1998; Maltby, 1998; Maltby, McCollam & Millar, 1994; Park et al., 1998; Tapanya et al., 1997; Van Haitsma, 1986; Watson, Morris & Hood, 1990), and in many comparisons of religious faith and personality (e.g., Kahoe, 1974; Maltby, 1998; 1999; McClain, 1978; Watson, Morris, Hood & Biderman, 1990; Wiebe & Fleck, 1980), self-esteem (Gill & Thornton, 1989), and moral reasoning and behaviour (e.g., Batson & Gray, 1981; Foster & LaForce, 1999; Glover, 1997; Haerich, 1992). The ROS was also used in several other studies between variables thought to be related to religion, such as terminal illness and death (e.g., Meyer, Altmaier & Burns, 1992; Tapanya et al., 1997), and even work (e.g., Morris & Hood, 1981; Struempfer, 1997).

Reed and Meyers (1991) and Bassett, Smith, Newell and Richards (1999) studied the relationship between the ROS and sexual attitudes, Haerich (1992) correlated it with premarital sexual permissiveness, Edmonds and Cahoon (1993) examined the effect of religious orientation on the revealingness of women's clothing, and Leak (1993) compared the ROS with the love styles (cf. 3.2, p. 40). Furthermore, Wann (1993) and Leak (1993) also found that intrinsically religious participants displayed less premarital sexual permissiveness than indiscriminately pro-religious participants, who were also in turn less permissive than extrinsic participants.

2.3.2.4 Structure and psychometric properties of the ROS

The ROS consists of 20 items, the first nine of which measure the intrinsic religious orientation, with the eleven remaining items measuring the extrinsic religious orientation. Although several researchers have suggested revisions for the ROS (cf. Genia, 1993; Hall et al., 1994), it was decided to use an unrevised version for this study. The intrinsic items appear first, followed by the extrinsic items, and all items are formulated positively. The ROS, by nature of the differences between the two subscales, does not have a total score.

Evaluating the ROS psychometrically is complicated by the fact that the original scale has seen many revisions (Donahue, 1985a; Gorsuch & McPherson, 1989; Gorsuch & Venable, 1983; Hoge, 1972; Kirkpatrick & Hood, 1990). Thus a discussion of the psychometric properties of the scale will focus primarily on the original version, which was also used in this study.

2.3.2.4.1 Reliability of the Religious Orientation Scale

The ROS does seem to have a fair degree of reliability. Although Allport and Ross (1967) did not report reliabilities for the ROS, several other researchers have since provided reliabilities for it (as summarised in Trimble's (1997, p. 976) meta-analytic study). Gorsuch found alpha coefficients of .67 for Intrinsic and .76 for Extrinsic using a sample of 94 students (Gorsuch & McFarland, 1972, p. 55), and .73 for Intrinsic and .70 for Extrinsic using a sample of 101 adult Protestant Christians (Gorsuch & Venable, 1983, p. 182). Gorsuch and Venable (1983) also developed the "Age universal I/E scale," and showed it to be essentially equivalent to the original ROS. Gorsuch found reliabilities for the age universal version of .82 for Intrinsic and .66 for Extrinsic using a sample of 771 "college students at both secular and religious colleges in Southern California" (Gorsuch & McPherson, 1989, pp. 349, 352).

Using an Afrikaans version of the ROS completed by 144 students from the University of the Free State in South Africa, Raubenheimer (1997) found a coefficient alpha of .78 for Intrinsic and .76 for Extrinsic. This compares well with Donahue's (1985b, p. 418) review of ROS reliabilities, which range from .67 to .93.

2.3.2.4.2 Validity of the Religious Orientation Scale

That the ROS correlates well with other measures of religious faith in general, and Christian faith in particular, has been amply shown (Bassett et al., 1991; Donahue, 1985a). The ROS has also stood up reasonably well to factor analytic studies. Although some researchers did find three factors in the original set of ROS items (e.g., Kirkpatrick & Hood, 1990), most studies have confirmed the basic two-factor structure of the ROS (Donahue, 1985a). Even Kirkpatrick and Hood (1990, p. 446) made mention of the fact that their three-factor structure was not replicated very well by other researchers. Furthermore,

Donahue found the average correlation between the two subscales across 28 studies to be -.20. This correlation is relatively low, but still in the expected direction, and it would seem to indicate that the ROS does discriminate between the two related (but not equivalent) constructs of intrinsicness and extrinsicness.

2.3.2.5 The Religious Orientation Scale and the construct of Christianity

The importance of the ROS is that Allport (Allport & Ross, 1967; Dudley & Cruise, 1990) saw the religious orientation typologies as being indicative of religious maturity (with Intrinsic indicating maturity, and Extrinsic indicating immaturity). It can provide the much-needed distinction between mature and immature members of the Christian faith. The ROS measures attitudes toward religion, and not any aspect of Christian doctrine per se. It has already been used in measuring religious orientation in non-Christian samples (e.g., Tapanya et al., 1997), and attempts have been made to revise the scale for use with both religious and non-religious samples (e.g., Maltby & Lewis, 1996), although, as was shown in the discussion of the specificity required in measuring religious variables, this may not be wise.

In the light of its only measuring an attitude towards religion, the ROS cannot be seen as a sufficient measure of Christian faith. Gorsuch (1994, p. 317) also emphasised this aspect of the ROS, saying:

> Beliefs and norms need to be measured separately from motivation when relating religion to other variables. Including in the sample anyone from any religious group and using intrinsic scales without measuring the varying beliefs and norms of those people serves only to reduce our observed correlations and to confuse readers.

The ROS may add important information to the measurement of Christian faith when combined with a more purpose-orientated scale, but it would be unwise to use it as the sole measure of Christian faith.

2.4 Structural modelling and research on religion

It would seem as if there has been a near-total dearth of any structural modelling studies in the field of psychological research into religion. No structural modelling studies could be found on the SS, and only one study tangentially related to the ROS. Hilty, Morgan and Hartman (1985) examined Batson's (e.g., Batson et al., 1986; Batson & Gray, 1981; Burris, 1994; Nielsen, 1995a) reformulation and extension of the religious orientation types (into End [Intrinsic], Means [Extrinsic] and Quest [religious maturity]). Their findings did provide a better (but not substantially) fit for a single-factor model than Batson's three-factor model in four of their five samples, but they commented (p. 431) that their "confirmatory factor analyses do not provide a clear answer to the dimensionality issue of the RLI-R scales."

Chapter 3
Love

Love is almost equally as pervasive an aspect of human existence as religion. There are few other variables so intricately interwoven into the fabric of human existence as love. For the purposes of this study, we will delimit ourselves to what is commonly known as "romantic love." At its most basic, this researcher would define it as the mutual emotional, physical, mental and spiritual attraction between two individuals of the opposite sex, leading to the establishment of an exclusive relationship between said two individuals. Yet even this definition does not seem to satisfy entirely. Even though love forms such an integral part of our existence, it remains one of the most mysterious and hardest phenomena to define. In answer to the question "What do I mean by 'love?'," Lee (1977, p. 173) wrote the following: "There's the rub! The fictional and non-fictional literature of the western world for twenty centuries is strewn with conflicting definitions of love." Wheat and Perkins (1980, p. 49) note that "[Love] is *the most desired and the most elusive emotion* [italics in original]." While it would seem as if love is such a common experience that there is no-one who does not know what it is, it would also seem as if, when pressed for an explanation, most people find themselves incapable of defining love. Toufexis (1993, p. 55) notes that "love will always be more than the sum of its natural parts." Even when we try to delimit love to some specific arena, such as romantic love, we find that it is very hard to capture the essence of what it really is.

The Oxford Advanced Learner's Dictionary (Hornby, 1989, pp. 741-742) lists no less than nine different definitions for love as a noun and three as a verb, and The Concise Oxford English Dictionary (Thompson, 1995, p. 808) lists nine noun and four verb forms. The most salient of these are (Hornby, 1989, pp. 741-742):

- A "warm liking or affection; affectionate devotion" and "to have a strong affection or deep tender feelings for [somebody or something]."
- "Sexual affection or passion."
- "God's benevolence towards mankind"
- A "strong liking for [something]" and "like [somebody or something] greatly; take pleasure in."

Even though these definitions seem to include a great variety, one is left with the feeling that it does not quite adequately explain what love is. There are still too many meanings for "love," and too many situations in which the word is used for explanations such as these to really encompass its true meaning.

However, even in the field of psychology, a plethora of different theories on love have mushroomed from the research literature, and each has its own preferred means of measuring love. Of course each measurement is inherently bound to its theoretical underpinnings, meaning that what is measured and spoken of by different researchers is not always the same thing. Although there have been attempts at comparing the different love theories with each other (e.g., Aron & Westbay, 1996; Bierhoff, 1991; Hendrick & Hendrick, 1989; Shaver & Hazan, 1988; Sternberg, 1987), it is doubtful whether these will ever be united into a single theory of love. Love, after all, is just too enigmatic to be encapsulated so easily. Focus will thus be placed on the five major attempts (defined in terms of subsequent research interest generated) to define love from psychological circles. However, some underlying theoretical issues first need to be discussed.

3.1 The rise of psychological research on love

Although the definitions of love offered by psychologists are heavily dependent on the theoretical framework which forms their point of departure, a few general notes on the psychological definition of love are in order.

Firstly, the strict empirical study of love is a relatively recent development in the history of psychology, even though a small few psychologists have long been theorising about love. Brown (1995, pp. 67-68) gives a brief history of psychologists who have dabbled in the theory of love. He mentions such notable psychologists as Sigmund Freud, Carl Jung, Rollo May, Theodore Reik, Abraham Maslow, and Erich Fromm – known for his book *The Art of Loving* (1956).

In 1980, Wheat and Perkins (p. 49) could say that

> while people are absorbing these erroneous beliefs about love, the scientific/intellectual community is, for the most part, staying out of the field.... With rare exceptions, most psychoanalytic, psychiatric, and psychological books and textbooks do not have the word *love* in their indexes.

However, in the decades since, the picture changed dramatically (Gray, 1993). Despite the late start, interest in the subject has grown quickly, and the contribution has been significant, resulting in a sizeable volume of work on the topic (Berscheid & Walster, 1978; Bierhoff, 1991; Brehm, 1992; Hendrick & Hendrick, 1986; 1989; Richardson, Medvin & Hammock, 1987; Sears, Peplau & Taylor, 1991). Hinde (1979, p. V) justly stated that "the study of relationships between people, for long the preserve of

novelists and biographers, now lies within the domain of a variety of disciplines from the social, medical and natural sciences."

Nonetheless, while psychologists may have been making themselves heard in the world of empirical study on love, it would seem as if the dust has not nearly settled in the debate *within* psychological circles as to the question "what is love?". In fact, there seem to be almost as many answers to the question as there are contributors. Bierhoff (1991, p. 95), in his overview of research on love places the blame for psychology's late entrance into the debate on love on this very issue: "The question of how to define love raises difficult problems which have deterred researchers from investigating love and intimate relationships." These "difficult problems" are well described by Taylor, Peplau and Sears (1994, p. 295) who note that "one of the dilemmas of love researchers [is] how to capture the essential features of love, and at the same time depict the diverse experiences of people in love." Hendrick and Hendrick (1989, p. 792) state that "love in an inclusive sense cannot be defined by any single characteristic." Fehr (1993, p. 91) also succinctly reports that "social scientists are unclear about what should be included under the heading of love." Thus any attempt at defining love will necessitate either delimiting it to a specific kind of love, or, preferably, developing a multidimensional approach. Most researchers studying love (certainly those who have made a lasting impact) have taken the latter tack.

A further complication is that the definitions of love provided by different researchers vary vastly, not only in scope, but also in approach. Berscheid (1994, p. 106) comes to the conclusion that "love means different things to different people in different relationships at different points in time." In the same way, psychologists have defined love on the basis of different understandings of its nature, or on the basis of one of several different meanings it has to different sets of people. A look at the widely varying definitions of love provided by different psychologists could lead one to believe that the "novelists and biographers" (or indeed the poets and musicians) may be far closer to understanding what love really is.

The varying definitions of love have also meant that the psychological study of love is also one which is characterised by a number of interesting debates.

The first issue which is hotly debated concerns the nature of love. Is it a trait (a stable aspect of personality) or a state (changeable and dependent on the individual's circumstances and environment)? While this study will not concern itself with generating an answer to this question, it can be noted that it may be best to view love as a combination of traits and states (Bierhoff, 1991; Davies, 1996; Mallandain & Davies, 1994; Richardson et al., 1987; Thompson & Borrello, 1992a). Love seems to be a complex, multidimensional, multicomponential construct which defies easy classification, and, increasingly, theories of love are taking this into account. As Hendrick, Hendrick, Foote and Slapion-Foote (1984, p. 177) note: "Initial notions of love as a global construct are being replaced by multidimensional constructs that promise greater yields in precision of knowledge." Hinde's (1979) view of relationships is

important in understanding this multidimensional quality of love. Our personalities do influence our relationships, but our relationships also affect our personalities. Furthermore, our relationships shape, and are shaped by, our immediate surroundings and our social sphere. Hendrick and Hendrick (1993, p. 293) state their position on this topic as follows:

> Love is to some extent transient, situational and a product of a unique time and place. Phenomena such as present love status, past love relationships and cultural upbringing may influence one's love styles. Yet love can also be constant, relatively untouched by temporary adversity and amazingly consistent throughout a person's lifetime. In addition, love is experienced both in the context of the self and in conjunction with a beloved other.

In summary, love can be seen as an aspect of the personality which is predictable, but which does also undergo change, albeit gradually. Thus love shapes our reaction to circumstances, but it is also shaped by these circumstances and the consequences of the very reactions it helped shape. Love is relatively stable, but in different situations an individual's "love" can be expressed in different ways. And while love is stable, it is not fixed. Love can change over the years, and people can learn to love better or they can learn to hate. This study will then also work with a multi-dimensional concept of love, as if love were a trait with state-like expressions.

Even as there is much speculation as to the precise nature of love, so also there is an equal amount of speculation as to what the differences are in "ways of loving" between the sexes. Some researchers (Hatkoff & Laswell, 1979; Hendrick et al., 1984; Rubin, 1974) have found gender differences in love, while others (Hatfield & Rapson, 1987; Hatkoff & Laswell, 1979; Hendrick & Hendrick, 1988; 1993; Hendrick, Hendrick, Slapion-Foote & Foote, 1985; Leon, Philbrick, Parra, Escobedo & Malgesini, 1994; Mallandain & Davies, 1994) have not, although the precise variables under examination were not always the same. Still others (Dion & Dion, 1993; Hall, Hendrick & Hendrick, 1991) have found gender differences only in certain, but not all, aspects of love. Furthermore, contradictory findings are sometimes produced: Hendrick and Hendrick (1986), Murstein et al. (1991) and Rotenberg and Korol (1995) found females to be more erotic, while Davies (1996), Hatkoff and Laswell (1979) and Hendrick et al. (1984) found males to be more erotic. It seems, then, as if the findings regarding gender differences in love are, at present, still very ambiguous.

Fehr (1993), however, provided the most insightful explanation to the dilemma of gender differences in love: When men and women are asked to define the *concept* of love (i.e., general definition), no gender differences are found. When asked to give their own *feeling* of love (i.e., personal definition), differences are found. This is an important factor when considering the nature of questionnaire *presentation*, since this may result in important differences in measurement. Furthermore, it would seem as if the current love status of the respondents also has a marked influence on gender differences in love. Hendrick and

Hendrick (1986) note that it may seem as if respondents who are currently involved in a love relationship may well display significant gender differences, while respondents who are not currently "in love," could display no differences in love across gender.

Thus, while the matter of gender differences in love has not been resolved as yet, it is worth noting that the resolution of the matter lies in a more precise definition of those differences, and the careful structuring of one's research to match this definition. Researchers should not be discussing gender differences in general, but gender differences in specific conceptions of love. In the end, as Hendrick and Hendrick (1987b, p.295) so aptly put it: "Males and females obviously do not experience relationships in the same way... but they are more alike than they are different."

Although love eludes easy definition, it is very observable and therefore, to some extent, measurable. The question that arises is, given love's multidimensionality, how should it best be measured? Although this study will focus on only one theory (and measurement) of love, the psychological study of love is a rich and varied field of study, with several major (and numerous minor) competing theories. Thus an overview of the history of the psychological enquiry into love will be given, and the major theories in the field will be briefly mentioned.

One of the first researchers in the field of love was Zick Rubin. He distinguished between **liking** and **loving** and developed his Liking and Loving Scales (Rubin, 1970; 1974). His major contribution was that he determined that loving and liking were not opposites of a continuum. Using several experiments and the Liking and Loving Scales which he developed, he showed that there are important qualitative differences between loving and liking. He also identified different love themes, viz., attachment, caring, and trust and self-disclosure (Rubin, 1970; 1974). Rubin can rightly be said to have pioneered the study of love as a separate entity, and his contributions to the study of romantic love remain significant (Taylor, Peplau & Sears, 2000, pp. 250-251).

Berscheid and Walster (1974) and Walster and Walster (1978) distinguished between two broad types of love: passionate love and companionate love. **Passionate love** is a wild, vacillating emotional state which is characterised by a constant preoccupation with the beloved. It is the kind of love which is mostly associated with romantic love. In contrast to this, **companionate love** is less intense and more permanent, and it is characterised by trust, caring and acceptance. (Berscheid & Walster, 1974; Hatfield & Sprecher, 1986).

Hazan and Shaver (Hazan & Shaver, 1987; Shaver & Hazan, 1988) applied Bowlby and Ainsworth's attachment theory to the study of love. They conceptualised that, since the attachment models seem to form the basis of relatively permanent ways of relating to other people, the same attachment styles would be found in romantic relationships amongst adults as are found in infants. The basic premise of using attachment styles to study relationships, is that children's experiences with their parents lead them to

develop certain beliefs about how relationships in general, and thus also romantic relationships in particular, function. In this way all people develop their own "working model" of relationships. They thus defined romantic love as an attachment process, distinguishing between secure, avoidant and anxious/ambivalent individuals. **Secure** adults find few problems in developing intimate relationships with others and do not fear abandonment. Their romantic relationships are characterised by happiness, friendliness and trust, and they tend to have very positive views of their parents. **Avoidant** adults are uncomfortable in intimate situations and find it hard to trust others. Their romantic relationships are characterised by emotional fluctuation, jealousy and fear of intimacy. Their relationships are generally shorter in duration than for secure adults, and they tend to describe their parents as not caring for them, and also as being very demanding and critical. **Anxious/ambivalent** adults seek intimacy, but constantly fear that their efforts will not be reciprocated. Their romantic relationships are obsessive, and they desire union while experiencing fluctuating emotions and feelings of both intense attraction and jealousy. They see their parents as being very demanding and intrusive.

Sternberg (Aron & Westbay, 1996; Hendrick & Hendrick, 1989; 1991; Hendrick & Hendrick, 1987b; Sternberg, 1987; Sternberg & Barnes, 1988; Taylor, Peplau & Sears, 2000; Whitley, 1993) has devised one of the most complete theoretical approaches to love, conceptualising it as a combination of three constructs: Intimacy, passion and commitment. The element of passion is a motivating factor in love. It refers to that part of the personality that gives rise to the intense emotions experienced in a relationship. Some of the motivators included under passion are physical attraction, sexuality, nurturance, self-esteem and dominance. Intimacy represents emotional investment in the relationship. It refers to the degree of "closeness" which the partners achieve. Intimacy is seen in feelings of admiration and caring, and is characterised by self-disclosure and intimate communication. Commitment represents cognitive involvement in the relationship. It refers to the decision that love exists, and to the decision to maintain that love over a long term. The unique aspect of Sternberg's theory lies in the way in which he combined these basic building blocks of love to form eight different classes of loving. **Nonlove** is a state devoid of all three love components. **Liking** can be equated with normal friendship, where intimacy is experienced without passion or commitment. **Infatuated love** is the love of the schoolchild's "crush." It is full of passion, but has neither commitment nor intimacy. **Empty love** is the love found in a dry and lifeless marriage. It has commitment, but is devoid of passion and intimacy. **Romantic love** is the love of an affair, characterised by intimacy and passion, but lacking in commitment. **Companionate love** is the love where passion has gone (or never existed), but intimacy and commitment remain. **Fatuous love** is "love at first sight." It is love which has passion and commitment, but lacks intimacy. **Consummate love**, the highest and fullest experience of love, is the love relationship filled with passion, intimacy and commitment. He also considered these classes of loving as being non-static. For example, a relationship

might start with fatuous love, and as the partners get to know each other, morph into consummate love. This aspect gives the triangular theory of love tremendous flexibility and applicability.

3.2 Lee's Love styles[6]

One of the contributions which has sparked off more research than most, and as the focus of this study, deserves its own heading, is that of the American sociologist John Lee. Lee gathered a large data set through a long series of interviews, and then used a "constructive typology" (Lee, 1977, p. 172) to derive a definition of romantic love. His aim was "not to define love, but to distinguish clearly the personal and social expression of the various conceptions of love... or... lovestyles[7]" (p. 173). Lee's typology was once described as "currently... the most complete analysis of love" (Bierhoff, 1991, p. 100).

3.2.1 The development of the love styles

Perhaps one of the reasons for the success of Lee's typology is that it was, in essence, a typology derived from subjective respondent experience, and not an abstract theory. Lee's work was descriptive, not philosophical. Lee recognised that "whenever an author departs from mere description of the kinds, to attempt a definition of 'love', his own biases instantly creep in" (1977, p. 173). Instead, he set out to "distinguish clearly the personal and social expression of the various conceptions of love.... in intimate adult affiliation" (p. 173). He admitted that other forms of love (e.g., love of God or love of children) were related to "intimate adult affiliation," but he did not wish to include them in his study. What resulted was a taxonomy of different love styles. The love styles were styles of relationships, and not personalities or identities (Lee, 1977). Lee (p. 175) defined these love styles as ideologies, "systematic clustering(s) of ideas used to justify special social arrangements and institutions." He then categorised these styles as primary, secondary or tertiary. Lee at first defined the three primary love styles of eros, storge and ludus, six secondary love styles (agape, pragma and mania, as well as ludic eros, storgic eros and storgic ludus), and also numerous tertiary love styles (the most common of which are manic storge, manic ludus and manic eros). Most subsequent research has focused on the six (all three primaries, and

[6] It is interesting to note that, in fact, there were two Love Attitudes Scales measuring two different Love Styles theories! Munro and Adams (1978a; 1978b) also developed a Love Styles theory, where their Love Attitudes Scale measured three aspects of love: Romantic Ideal, Conjugal-rational Love, and Romantic Power. Their theory did not receive wide support, and perhaps the greatest support for Lee's Love Styles theory may be that at least one researcher (J.L. Philbrick) migrated from using Munro and Adams' theory (Philbrick, 1987; Philbrick & Opolot, 1980; Philbrick & Stones, 1988a; 1988b; 1989a; Stones & Philbrick, 1989b; 1991; Vandewiele & Philbrick, 1983) to Lee's (Leon et al., 1994; Philbrick & Leon, 1991).

[7] Although Lee originally used the single word "lovestyles," most subsequent researchers (as also in this study) have used the two-word term "love styles."

three of the secondaries) love styles of eros, ludus, storge, pragma, mania and agape. It is important to remember Lee's comparison of the love styles to colours (p. 174): "As in color, 'secondary' does not imply 'inferior' but simply, 'constructed out of a combination of primaries.'" What Lee was, in fact, trying to say is that the primary love styles seemed to be conceptually distinct, that they were further "irreducible," while the secondary and tertiary love styles had some commonalties with the primaries, allowing them to be dissected into components stemming from the primaries. While the secondary and tertiary love styles were combinations of love styles from the preceding levels, they were nevertheless conceptually distinct.

It is at this point, however, where the love styles taxonomy underwent a major revision. While a multi-dimensional approach to the measurement of love is a necessity, Lee's taxonomy was, at first, too fragmented. Subdividing too many times will result in categories which are so close conceptually that they will actually hinder, and not enhance, our understanding of love. This is then precisely what happened with the love styles. Lee himself (cf. Lee, 1977, p. 174) and also subsequent scale developers (Hatkoff & Laswell, 1979; Hendrick & Hendrick, 1986; Hendrick et al., 1984) focused on only the six most common love styles: The three primary styles of eros, ludus and storge, and the three secondary styles of agape, mania and pragma. Almost all subsequent research has also focused on only these six love styles (Bierhoff, 1991; Hendrick & Hendrick, 1989).

A further "development" of the love styles taxonomy was related to our understanding of their operation in the life of a person. Lee originally saw the love styles as being largely exclusive. Thus any given individual was most likely to be involved in a relationship characterised by one particular love style at one particular time, although he did concede that an individual could "at different times, or in some cases concurrently" (1977, p. 174) be involved in relationships exhibiting different love styles. He also conceded that any given relationship may evolve from one love style to another. Furthermore, as has already been mentioned, he felt that the love styles were almost akin to ideologies. This meant that different love styles could form the prevailing ideology of a certain era, and could be displaced by another. This idea, in effect, had two results which are relevant to our understanding and application of his theory. Firstly, it means that although the typology is multidimensional, it describes each individual (in fact, even each epoch) in terms of chiefly one style only. This could have led to a radical loss of meaning for the theory, had it not turned out that the researchers who followed on with Lee's work differed with him on this aspect. The second potentially disastrous implication of Lee's view is that it placed him firmly (albeit unwittingly) in the "state" camp of love theorists. For example, he said (1977, p. 174) "it is about a style of relationship, not about a personality or identity." Hendrick and Hendrick (1986, p. 401) note the irony of this: The very fact that Lee's work is a typology would seem to imply that the love styles were traits, but Lee's views tended towards the opposite conclusion. Again, Lee's

successors have differed from him on this point, guiding the love styles theory into a safer (and more meaningful) middle ground.

The resulting changes to the love styles theory mean that it is now thought better to see the love styles as ways in which individuals express themselves in relationships, rather than prevailing ideologies about love (Hall et al., 1991; Hendrick & Hendrick, 1986; 1988; Morrow, Clark & Brock, 1995; Taraban & Hendrick, 1995). These expressions may change within one relationship over time, or may vary from relationship to relationship, and most importantly, any individual can be seen as expressing *all* of the love styles *all* of the time, albeit at different levels. Thus an individual may, for example, be high on ludus, eros and mania, but low on agape, pragma and storge, and yet this configuration may also change for this individual over time, or remain stable for a long period of time. In this way, people are no longer characterised by one love style only, but by their standing on all of the (six) love styles.

3.2.2 Defining the love styles

Lee used Greek and Latin words for the love styles (and each of the six most common styles have their own "non-compounded" name). Lee defined the three primary and three secondary love styles in the following way (Lee, 1977, p. 174-5):

- **Eros** is physical love. It is "the search for a beloved whose physical presentation of self embodies [the lover's]... ideal image of the beautiful."
- **Ludus** is "permissive and pluralistic." The ludic lover sees love as a game, and may be involved in multiple relationships. Commitment is generally very low, and relationships are not lasting.
- **Storge** is friendship love. It is a lasting love, based on companionship and commitment. It is a "slowly developing affection, [involving]... a gradual disclosure of self, [and] an avoidance of self-conscious passion."
- **Pragma** is practical, pragmatic. It is "the search for a compatible match" in which "demographic characteristics" hold sway. Pragma is coldly conscious and unemotional.
- **Mania** is an insecure style of love. It is characterised by obsession, jealousy and emotional intensity.
- "**Agape** is altruistic love.... It is gentle, caring, and guided by reason more than emotion." Agape is the expression of love as duty, and, as such, does not expect reciprocation. Agape is self-giving love.

3.2.2.1 Hellenistic definitions of love

As this study attempts to define the relationship between Christian faith and love, a basic working premise of this study rests on the Biblical definition of love. Such a definition will always have to be in terms of the words the Bible uses for love in the original languages (Hebrew and Hellenistic Greek), as these words are often endowed with different meanings and intentions. However, it should be noted (and

will be shown) that Lee did not always correctly apply the Greek concepts to his own definitions of love. In other words, although he used the framework of classical[8] definitions to provide a jargon for his own theory, he endowed the terms he borrowed, to a greater or lesser extent with his own meanings, which are not necessarily true to the original classical definitions. So far, these differences have not been noted by any psychological researchers (possibly due to their not being aware of them in the first place). Although the meanings associated with the terms as defined by Lee, and as used in this study, are thus not applicable outside of the love styles theory, it may be necessary to indicate how they correspond to, or differ from, a Biblical definition of love. Although a full study of the meaning of these terms could easily form a study of its own, a brief description will be given of these terms in their Hellenistic usage. The Hellenistic era will be used as referent, since this relates these terms to the rise of the Christian faith, which is relevant to this study, and as Lee himself relates them to this era (1977, p. 175). Furthermore, there are four Hellenistic words used to describe love (*erōs*, *storgē*, *philia*, *agapē*) of which Lee used three, and two Hellenistic words (*pragma*, *mania*), as well as one Latin word (*ludus*), used by Lee which did not, in their original languages, refer to love.

3.2.2.1.1 Erōs

This word, from which the English word "erotic" stems, was very common in Greek usage, but is not found at all in the NT. This is because of "its bad connotations in pagan society" (The New Open Bible, 1990, p. 1357). The Septuagint (LXX), the first Greek translation of the OT, does use the word on occasion. The basic meaning of the word lies in its reference to physical, sexual love. Even though this word is not found in the NT, The New Open Bible (p. 1357) commented that "there is a valid place in Christian thinking for this love of physical attraction when it is between married couples (cf. Song of Solomon)."

Erōs is the love most often associated, even in today's world, with romance. Lewis (1960, p. 85) explained that "by *Eros* I mean of course that state which we call 'being in love'; or, if you prefer, that kind of love which lovers are 'in.'" Wheat and Perkins (p. 59) described *erōs* as "the love that, more than any other kind, carries with it the idea of romance... [including] the idea of yearning to unite with and the desire to possess the beloved. Eros is romantic, passionate and sentimental."

Although the word "erotic" has, in English, a definite sexual connotation (Hornby, 1989, p. 406), it is important to bear in mind that *erōs*, while incorporating the sexual, is far broader than that (Brown, 1995, pp. 79 ff., 101). This distinction is so important that most authors dealing with the subject distinguish

[8] It should be noted here that to scholars of Greek, the word "classical" has a different meaning than to scholars of Western literature, from which perspective Lee was most probably functioning. To scholars of Greek, the classical period refers to a specific era of Greek literature a few centuries B.C., whereas scholars of Western literature use the word in a more encompassing way as referring to a whole range of ancient literature, including early and ancient Greek literature, Latin, and even early English literature. The latter definition will be used in this study as well, barring the quotation from Palmer on p. 53, where the former definition is to be used.

sexual love as a subclass of *erōs*. Lewis (1960) spoke of "Venus," when referring to sexual love, emphasising that *erōs* is romantic love. Wheat and Perkins (1980) used the Greek word *epithumia*, defining it (p. 58) as "a Greek word the Bible never calls love... [it is] a strong desire of any kind – sometimes good, sometimes bad." Their choice of this word, however, is unfortunate, as Louw and Nida (1989, pp. 290-291) showed firstly that the word refers to more than just sexual desire, and secondly that it is loaded with immoral and negative connotations.

Furthermore, Lewis (1960, p. 86) noted that *erōs* is not (and should not) be a requirement for Venus, since "the times and places in which marriage depends on Eros are in a small minority.... It has not pleased God that the distinction between a sin and a duty turn on fine feelings." Lewis was not advocating free sex, sex for the sole purpose of sex, devoid of any greater context. Rather, his view was that the modern tendency to view these things as being solely dependent on feeling is wrong, and that these issues are much more related to duty and practise than fleeting emotions.

Nevertheless, the free sex movement of our day has quite successfully separated sex and love (Zarakhovich, 1999), or, in this instance, *erōs* and *venus*. Usher (1999, p. 44) even quoted one youth to say: "I never mix sex and love.... Sex is simply giving and receiving pleasure." Colson (1993, p. 19) lamented the disintegration of the once close bond between love, sex and marriage. He bemoaned the fact that "sex educators are *worried* [italics added] that teens tend to treat sex as passionate, romantic, meaningful."

An important aspect of *erōs* is that the romantic feelings it consists of are fickle. They wax and wane at an alarming rate. This is a normal aspect of life, Lewis contended, and should not pose a great threat to true love (1960, p. 105).

Lastly, some Christian authors have spurned romantic love (e.g., Lindvall, 1996a; 1996b; 1997a; 1997b). Christian psychologist James Dobson (1975, p. 89) noted that "the idea of marriage based on romantic affection is a very recent development in human affairs.... Prior to about 1200 A.D., weddings were arranged by the families of the bride and groom, and it never occurred to anyone that they were supposed to 'fall in love.'" However, both Lewis (1960) and Wheat and Perkins (1980, pp. 93-94) have defended the fact that romantic love is not a recent invention, but has existed since time began (cf. also Smalley, 1982, p. 743). The Bible itself contains numerous instances of romantic love, treating it in a non-judgemental manner. It accepts romantic attraction as a given. The Bible contains both positive (e.g., Gen 29:11-30; Song 4:1-15; 5:10-16), neutral (e.g., Deut 21:11; Esth 2:7, 17; 1 Sam 18:20; 25:3, 39-42), and negative examples (e.g., 2 Sam 11:2; 13:1-19) of this kind of attraction. One of the most expressive verses of the emotional effect of physical attraction is found in Gen 29, where Jacob falls in love with Rachel, who was "lovely in form, and beautiful" (v. 17). To Jacob, seven years of hard labour "seemed like only a few days to him because of his love for her" (v. 20). The word for love here is *ahab*, which is

used in a general sense to describe many aspects of love, amongst others also physical love (cf. Gen 24:67; 29:11-30; Jud 16:4, 15) (Quell & Stauffer, 1951).

This erroneous rejection of romantic love by Christian authors may be because they firstly do not understand the true nature of *erōs*, and secondly because they base their definition of romantic love on the infatuation they see in the world around them. Wheat and Perkins (1980, p. 95) attempted to dispel this confusion:

> Infatuation is based on fantasy; true romantic love has a foundation of strong but tender realism. Infatuation is occupied with externals; real love is a response to the whole person. Infatuation fades with time; love keeps on growing like a living thing. Infatuation demands and takes; love delights in giving.

Erōs, then, is an important and necessary component of love, but it is not to be taken as the totality of love either (Lewis, 1960; Wheat & Perkins, 1980).

The Bible treats *erōs* neutrally (so much so that the word is only found in the OT/LXX) – it does not negate it or condemn it, but accepts it as a given, something which is beautiful when exercised properly, but devastating when abused.

3.2.2.1.2 Storgē

This love is described as the love which exists (or should exist) between family members and close associates (Louw & Nida, 1989, p. 293; The New Open Bible, 1990, p. 1357). It is important to bear in mind that while this is a familial love (and thus applies to all members of the family), it also finds specific application with the couple (who are romantically in love) who form the foundation of the family. The New Open Bible (1990, p. 1357) emphasised that "the Judeo-Christian tradition has always been strongly family-oriented [and] today, as the Christian family is under constant attack by secular and humanistic forces, [*storgē*] is very crucial." *Storgē* can also be combined with *philia* (friendship love – 3.2.2.1.3) in an emphatic form, as in Rom 12:10. The only other occurrences of this word in the NT are in the negative form *astorgos* in Rom 1:31 and 2 Tim 3:3.

Lewis (1960, p. 34) explained that *storgē* "is the least discriminating of loves.... Almost anyone can become an object of Affection.... There need be no apparent fitness between those whom it unites." He also calls it "the humblest love... modest – even furtive and shame-faced" (p. 35). Despite the fact that this love is so simple, it still forms a vital component of the overhead concept of love: "Because this is such an unspectacular, down-to-earth form of love in marriage, its importance may be underestimated," but it is "*essential* to ... happiness in marriage" (Wheat & Perkins, 1980, p. 98, emphasis added).

Wheat and Perkins (1980) defined *storgē* in terms of several distinctive characteristics. Firstly, it is a state of solidarity, which they describe as "practical oneness" (p. 99). Basically, this is developed when

the family members no longer relate as individuals, but when the goals, needs, desires, wants, values and ambitions of the family are shared, and they relate to the outside world as *one*. Secondly, *storgē* in the relational context is characterised by faithfulness, or, as Wheat and Perkins called it, "supportive loyalty" (p. 100). Although the Greek word used in 1 Cor 13:7 as love is *agapē*, Wheat and Perkins pointed out that *storgē* has this attitude of loyalty in common with *agapē*. It means that the partners are always loyal to each other, that they are always faithful and supportive. Thirdly, *storgē* consists of "mutual trust" (p. 100). This is a state where the partners display full and undoubting confidence in each other – in their abilities, capabilities, and also in their loyalty. The fourth characteristic of *storgē* listed by Wheat and Perkins is "emotional refuge" (p. 101). They explained (p. 101) that *storgē* "was designed to be the soothing, healing love of marriage." *Storgē* provides the beloved with security and sympathy. It is the love that offers "a shoulder to cry on" (p. 102), the love where emotions and hurts can freely be shared and healing wrought through caring. The last facet of *storgē* which Wheat and Perkins define is that of "comfortable familiarity" (p. 102). Lewis (1960, p. 35) defined this comfortableness of *storgē* as follows:

> Affection almost slinks or sleeps through our lives. It lives with humble un-dress, private things; soft slippers, old clothes, old jokes, the thump of a sleepy dog's tail on the kitchen floor, the sound of a sewing machine, a gollywog left on the lawn.

Wheat and Perkins (p. 102) had a far less poetic (they did, at least, equate it with the "comfort of an old shoe"), but equally meaningful explanation when they simply stated that it "means you enjoy being together." It refers to the safety felt when people who share love are with each other, the security of what is known and familiar.

It is thus clear that *storgē* is a foundational aspect of love. It is not often noticed in love, and yet, love cannot exist for long without the proper and necessary foundation of *storgē*.

Storgē is also given cursory treatment by the Bible: Christians are commanded to show it (Rom 12:10) and unbelievers are condemned for their lack of it (Rom 1:31; 2 Tim 3:3). Not much more is said about it.

3.2.2.1.3 Philia

This is a "warmhearted, spontaneous affection, liking, attractive appeal, and friendship" (The New Open Bible, 1990, p. 1357). Louw and Nida (1989, p. 293) defined *philia* as "to have love or affection for someone or something based on association." They also explained (p. 293) that in Christian usage, the derivatives of *philia* (*philadelphia* and *philadelphos*)

> have acquired highly specialized meanings which restrict the range of reference to fellow believers. In nonbiblical contexts these terms would refer to affection or love for persons

belonging to a so-called 'in-group,' but in the NT this in-group is defined in terms of Christian faith.

Wheat and Perkins (1980, p. 60) explained that "*Phileo*[9] cherishes and has tender affection for the beloved, but always expects a response. It is a love of relationship – comradeship, sharing, communication, friendship." They also defined four more specific characteristics of *philia* (p. 105). Firstly, "it is emotional in nature and cannot be commanded, but can be developed." Secondly, "it is a selective love, based on qualities in another person that one finds admirable, attractive and appealing." Thirdly, "it is fellowship love requiring enjoyable interaction through comradeship and communication." Fourthly, "it is the manifestation of a living, growing relationship between two friends." They went on to say (p. 107) that "*phileo* is by no means a certain thing." Many couples do not have it. Many relationships have gone stale, and many relationships maintain only a mere formality to the relationship, without partaking of the "comradeship, companionship and communication" that should be theirs through *philia*.

Wheat and Perkins (1980) also explained the gradual nature of *philia's* development through three characteristic stages: The first is relaxation (p. 108), where a common interest brings two people side-by-side, allowing them to relax in each other's company as they focus on the task or topic at hand. What follows is a necessary process of sharing, resulting in deepened intimacy and heightened trust. They explain (p. 109) that "shared time, shared activities, shared interests, and shared experiences lead to shared feelings and shared confidences." This is the second stage of friendship – rapport (p. 110), a stage which is also characterised by the development of open and effective communication. This increased and improved communication is itself the precursor for the third stage: revelation, which is described as follows (p. 112):

> In the revelation phase both partners are freely open to one another. Both have gladly exchanged the original state of independence for an emotional interdependence that is unafraid to lean, to trust, and to seek fulfilment of personal needs and desires. On this level, both the needs and longings of the two personalities are understood and met in a process that becomes almost as natural as breathing.

This is the peak of *philia*, a state in which the partners communicate so effectively and share so wholly that they can reveal their deepest selves to each other in the assurance of complete understanding.

Lewis (1960) devoted a great amount of energy on dispelling modern myths about this love (which he calls "Friendship"). Firstly, many people seem to be totally ignorant even of its existence. He said (p. 55): "To the Ancients, Friendship seemed the happiest and most fully human of all loves; the crown

[9] Wheat and Perkins use the verb form (*phileo*) as they believe it to be more familiar than the noun form (*philia*).

of life and the school of virtue. The modern world, in comparison, ignores it." His explanation (pp. 55-56) for the reason that this love is so ignored in modern times was that

> the first and most obvious answer is that few value it because few experience it. And the possibility of going through life without the experience is rooted in that fact which separates Friendship so sharply from both the other loves [*storgē* and *erōs*]. Friendship is – in a sense not at all derogatory to it – the least *natural* of loves; the least instinctive, organic, biological, gregarious and necessary.

He also sought to refute the misconception that *philia* (such as between David and Jonathan – 1 Sam 19:1; 20:17, 41-42) is a homosexual love. Lewis believed that this love can be found between either two or more people of the same or opposite sex, but that it was itself devoid of any sexual/romantic content. He emphasised that (p. 58):

> Those who cannot conceive Friendship as a substantive love but only as a disguise or elaboration of Eros betray the fact that they have never had a Friend. The rest of us know that though we can have erotic love and friendship for the same person yet in some ways nothing is less like a friendship than a love-affair. Lovers are always talking to one another about their love; Friends hardly ever about their Friendship. Lovers are normally face to face, absorbed in each other; Friends, side by side, absorbed in some common interest.

This common interest is very important, since his explanation of the typical development of *philia* is that although it arises from a common interest, yet through some discovery of an even greater shared interest or belief, the two or three friends in the friendship are separated from the rest of their group of origin. The other special thing about this love which Lewis points out is that the partners in the friendship bring out the best, not in themselves, but in each other, such that when one is removed from a friendship of three (e.g., through death), the remaining two lose not only the friend, but what that friend brought out in each of the others.

However, friendship is also fraught with danger. Firstly, the danger is there that the friends can influence each other in ways that the rest of society cannot (a mixed blessing). Lewis (1960, p. 75) noted that "Friendship (as the ancients saw) can be a school of virtue; but also (as they did not see) a school of vice. It is ambivalent. It makes good men better and bad men worse."

Secondly, the separateness of friendships can lead to pride. Pride is

> the danger to which Friendship is naturally liable. Just because this is the most spiritual of [the natural, i.e., *storgē, erōs*, and *philia*] loves the danger which besets it is spiritual too. Friendship is even, if you like, angelic. But man needs to be triply protected by humility if he is to eat the bread of angels without risk (p. 81).

Humility (in realising that you have been chosen for the friendship, not of yourself, and have not chosen the friendship), is the only key to solving this problem, and Lewis warned that this is even more so with Friendships where the common interest is religious in nature.

Philia is thus also an important aspect of love, but one which might easily be absent in love without its absence being noticed. Although the friends who should have *philia* might notice that something is amiss, they would often not realise that it is the love of friendship, *philia*, which is missing (Lewis, 1960; Wheat & Perkins, 1980).

Philia is used in a more general sense in the NT, being the word of choice when love is expressed towards an object or a circumstance (e.g., Matt 6:5; Lk 20:46; Tit 1:8; Jas 4:4; 3 Jhn 9; Rev 22:15). Furthermore, women are commanded to show it towards their husbands and children (Tit 2:4) and all Christians are commanded to show it to each other (Heb 13:1; 1 Pet 2:22, 3:8; 2 Pet 1:7). In Rev 3:19 Christ Himself expresses this love towards humanity.

3.2.2.1.4 Agapē

The New Open Bible (1990, p. 1357) quoted (with no reference) R.C. Trench who said that *agapē* was "born within the bosom of revealed religion." This love is a love with religious roots, a love inspired by God.

Despite its humble beginnings, *agapē* is a very rich concept, which includes a whole variety of concepts. The three chief characteristics of *agapē* are that it is motivated solely by the will, it is focussed entirely away from the self and totally and selflessly on the needs of the beloved, and it is wholly unconditional (Wheat & Perkins, 1980, p. 119). Each of these three characteristics also encompasses a number of finer distinctions.

Firstly, *agapē* is

> exercised as a choice of your will and has no dependence on feelings. It is a love of action, not emotion. It focuses on what you do and say rather than how you feel.... It is a mental attitude based on a deliberate choice of the will (Wheat & Perkins, 1980, pp. 61-62).

Agapē is a practical expression of love, not just an emotional experience of love. It "means action, not just a benign attitude" (Wheat & Perkins, 1980, p. 120).

Furthermore, *agapē* is selfless. According to Wheat and Perkins (1980, p. 61-62), *agapē* is "the totally unselfish love that has the capacity to give and keep on giving without expecting in return.... It is always concerned with doing what is best for the beloved."

> This love has the capacity to persist in the face of rejection and continue on when there is no response at all. It can leap over walls that would stop any human love cold. It is never

> deflected by unlovable behaviour and gives gladly to the undeserving without totalling the cost. It heals and blesses in unpretentious, practical ways, for it is always realistically involved in the details of ordinary life.... [It] means consistency of behaviour showing an ever-present concern for the beloved's highest good (Wheat & Perkins, 1980, pp. 119-120)

This selflessness of *agapē* incorporates a number of further aspects. The Bible sketches it (1 Joh 3:16-18) as being intimately involved in (and not detached from) the lives and needs of others. *Agapē* is given voluntarily, and is neither bought nor deserved ("If one were to give all the wealth of his house for love, it would be utterly scorned" – Song 8:7). Palmer (1982, p. 711) described this aspect of love (*agapē*) as "that highest and noblest form of love which sees something infinitely precious in its object." *Agapē* is described in 1 Cor 13:4 as being "kind." The Greek word is *chresteomai,* and it refers to working for the benefit of someone as an act of kindness, and without reward (Louw & Nida, 1989, p. 750). The sense here is of a gentle behaviour or manner, that is demonstrated even in a willingness to work for the benefit of one's enemies, let alone one's friends, and the motive for this kindness is not recompense, but love.

Agapē is also content (not envious) with the object of love (1 Cor 13:4). Together with this it is characterised by unwavering trust and hope (1 Cor 13:7).

Furthermore, *agapē* is not boastful, proud or rude (1 Cor 13:4-5). It is neither indecent, nor does it violate the rights of others. Love does not "act in defiance of social and moral standards, with resulting disgrace, embarrassment, and shame" (Louw & Nida, 1989, p. 759), and it is not easily provoked into anger (1 Cor 13:6).

Agapē is also known for abhorring what is wrong and delighting in what is good (1 Cor 13:6), regardless of personal cost.

The third chief characteristic of *agapē* flows from its selfless nature: *Agapē* is wholly unconditional. It "means unconditionally loving the unlovable, the undeserving, and the unresponsive" (Wheat & Perkins, 1980, p. 120). Not only is it unconditional, it is also persevering: *Agapē* "means permanent commitment to the object of one's love" (Wheat & Perkins, 1980, p. 120). Love is "as strong as death," it is enduring, persevering and unquenchable (Song 8:6-7). Put simply, it is patient (1 Cor 13:4) and enduring. The only thing that breaks true love is death, and true love is "as irresistible as death" (Guthrie, Motyer, Stibbs & Wiseman, 1970, p. 586). *Agapē* always perseveres – *Hupomenō* is the Greek word in 1 Cor 13:7 translated in the NIV as "perseveres." Louw and Nida (1989, p. 308) clarified the word's meaning: "to continue to bear up despite difficulty and suffering – 'to endure, to bear up, to demonstrate endurance, to put up with.'" It refuses to accept defeat. It is unflinching in its commitment and unwavering in its labour. In fact, it never, ever, fails (1 Cor 13:8). This unconditional nature of *agapē* also means that it is a love characterised by forgiveness (Prov 10:12; 1 Cor 13:5; Eph 4:32; Col 3:13-14).

Several misconceptions exist about *agapē*. Firstly, it is often translated as "charity," which is also how Lewis (1960) describes it. The New Open Bible (1990, p. 1357) noted that the King James (Authorised Version) translators, in an attempt to exalt *agapē* and also in order to keep in step with the Latin Vulgate's translation of "*charitas*," translated it as "charity," which is unfortunate, because "[charity] now has a restricted meaning that is most unsuitable for Christian love of the highest order." However, the true misfortune lies not in their (the AV translators') choice of a word which once described *agapē* well, but in the changes in the English language which have robbed the word "charity" of its original meaning.

Secondly, much confusion has arisen from the "otherness" of *agapē*, its "divine" nature. One the one hand, the divine nature of this love has led to some people virtually deifying it. In contrast to this, the New Open Bible (1991, p. 1357, cf. also Lewis, 1960, p. 13) countered that "God (even in our sin) decided to love us, because it is His nature to love. In fact, while it is wrong to turn the verse around (as some do) and teach that 'love is God,' it is quite true that 'God is love' (1 Jhn 4:8)." On the other hand, some people have negated all other forms of love, and have tried to hold forth *agapē* as the only true form of love. However, The New Open Bible commented:

> Just because it is so popular a word, *agapē* has also been misunderstood by many. Commonly *agapē* is called "divine" love. This is misleading because it is used for love from man to God and from God to man. It is also used for love between people. It is divine in the sense that it is the love that God commands, the love of choice.

Lewis (1960) correctly sketched a view of love incorporating all the forms of love. He distinguished between *agapē* (as the truly spiritual love), on the one hand, and *erōs*, *storgē* and *philia* (as the natural loves) on the other. He (p. 107) pointed out that

> the natural loves are not sufficient. Something else... must come to the help of the mere feeling if the feeling is to be kept sweet. To say this is not to belittle the natural loves but to indicate where their real glory lies.

That thing that "must come to the help of the mere feeling," Lewis explained, is the will. The natural loves must be controlled and tended by the will so that they can function to their fullest. Lewis also showed that the natural loves are not "rivals to the love of God" (p. 108). It is so that these forms of love are qualitatively different (natural vs. spiritual), but they are all part of one thing: Love. Lewis contended that the main problem is not that our human loves interfere with our divine love (as the Christian detractors suppose), but merely that our divine love is too small. Lewis (p. 108) asserted that "it is dangerous to press upon a man the duty of getting beyond earthly love when his real difficulty lies in getting so far." Decreasing the human loves, as Lewis pointed out, only further diminishes *agapē*. Rather, we should increase the divine love, and the human loves will increase as well. Because of this,

we cannot negate the natural loves, nor can we unduly extol them. Instead, *agapē* completes (without stifling) the other loves, and allows them to function as they fully should. Thus the principle also stands that the highest does not stand without the lowest, for having *Agapē* does not mean disposing of the other loves, it means living them out to their God-intended fullness. Lewis also dismissed the assertion that since the natural loves of necessity cause pain and heartache, they are evil and must be thrown overboard leaving only the love for God (which, since it alone has a true and eternal object – God Himself – can never result in disappointment). "To love at all is to be vulnerable," Lewis stated (p. 111), showing that even the love God has for us may be fraught with disappointment and rejection. Furthermore, Lewis points out that God is not only the originator of *agapē*, but the "inventor of all loves" (p. 116). Lewis noted that "the Gift-loves are natural images of Himself,... [but] the Need-loves, so far as I have been able to see, have no resemblance to the Love which God is" (p. 117). They are given to us so that we may realise our need of His love, of *agapē*. Lewis showed that *agapē* needs to (and can) be exalted to its rightful place without in the least affecting the sanctity of the other loves.

Furthermore, the similarity between *agapē* and *philia* also needs to be noted. Louw and Nida (1989, p. 294) continued their definition of *agapē* with this comment:

> Though some persons have tried to assign certain significant differences of meaning between [*agapaō, agapē*][10] and [*phileō, philia*][11],... it does not seem possible to insist upon a contrast of meaning in any and all contexts.... Though the meanings of these terms overlap considerably in many contexts, there are probably some significant differences in certain contexts; that is to say, *phileō* and *philia* are likely to focus upon love or affection based upon interpersonal association, while [*agapaō*] and [*agapē*] focus upon love and affection based on deep appreciation and high regard.... It would... be quite wrong to assume that [*phileō*] and [*philia*] refer only to human love, while [*agapaō*] and [*agapē*] refer to divine love. Both sets of terms are used for the total range of loving relations between people, between people and God, and between God and Jesus Christ.

So, although the different Greek words for love do have different shades of meaning, they are very closely related (Nida, 1984, p. 63), and describe different facets of one thing – love.

It may further be argued that the ancient (and pagan) Greco-Roman society may only have considered the first three (*erōs*, *storgē* and *philia*) to be the actual constituents of love, although Quell an Stauffer (1951, p. 25) noted that *erōs*, *philia* and *agapē* were the important words for love in pre-Biblical Greek. However, they did (p. 30) point out that *agapē* received no attention from Greek writers, so much so that

[10] *agapaō* is the respective verb form of the noun *agape*.

[11] *phileō* is the respective verb form of the noun *philia*.

the world hardly ever occurred. The New Open Bible (1990, p. 1357) noted that in ancient Greek literature, the word *agapē* was found almost exclusively in Christian writings. Palmer (1982, p. 711) wrote that

> the commonest [Greek] word in the NT for all forms of love is *agapē*, *agapaō*. This is one of the least frequent words in classical Greek, where it expresses, on the few occasions it occurs, that highest and noblest form of love which sees something infinitely precious in its object. Its use in the NT derives not directly from classical Greek so much as from the LXX, where it occurs in 95% of all cases where [the English versions] translate the Hebrew by 'love', and in every case of love from God to man, man to God and man to his neighbour. The dignity which the word possesses in the NT has been contributed by its use as a vehicle of the OT revelation. It is pregnant with OT associations.

It is thus evident that the meaning of *agapē* as we have it today is a meaning which arose from its Christian usage. Quell and Stauffer (1951, p. 28) showed that originally, the word was "colourless and indefinite." However, it cannot be argued that the early Church considered anything less than all four these aspects of love to be vital components of true and sincere love.

3.2.2.1.5 Other (non-love) terms used by Lee

Three of the love styles (ludus, pragma and mania) have no counterpart in the Hellenistic words for love. This is because the words did not, in classical culture, refer to love. The Hellenistic definitions of the three words Lee added are as follows:

- **Pragma** – This is the Greek word from which we get "pragmatic," which refers to someone who is practical, realistic, sensible, and matter-of-fact. The word *pragma* itself refers to a happening or event (Louw & Nida, 1989, p. 161), or an activity/undertaking (Louw & Nida, 1989, p. 512).
- **Mania** – This is the Greek word from which English derived the word "manic" – a hectic, frenzied state. *Mania* in ancient times referred to irrational or insane thinking and reasoning (Louw & Nida, 1989, p. 353).
- **Ludus** –Lee (1977, p. 174) borrowed this Latin word from "Ovid's term for playful or game love." The actual meaning of the word is, in fact, "a child's game" (Simpson, 1962, p. 352), and Ovid probably used it only in a metaphorical sense to refer to a type of love.

3.2.2.1.6 Differences in Lee's usage and Hellenistic meanings

As should already be apparent, there are several semantic differences between the meanings Lee (1977) associated with each love style and the corresponding Hellenistic meaning. Firstly, it may be argued that the three which did not originally refer to love are not really ways of loving, but are more general aspects

of the personality which find very specific expression in love relationships. The pragmatic person is very likely to be pragmatic in other areas of life as well. The manic person is very likely to be reasonably excitable in other areas of life too, and the expression of that excitability in love is what is seen as mania. The ludic person may in any case be a selfish manipulator in other areas of life (business, etc.) as well. This enquiry may be an interesting area of future love styles research.

Secondly, one of the Greek words for love (*philia*) seemingly does not figure in the six love styles. This may be because Lee (1977, p. 173) concerned himself only with "those forms of love involved in intimate adult affiliation (sometimes called mating love, marrying love, or 'heterosexual love')." Lee both conceded that there were other kinds of love, (such as the love for God, children or country), and also that "these [other] ideas of love are by no means unrelated to conceptualizations of intimate adult affiliation" (p. 173). Both Lewis (1960) and Wheat and Perkins (1980) saw *philia* as an essential component of romantic relationship love, although both also admitted that it is found equally strongly outside of the marriage union. This (seeming) omission of *philia* is also the root of the third difference, viz., that the precise meaning of the love style of storge does not correspond with the Hellenistic meaning of *storgē*, but, in fact, with *philia*! These differences need to be kept in mind in dealing with Lee's love styles theory and his use of Greek terminology.

Lastly, Lee's conceptualisation of both eros and agape correspond very closely to their original classical meaning.

The relation between these conceptions of love and Lee's love styles will be returned to when the relationship between love and religion is discussed (3.4, p. 64).

3.2.3 Research on the love styles

Although Lee developed the initial typology, he never quantified it in terms of a measuring instrument. The first to do so were Laswell and Laswell (in Hatkoff & Laswell, 1979; Hendrick & Hendrick, 1986), who, in 1976, used statistical means to reduce an initial 144 items to 50 usable and "conceptually distinct" items. This fifty item true/false scale was known as the SAMPLE questionnaire, where each letter of the acronym represents one of the love styles. However, the SAMPLE scale found very limited support (e.g., Leon et al., 1994; Philbrick & Leon, 1991; Yancey & Berglass, 1991; Yancey & Eastman, 1995).

Close on the Laswells' heels was Mathes (1980) who developed items to test eight of Lee's love styles (he discounted agape on the basis of Lee's own difficulties with it). He did not find support for Lee's typology, but rather for a single general romantic love factor, and this may in part explain why his research was never taken further.

Probably the chief reason for the demise of the SAMPLE scale was that Hendrick and Hendrick continued with the process of development started by the Laswells to arrive, eventually, at a totally transformed scale. Together with their associates, they converted the true/false responses of the SAMPLE scale to Likert-scale response categories, and added two items each to the eros and storge subscales, so that each love style was measured by nine items (thus 54 in total). After testing the scale and submitting it to principal components analyses, they felt that "though a good start on scale development has been made, more work is needed" (Hendrick et al., 1984, p. 192). The Hendricks then went on to do that work, refining the scale's items and also trimming it down with principal components analyses to seven items per love style (for a total of 42 items) (Hendrick & Hendrick, 1986). This scale, the Love Attitudes Scale (LAS), has been the basis of much later research on love. As the Hendricks (1986) explained, the appeal of Lee's typology is that it is grounded in practical research, and it is multidimensional, which allows it to encompass many other theories of love. The Love Styles theory also appears to enjoy widespread intuitive appeal amongst the general population (Davis & Latty-Mann, 1987).

The Hendricks (1990) also revised the LAS in response to criticism about its face validity for use with couples who were romantically involved. The new relationship-specific scale was compared to the existing LAS, and the two were found to be closely equivalent.

The Hendricks found the LAS subscales to be reliable and relatively independent (Hendrick & Hendrick, 1986; 1989; Hendrick & Hendrick, 1987a). This has since been confirmed by other researchers (Bierhoff, 1991; Borrello & Thompson, 1990b), and the LAS (or variants of it) has also been used successfully in a number of other societies and cultures, viz., British (Erwin, 1999); French (Murstein et al., 1991); German (Bierhoff, 1991); Guatemalan (Parra et al., 1998); Mexican American (Contreras, Hendrick & Hendrick, 1996); Portuguese (Neto, 1994); and Taiwanese (Cho & Cross, 1995; Huang, 1999). Dion and Dion (1993) used the 54-item LAS (the first draft of the LAS compiled by Hendrick et al. (1984)) on Anglo-Celtic, European and Asian participants, and Leon et al. (1994) used the SAMPLE profile on Mexican participants. Apart from their use of the LAS, the only other characteristic all of these studies, barring (Parra et al., 1998) have in common is that their participants were all students!

The LAS has been used in a number of avenues of research, such as relationship preferences, stability and quality (Contreras et al., 1996; Davis & Latty-Mann, 1987; Hahn & Blass, 1997; Hendrick, Dicke & Hendrick, 1998; Hendrick, Hendrick & Adler, 1988; Meeks, Hendrick & Hendrick, 1998; Yancey & Berglass, 1991), the relationship between love and sex (Hendrick & Hendrick, 1987a; 1987b; Hensley, 1996), the influence of divorce on beliefs about love (Mallaby, 2001; Sprecher, Cate & Levin, 1998), self-defeating personality traits and love (Williams & Schill, 1994), the relationship between love and religion (Hendrick & Hendrick, 1987a; Leak, 1993; Raubenheimer, 1994; 1997), and even in an investigation of eating disorders (Raciti & Hendrick, 1992). Yancey (Yancey & Berglass, 1991; Yancey

& Eastman, 1995) also used the SAMPLE profile to examine the relationship between love styles and life satisfaction.

3.2.4 Structure and psychometric properties of the LAS

The LAS subscales (consisting of only positively scored items) are presented in the following order: eros; ludus; storge; pragma; mania; agape. As the subscales measure conceptually different, sometimes contradictory, love styles, a separate score is obtained on each subscale, and the scale yields a particular pattern of scores across the various love styles.

Apart from the translated versions, the LAS also exists in several incarnations: The original version, developed over a period of time by Hendrick et al. (1984) and Hendrick and Hendrick (1986); the relationship specific version, also a product of Hendrick and Hendrick (1990); and the LAS short form, developed by Hendrick et al. (1998).

The version of the LAS used in this study had the same basic structure as the original, although several minor changes were made. The items were presented in the same order, but the scoring was reversed, so that, contrary to the Hendricks' original scale (Hendrick et al., 1984; Hendrick & Hendrick 1986), a high score on a subscale indicated a high level of agreement for that particular love style. Lastly, minor changes were made to the scale to maintain the cultural appropriateness of the questionnaire, more than the linguistic correctness (cf. Geisinger, 1994). As an example, Item 3 was changed to: "Our *physical relationship* is very intense and satisfying," instead of "Our *lovemaking* is very intense and satisfying," (italics added for emphasis, but not included in the actual scale) since this is deemed more culturally appropriate. Cho and Cross (1995, p. 292) made a similar change to this item when working with Taiwanese respondents. Nevertheless, it must be noted that the South African white culture is not very far-removed from American culture, and inter-version scale discrepancies such as these are not large (this example given here being the largest such discrepancy).

3.2.4.1 Reliability of the Love Attitudes Scale

The final 42-item version developed by the Hendricks (1986) yielded the following alpha coefficients when tested on a sample of 567 introductory psychology students at a Texas university: Eros (.70); Ludus (.74); Storge (.69); Pragma (.74); Mania (.72); Agape (.83). The reliability of the LAS has also been assessed in a number of other studies (Davis & Latty-Mann, 1987; Hendrick et al., 1998; Hendrick & Hendrick, 1987b; Jones & Nelson, 1996; Neto, 1993; Raubenheimer, 1997; Richardson et al., 1987; Sprague & Kinney, 1997), and have shown the original estimates to be relatively stable. Although the reliabilities may not be thought of as being excessively high, they are adequate, especially considering the small number of items per subscale.

3.2.4.2 Validity of the Love Attitudes Scale

The LAS has been compared with a number of other established measures of love. Richardson et al. (1987) correlated it with measures of relationship and satisfaction, and also with Rubin's Liking and Loving Scales. They found that the love styles correlated selectively with the aforementioned variables (i.e., the different love styles correlated with different variables), supporting both the criterion and discriminant validity of the LAS. Davis and Latty-Mann (1987) and Hendrick and Hendrick (1989) reported similar findings with other relationship measures. The only love style which did not correlate well with any of the other love measures used in these studies was storge, with pragma also showing a similar tendency. This led Shaver and Hazan (1988, p. 498) to doubt that these two love styles actually measured "forms of romantic love," and calling for their exclusion (together with agape) from the LAS, in a trimmed scale which they equated with their own attachment theory of love.

As was mentioned, the LAS went through a process of development (Hatkoff & Laswell, 1979; Hendrick & Hendrick, 1986; Hendrick et al., 1984) intended to maximise the distinctness of the six factors it measured, and thus also its discriminant validity. Richardson et al. (1987, p. 648) found a principal components analysis with varimax rotation to deliver "a factor structure almost identical to that found by the Hendricks." Similar analyses and findings were reported by Davis and Latty-Mann (1987), Hendrick and Hendrick (1989, 1990), Neto (1993; 1994), and Raubenheimer (1997).

Butler et al. (1995) also replicated relatively closely the Hendricks' factor structure across two different age groups, indicating that the factor structure of the LAS seems to be relatively stable across age groups. Furthermore, although Cho and Cross (1995) reinterpreted the love styles for a Taiwanese context, the six factors they extracted with a principal components analysis and varimax rotation corresponded very closely to the original six factors defined by the Hendricks. Thus the factor structure of the LAS appears to be very stable across cultures as well.

In closing, while evidence does exist in support of the reliability and validity of the LAS, it should be noted that the reliabilities of the LAS subscales are still relatively low (four of the six love styles had reliabilities <.70 in at least one of the mentioned studies). Furthermore, all of the factor analyses used in validation studies were principal components analyses with varimax rotations, which make the assumption of orthogonality – an assumption which is not necessarily reflective of reality (Borgatta, Kercher & Stull, 1986; Gorsuch, 1990a; Snook & Gorsuch, 1989). Also, after having provided one of the first validation studies of the LAS (Davis & Latty-Mann, 1987), Davis made an about-turn and has sharply criticised the criterion validity of the LAS (Davis, Kirkpatrick, Levy & O'Hearn, 1994), preferring in its stead the attachment theory of Hazan and Shaver.

3.3 Structural modelling on love

In contrast to the study of religion, several studies have used some form of structural modelling in the study of love, centring around two measures of love: Rubin's Love Scale and the LAS.

3.3.1 Structural modelling on Rubin's Love Scale

As early as 1976, Tesser and Paulhus (1976) developed a "causal model of love." They used Rubin's (1970) love scale, and developed a path analysis model of predicting the relationship between love, thoughts about the beloved, reality constraints and dating frequency. A brief summary of their final model is that thinking about love can, in the short term, increase love, but in the long term could have a negative influence on love. At the same time, love can influence the amount of thought about the beloved. Furthermore, dating and love seem to have a slight reciprocal relationship, and reality constraints (which are not influenced by dating frequency or love) appear to have a negative influence on love over the long term.

In reply to Tesser and Paulhus' model, Bentler and Huba (1979) proposed a simpler model of love. They used the Tesser and Paulhus data to generate two "simple minitheories of love." Using LISREL III, they pointed out that with newer methodology and computer software, better models could be generated to fit the data. Bentler and Huba added a general latent variable ("general attraction"), to the theoretical model, and tested it against the data, providing a statistically acceptable fit. One of the models was a simple refinement of the Tesser and Paulhus model, constructed in order to create a good fit with the data. Their preferred model, an even simpler model, had the advantage of using latent variables to underlie the measured constructs – in Tesser and Paulhus' model, the first measurements were used as the exogenous variables, a strategy which Bentler and Huba termed "shortsighted" (1979, p. 129). The Bentler and Huba model presumed a unidimensional construct of interpersonal attraction to underlie all the observed variables of thought, love, dating frequency and reality constraints (although each of these would also have their own unique factor accounting for a part of their variance). Bentler and Huba also chose to set all the correlations for the latent variables and the overt measurement to be equal for both models (i.e., it was assumed that the influence of the latent variable on the measurement thereof would not change over time). Their model produce a good fit with the data, but no further work was done on the model. This may be because Rubin's theory and measurement of love was superseded by other more complex theories about love and their attendant measuring instruments (such as Lee's love styles theory).

3.3.2 Structural modelling on the Love Attitudes Scale

A large body of work has been done on the LAS by Thompson and Borrello and their associates (Borrello & Thompson, 1990a; 1990b; Murthy, Rotzien & Vacha-Haase, 1996; Rotzien, Vacha-Haase, Murthy, Davenport & Thompson, 1994; Thompson & Borrello, 1987; 1992a; 1992b). They used various factor analytic methods to test the validity of the LAS, and also to test the possibility of second-order factors for the LAS. An examination of the theoretical assumptions and methodology used in these studies is vital for a proper understanding of what may and may not be assumed about the structure of the LAS.

In their first study (Thompson & Borrello, 1987) they selected those 18 items from the LAS (3 per subscale) with the highest respective factor loadings reported in Hendrick and Hendrick (1986). These items were then used to provide a measure of validity for their Love Relationships Scale (LRS). The 18 LAS items were also factor analysed, although the results of this analysis were not reported fully, as this analysis was secondary to the development of the LRS. They did, however, note that the factor analysis delivered only five factors, and that the agape and mania items had loaded on the same factor. It should also be noted that their factor analysis did identify each of the remaining love styles as factors. They also noted a strong tendency for all the love items to load on one general factor.

Thompson and Borrello's next study (Borrello & Thompson, 1990b) involved a more focused examination of the validity of the LAS. They added one additional item for each of the agape and mania subscales to their original selection (i.e., 20 items in total) in an attempt to better separate the two factors. Use of factor analyses provided a much better confirmation of the validity of the LAS (albeit only the 20 items of the LAS that they had used).

In the third phase of their inquiry into the nature of the LAS (Borrello & Thompson, 1990a), they combined the samples used in the first study with two newer samples (who had also completed the later set of 20 items) and conducted a second-order factor analysis using Thompson's (1990) SECONDOR programme. It is important to note the subtle paradigm shift which had occurred in their thinking. Where previously they had only sought to identify the six love styles as unique factors in the LAS items, they had now taken cognisance of Lee's distinction of the love styles of eros, ludus and storge as being primary, and the love styles of mania, pragma and agape as being secondary (i.e., consisting of compounds of pairs of the primary love styles), leading them to believe that "Lee's model might be interpreted as being hierarchical" (Borrello & Thompson, 1990a, p. 329). They had hoped to find three first-order, and three second-order factors in their analysis (p. 329). However, their analysis (which was exploratory) delivered six first-order factors (which was, they noted, consistent with previous research on the LAS), and three second-order factors. They did not attempt to extract any third-order factors. The three second-order factors consisted of pairs of first-order factors, viz., mania and agape, ludus and eros,

and storge and pragma. Because the secondary love styles appeared as first-order factors, it would be expected that they would confound the formation of pairs of the primaries in keeping with Lee's original conception of the love styles (mania being formed from ludus and eros, pragma consisting of storge and ludus, and agape being produced from eros and storge). This was then also the case, with the only recognisable pair in their study being that of ludus and eros, and even that pair's second-order factor would be difficult to equate with mania, as it already existed as a first-order factor.

In contrast to the exploratory approach employed in their third study, Thompson and Borrello (1992b) turned to confirmatory methods in their fourth study. They employed LISREL to examine the same data set as in the third study, positing each of the love styles as a first-order factor, and each also loading on a single second-order factor. This factor was found to have high loadings on especially mania and agape. Unfortunately, Thompson and Borrello committed an important oversight in that they did not consider any equivalent models (Kline, 1998, p. 279; Lee & Hershberger, 1990; MacCallum, Wegener, Uchino & Fabrigar, 1993; Stelzl, 1986) – a step Thompson (2000, p. 277) would later identify as being the third most important "commandment" of structural equation modelling. Alternative models which could have been compared to their model, purely on theoretical grounds, are the following: A simple structure with no second-order factor; the model derived from their third study (pairs of first-order factors loading on three second-order factors); and, since they had hoped to confirm the existence of a general love factor, a similar model (three second-order factors), but with a single third-order factor.

The oversight of testing alternative models was corrected in later studies. Notably, Rotzien et al. (1994) tested five different a priori models with Confirmatory Factor Analysis (CFA) methods. The first was a simple model of the love styles theory, with each set of items loading only on their respective factor, and all the factors being uncorrelated. Their second model was different from the first only in that it allowed the factors to be correlated. Their third factor was the same as the second, barring that the number of factors had been reduced by one, and all the mania and agape items loaded on the same factor (based on Thompson and Borrello's (1987) findings). The last two models were not defined clearly (all the more a pity since these were the best-fitting models), but were developed by specification searches which Thompson had carried out. Their final conclusion was that, although the specification-search models (especially their "model 5") fit the data the best, their fit was still not confidence-inspiring. Their final conclusion was that more alternative models would need to be tested before an acceptable model for the LAS could be defined.

Apparently, instead of generating further a priori theoretical models which might explain the data, they went back to square one and attempted to redefine the LAS with exploratory factor analytic methods. Murthy et al. (1996) used Thompson's (1990) SECONDOR programme to extract second-order factors from all 42 items of the relationship-specific version of the LAS (Hendrick & Hendrick, 1990). Their analysis extracted eleven first-order factors and four second-order factors. While the first-order factors

were still reasonably representative of the different love styles, the second-order factors consisted of respective combinations of pragma and storge; ludus, agape, storge and eros; mania and agape; and mania and eros. Although they found the love styles to be "reasonably coherent" (p. 113), they did note that their results "suggest that some variations in Lee's measurement model [strictly speaking, the Hendricks' measurement instrument of Lee's theoretical model] may result in an improved model fit" (p. 108). However, they failed to make any recommendations as to what these alterations should be. Furthermore, it would seem as if Murthy et al. (1996) were still functioning largely from within the unidimensional paradigm of the love styles (i.e., not viewing them together). Murthy et al. (1996, p. 110) wrote that

> these love styles are qualitatively different and are based on preferences. One may prefer a certain style of love as one prefers a certain color .... An individual may have more than one preference or style at a time, each fulfilled by a different relationship.

In effect, it would seem as if they believe that a person may have only one love style, although they seem to concede the possibility of different love styles for different relationships, but still with the implication of only one love style for each relationship.

It would appear as if the reasoning behind their motivation for their second-order factor analysis was that some of the subscales of the LAS were intercorrelated, indicating second-order factors. This rationale is problematic on two grounds. Firstly, there is ample proof of the intercorrelations between some of the LAS subscales, but this may secondly also be as much a result of a sample-specific variable as a truly underlying factor. For example, the most common inter-scale correlations they mention are between agape and eros, and between agape and mania. Murthy et al.'s second-order factor analysis delivered several results related to the various love styles. Amongst others, it indicated that pragma and storge shared a common basis. It also indicated that ludus is negatively correlated with agape, storge and eros. However, it should be noted that the correlations between ludus, on the one hand, and agape and storge on the other, fit in well with the rationale presented by Love Styles theory. Further indications of Murthy et al.'s study are that some elements of mania and agape share a common factor, and that some elements of mania and eros are correlated as well. Lastly, Murthy et al. also had remaining first-order factors representing distinct portions of eros, agape, pragma and ludus.

However, the intercorrelations Murthy et al. (1996) reported only have a limited similarity to the intercorrelations found by those previously reported by Thompson and Borrello (Borrello & Thompson, 1990a; Rotzien et al., 1994; Thompson & Borrello, 1992b), and by this researcher (Raubenheimer, 1994; 1997). Raubenheimer (1994) found moderate correlations between ludus and eros (negative), between storge and both mania and agape (positive), and between pragma and mania. Stronger correlations were found between pragma and ludus (positive), and between agape and eros (positive) and agape and ludus

(negative). Some of these correlations are theoretically defensible, and it is very hard to determine the line between theory and statistics, and where the correlations should be allowed and where not. This is problematic, since it confounds attempts at defining the nature of multiple second-order factors for the LAS (a single second-order factor underlying all the love styles is, of necessity, less problematic).

Also, although Murthy et al. (1996) refer to Gorsuch's (1983) book on factor analysis several times, their methodology did not follow all of his recommendations. Firstly, they used principle components extraction, which Gorsuch (p. 243) describes as "not entirely appropriate for higher-order analyses" (cf. also Borgatta et al., 1986; Gorsuch, 1990a; 1997a, especially pp. 542-544; Hubbard & Allen, 1987; Snook & Gorsuch, 1989). Furthermore, they retained a number of trivial factors (cf. Gorsuch, 1983, p. 164; 1997a, pp. 545-546), the dropping of which would in all likelihood have affected their extraction of the higher-order factors. Their decision to extract eleven first-order factors was based on the eigenvalue ≥ 1 criterion. However, Gorsuch (1983, p. 164) noted about this criterion that

> depending upon the situation, it will often underestimate or overestimate the number of factors. It is... a rule of thumb of some use with less than 40 variables where the number of factors is expected to be between *v*/5 and *v*/3 and the N is large.

Note that Gorsuch is speaking here of *variables*, not individual scale *items*, which he notes (1983, p. 164; 1997b, p. 726) are even more prone to misspecification when analysed with this criterion. Bryant and Yarnold (1995, p. 104) were even stricter on the first condition, recommending that it be applicable with only less than 30 variables.

While Murthy et al.'s sample was large (N=499), they could not lay claim to having fulfilled the conditions stipulated by Gorsuch. The present researcher's impression after applying a scree test (Cattell, 1978, pp. 60-62, 76-86; Gorsuch, 1983, pp. 165-167) to the eigenvalues provided by Murthy et al. is that it would seem as if six factors would have been a better solution. Thirdly, they extracted four second-order factors, but failed to follow Gorsuch's recommendations fully by extracting third-order factors: "higher-order analyses stop whenever only one factor or uncorrelated factors occur" (Gorsuch, 1983, p. 239). Although Murthy et al. (1996) did not supply the intercorrelations of the higher-order factors, an examination of the factor matrix which they did supply does suggest a relatively high degree of intercorrelation between the second-order factors.

Furthermore, although Murthy et al. had attempted to re-examine the LAS, they did not put the model implied by their study to a CFA test, something which they had placed considerable emphasis on in their previous study (Rotzien et al., 1994).

It should also be noted that in their postulating the hierarchical structure of the LAS, Thompson and Borrello (and later Rotzien et al. and Murthy et al.) did not consider sufficiently the important fact that the LAS was not compiled by Lee. This oversight is perhaps best exemplified in Rotzien et al.'s (1994,

p. 372) equating Lee's theory with the Hendrick's scale development. While the Hendricks did compile the most-used scale in research on love, they did not necessarily remain 100% true to Lee's theory (and this may have been a very fortunate deviation too). For example, if the secondary love styles were truly only compounds of the primaries, the Hendricks may have done better (methodologically) by allowing them to be derived by combining the scores of the primary love styles from which they were compounded. However, they treated them as primary loves styles when they developed specific items to tap them. This would account for Borrello and Thompson's (1990a) finding six first-order factors when they expected three first-order and three-second-order factors, and the inability of hierarchical factor analysis to truly test whether the secondaries were compounds of the primaries. To their credit, Borrello and Thompson (1990a, p. 339) did note this in passing in the discussion of the results of their third study.

Based on the findings mentioned here, it would seem as if the LAS may need some refinement, but what that refinement should be is uncertain, and it is also uncertain whether their findings indicate that the LAS itself (as the measuring instrument), or the underlying love styles theory is in need of revision. What is certain, is that there seems to be a single second-order factor underlying the six love styles measured by the LAS, although how it relates to each of the individual love styles is, as yet, uncertain. That a single factor underlies the LAS' six constructs should not be surprising, or even be thought of as being incongruent with Lee's love styles theory, since the six love styles the LAS purports to measure are six different ways of *loving*. If one were to view the love styles as Lee originally imagined them (as mutually exclusive ways of loving by which an individual can be characterised), the unidimensional nature of the underlying factor may be out of place, but if one views the love styles together (as most subsequent research has) the single underlying factor seems more acceptable.

Lastly, it must be remembered that although Lee's theory could very well be invoked to defend intercorrelations between the Love styles, the theory itself does not preclude the existence of a general love factor. The love styles should not be seen as separate loves, but as different dimensions of one construct: Love. It should be theoretically sensible to see the love styles as indicators of a single love construct (as indicated by Thompson and Borrello) rather than six indefinite love constructs.

3.3.3 Structural modelling on the LAS and other variables

The only structural modelling work done in relating the LAS to external variables which this researcher was able to locate was that of Klein and Bierhoff (in Bierhoff, 1991), who applied structural modelling to the LAS and relationship-related variables. They used path analysis to test (and accept) a model where eros was posited to exert a positive influence on relationship satisfaction, pragma was thought to influence positively the length of the relationship and negatively the number of previous partners, and agape was correlated positively with the number of children.

3.4 Love and religion

While research on love in relation to other relationship variables (e.g., sex) proliferates, research on love and variables incidental to relationships (such as religious faith) is much less common. Leak (1993) notes that while love plays a crucial role in religion (Drakeford, 1964, pp. 106 ff.), research on love and religious faith has been scarce. Although Lee did consider religion when he formulated his typology of the love styles, little subsequent research has been done to investigate the relationship between religious faith and the love styles. in 1987 Hendrick and Hendrick (p. 392) commented that

> although philosophers and theologians have long realized the strong connections between religion and love, psychologists have instituted little joint exploration of religious faith and love in intimate romantic relationships.... Religious belief and love attitudes are suggested as an area for fruitful new research by those involved in the study and treatment of intimate relationships.

Despite this only a handful of researchers have ventured even a preliminary look at the correlation of love and religious faith, and even less at the specific correlation between love styles and religious faith, providing very little empirically meaningful information to date.

Prentice, Briggs and Bradley (1983) saw religion as an aspect of romantic love. Cimbalo and Novell (1993) used Prentice et al.'s definition of romantic love on a sample which was predominantly Roman Catholic, and found that there were no gender differences regarding the "romanticness" of religion, although women did find religion to be a more important aspect of love than did men.

Stones and Philbrick (1991) conducted research comparing the attitudes towards love of fundamentalist South African Christians with attitudes towards love of other African and South African samples, but using the Love Attitudes Scale of Munro and Adams (1978a; 1978b). In general, they found that religious people had more inhibited love styles, although these love styles are not nearly the same as those measured by the LAS.

Hendrick et al. (1984, p. 180) noted that in the development of the LAS, they found no differences between religious groups, although they do not mention how these groups were assessed (it would seem as if they relied on demographic information only). Hendrick and Hendrick (1987a) conducted a preliminary study into the relationship between religious faith, love and sex. They found that the religious participants scored highly on storge, pragma and agape, which they termed (p. 394) the "more 'dependable'" love styles, and very low on ludus.

However, their study was flawed by several methodological weaknesses. They used only two demographic items to measure religion: Firstly, a single demographic item "eliciting religious heritage

(Protestant, Catholic, Jewish, None, Other)" (p. 393) and a self-report measure of the strength of the respondent's religious beliefs ("Very religious to Very anti-religious" (p. 393)). Secondly, they used two samples of mixed and undefined religious groupings. They then went even further and ignored the religious heritage of the respondents totally, since (p. 394) "different proportions of participants in the religious heritage categories made the Study 1 and Study 2 samples noncomparable." This action rendered the results of their study empirically devoid of meaning, since conclusions cannot be made about any specific religious grouping – defining all religious groups as similar simply will not hold water in theoretical research (cf. 2.1.1, p. 6). It may very well be that on certain variables (such as sex attitudes), people from different religious backgrounds may be similar, but this needs to be proven, not simply assumed. Furthermore, to use gross indices of religious faith (such as the Hendricks' single question to determine the strength of the respondent's faith) when measuring love, is conceptually more confusing than illuminating (cf. 2.1.2, p. 8).

Leak (1993) correlated the Religious Orientation Scale with the Hendricks' Sexual Attitudes Scale and the LAS. He found that intrinsically religious participants had a conservative approach to sexuality and were more discriminating than extrinsically religious participants, who were more self-serving. He also found that mania and pragma were correlated with extrinsicness, and that storge was related to intrinsicness. His sample, however, was predominantly Roman Catholic, which is not directly comparable with the Evangelical Christian sample of the present study (cf. 2.1, p. 6 and 6.1.2, p. 99).

Preliminary work by this researcher (Raubenheimer, 1994; 1997) suggested that for White South African Evangelical Christian students, ludus was negatively correlated with Christian faith, and storge and agape were positively correlated with Christian faith, as measured by the SS and the ROS. These initial results would seem to indicate that the definition of love provided by the Bible is indeed found amongst Evangelical Christians, and can be tapped by the LAS. Stated more explicitly, the Bible defines love as consisting of both *agapē*, and *philia* in great measure, and also *storgē*. It was also noted that the LASs agape items do reflect, to a sufficient degree, those qualities which define *agapē*, and that its storge items do correspond to the love correctly known as *philia*. Unfortunately, the LAS does not tap those aspects of love correctly known as *storgē*. Nevertheless, merely considering the definitions of these various facets of love as provided from a Biblical perspective, one would expect Christians who live in accordance with the Bible to exhibit *agapē* and *philia* in their ways of loving. This was shown in the strong correlations between Christian faith, on the one hand, and storge and agape on the other.

Since the Bible assumes an accepting but neutral stance towards *erōs*, one would expect a degree of variation (left to individual choice, albeit within certain defined boundaries) amongst Christians regarding it. The LAS' conceptions of mania and pragma are not really included in a Biblical definition of love, and one would again not expect any significant effects for these love styles amongst Christians.

The initial results then also indicated that no strong effects existed for the love styles of eros, pragma and mania.

Lastly, the love style of ludus stands diametrically opposed, by Lee's own admittance, to the concept of *agapē*. Of course the word never appears in the original text of the Bible, as it is a Latin term, but the closest one comes to finding anything related to ludus in the Bible is the list of negatives in 1 Cor 13:4-6 which define precisely what love is not. As such, one may expect that Christian love would be devoid of ludus. The strong negative correlation between measures of Christian faith and ludus confirm this.

Chapter 4
Problem Statement

Building on the preceding chapters, the purpose of this study was to examine several causal models theory which might explain the relationship between Christian faith and romantic love more precisely. Although this study cannot prove such a relationship, the aim was to show how such a model may be put to a test of disconfirmation. Structural equation modelling (SEM) will be used to accomplish this. SEM involves the testing, not of zero-order relationships only, but of a set of relationships simultaneously. As such, the hypotheses in SEM do not centre around individual relationships, but around the tenability of entire models. Furthermore, SEM finds its optimal value, not in terms of the accepting or rejecting of a single model, but rather in the selection of the model, from amongst a number of competing models, that fits the empirical data best. In order to clarify the postulates of this study, the general thrust of this procedure will first be outlined. Then the postulates will be presented, where, in each instance, the basic model will be described, and a conceptual diagram of the model will be shown. These postulates will be tested in terms of scores on the LAS, SS and ROS.

As was noted (2.2.3, p. 20), a good measure of Christianity will be one which distinguishes Christians from non-Christians, while also providing a measure of devotion to the Christian faith for those participants who do fall into the Christian group. Such a scale would do this by measuring the belief, doctrine and behaviour of the individual in as objective a manner as possible. To accomplish this, the scale would have to meet three specific criteria: Firstly, it would have to have an explicitly Christian content, enabling it to separate Christians from non-Christians. Secondly, it would have to have a very specific doctrinal bent in its content (but focusing on key doctrines only), in order to separate Christians and cultists. Thirdly, it would have to include an explicit belief and behaviour content, measuring the level of devotion and adherence to the Christian faith. While it is unlikely that such a scale exists at present, a combination of scales, such as the ROS and the SS may fill the gap in the mean time.

4.1 Structural Equation Modelling

In essence, structural equation modelling (SEM) involves the testing of covariances implied by a model of the relationships between certain variables posited by the researcher. These relationships can be translated into structural equations, the unknowns of which are solved for by substituting sample

covariances so as to obtain estimates of all the parameters involved. Numerous fitting functions have been developed with which to obtain these estimates, as have a multiplicity of measures of fit which aim to indicate the degree to which the model fits the data (Hayduk, 1987).

SEM involves the testing of a latent variable model (LVM). A distinction is made between manifest (directly measured), and latent (hypothesised, but not measured) variables which are conceptualised to underlie the measured variables (Klem, 1995; 2000; Pedhazur, 1997, p. 771). SEM specifically examines the relationships between the manifest variables (MVs) and the latent variables (LVs) thought to underlie them, and the relationships between the various LVs themselves. Variables may further be classified as being either endogenous or exogenous. Exogenous variables are those variables whose "causes" lie totally outside of the model. Endogenous variables are "caused" by other (endogenous or exogenous) variables in the model. In SEM, an independent variable is a "cause" and a dependent variable is an "effect." However, certain variables may be "effects" (dependent variables) of certain other "causal" (independent) variables, while still at the same time also being a "cause" for one or more other variables. These variables are thus simultaneously dependent and independent. Thus, while all exogenous variables are independent, not all independent variables are necessarily exogenous. MVs are *usually* endogenous, since they are usually "caused" by the latent variable of which they are indicators, while LVs may be either endogenous or exogenous.

4.1.1 Model diagrams

Even though each of the interrelations between each pair of theoretically connected variables is expressed in terms of an equation, it is a common (and useful) practice to display the theoretically posited network of interrelations (the model) graphically (Bentler, 1980; Klem, 1995; 2000; Loehlin, 1987, pp. 2-8; McDonald & Ho, 2002). The models presented in this study may be understood as follows: LVs will be depicted as circles, MVs as squares, causal effects will be depicted as single-headed arrows (which will also be straight), intercorrelations between variables will be depicted by double-headed arrows (normally these arrows are curved, but space will not allow this here), and loadings/intercorrelations set to zero will be "indicated" by the absence of connecting arrows. All endogenous variables will have residual arrows pointing to them (seemingly out of nowhere). These residual arrows are the same as the error residuals in a regression equation, and account for most, but not all (DeShon, 1998), outside influences on the variables, such as unspecified causal variables and measurement error. Although some model depictions show these residuals as latent variables with variances of their own, the variances of all these residuals, as well as the variances of all the exogenous variables, will be scaled by setting them equal to unity (cf. 5.2.3, p. 90), and their variances will thus not be shown (to reduce clutter).

4.2 Models to be tested in this study

The different measurement models for the three scales used in this study will first be tested and, if need be, improved. After that the theoretical models positing the relationships between the latent constructs measured by the three scales will be tested. Since this study involves the evaluation of competing alternative models and possibly the generation of (a) better-fitting model(s), there are no hypotheses to accept or reject per se (as would be the case if this study was strictly confirmatory). The research "hypotheses" will thus be given in the form of a number of postulates concerning the various scales, their measurement, and their interrelationships. Equivalent models (cf. 5.2.1, p. 86) will also be generated a posteriori, as the final models may differ substantially from the models postulated here.

4.2.1 CFA models

Each of the scales used in this study will be subjected to confirmatory factor analysis (CFA) testing via structural models which represent the basic factorial structure of the scale as designed by its authors, as well as a number of competing models derived from the literature or proposed by this researcher.

4.2.1.1 Love Attitudes Scale

Several studies have also used exploratory and confirmatory factor analytic methods to investigate the nature of the LAS (cf. 3.3.2, p. 59). These studies have already proposed and tested several alternative models for the LAS, although the verdict still very much seems to be out. The various conceptualisations offered by previous researchers will be tested, as well as a new conceptualisation proffered by this researcher. The first three models proposed here correspond to the first three models tested by Rotzien et al. (1994) – their last two models were based on unpublished specification searches conducted previously by Thompson, and were not considered tenable alternatives for the present study.

The Hendricks (1986) saw the LAS as measuring six factors, each tapped by seven items. As noted by Rotzien et al. (1994), the factor analytic model employed by the Hendricks would imply that the six factors were uncorrelated.

Postulate 1: The Love Attitudes Scale measures six uncorrelated exogenous constructs: Eros (items 1 to 7), Ludus (items 8 to 14), Storge (items 15 to 21), Pragma (items 22 to 28), Mania (items 29 to 36) and Agape (items 37 to 42).

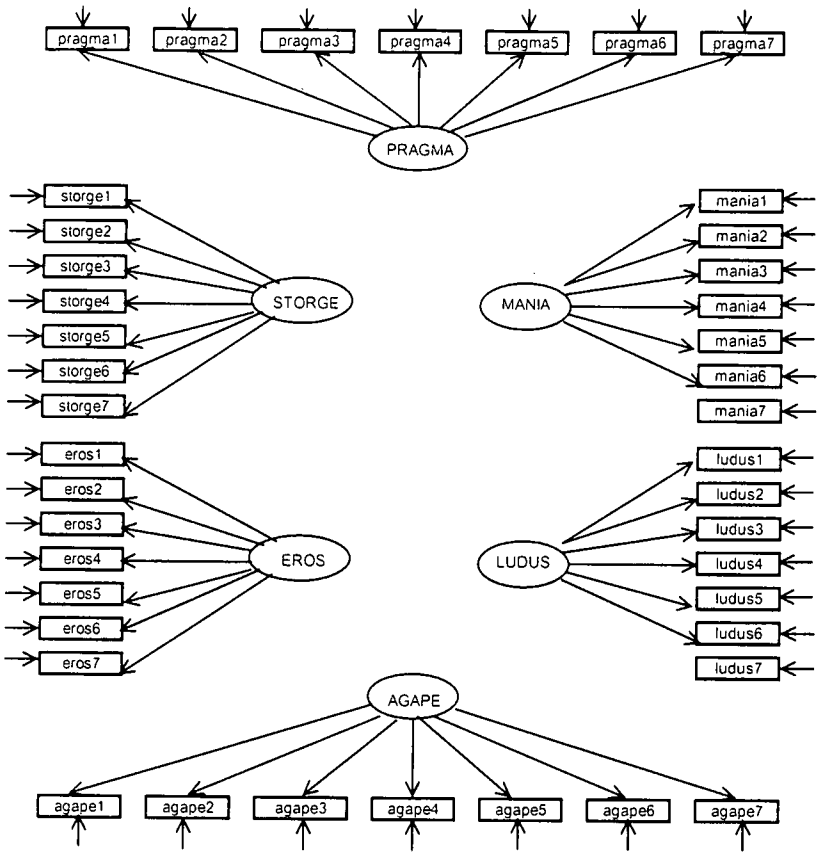


Figure 1 ***Postulate 1: LAS with uncorrelated factors***

It is, however, not standard practice to allow factors in CFA to be uncorrelated, neither is a model with uncorrelated factors generally regarded as accurately reflecting reality (MacCallum & Tucker, 1991). A more common (and more realistic) situation would entail allowing all exogenous variables to freely correlate (thus implying a standard CFA model). The factor-analytic model employed in the initial two studies of Thompson and Borrello (Borrello & Thompson, 1990b; Thompson & Borrello, 1987) reflects this situation.

Postulate 2: The Love Attitudes Scale measures six correlated exogenous constructs: Eros (items 1 to 7), Ludus (items 8 to 14), Storge (items 15 to 21), Pragma (items 22 to 28), Mania (items 29 to 36) and Agape (items 37 to 42).

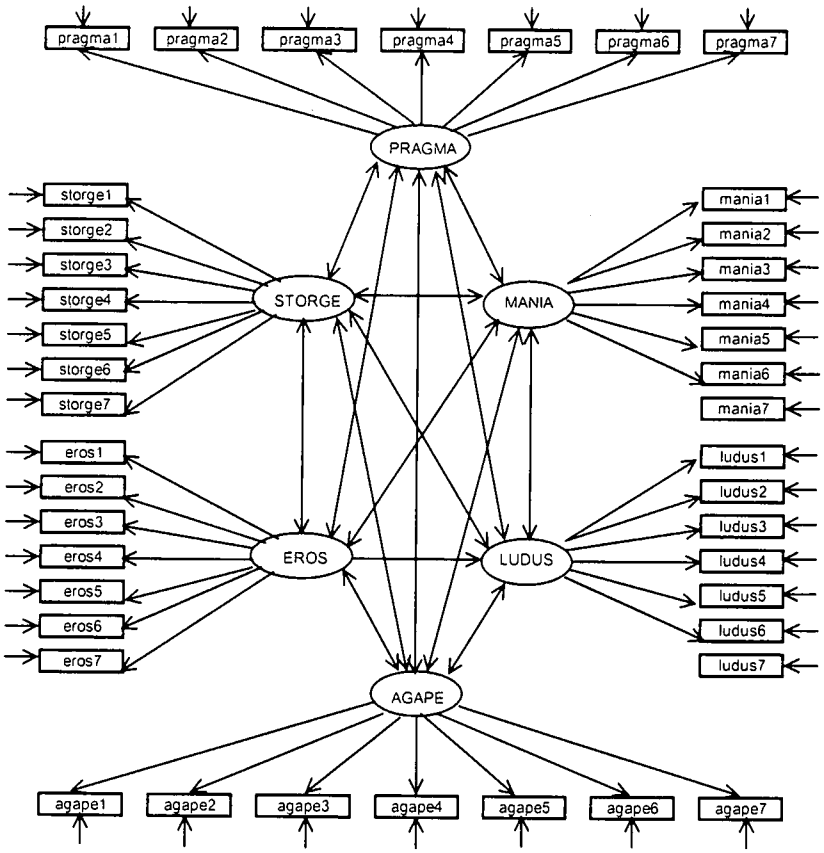


Figure 2 ***Postulate 2: LAS with correlated factors***

Although the six-factor solution seems to be the solution favoured by the love styles theory, Thompson and Borrello's first study (1987) also suggested that the Agape and Mania items might load on a single factor.

Postulate 3: The Love Attitudes Scale measures five correlated exogenous constructs: Eros (items 1 to 7), Ludus (items 8 to 14), Storge (items 15 to 21), Pragma (items 22 to 28), Mania/Agape (items 29 to 42).

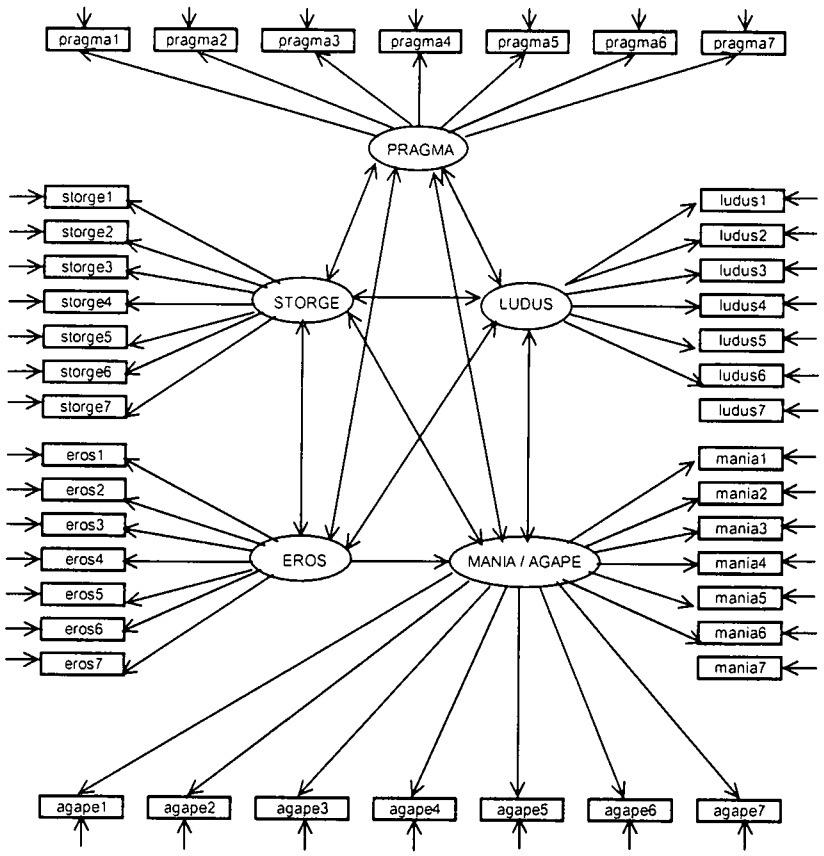


Figure 3 ***Postulate 3: LAS with Agape and Mania items loading on single factor***

The preceding models are all first-order models. However, in their third study, Borrello and Thompson (1990a) considered the possibility of second-order factors. They found three second-order factors, one defined by Eros and Ludus items, one by Storge and Pragma items, and one by Mania and Agape items.

Postulate 4: The Love Attitudes Scale measures six endogenous constructs: Eros (items 1 to 7), Ludus (items 8 to 14), Storge (items 15 to 21), Pragma (items 22 to 28), Mania (items 29 to 36) and Agape (items 37 to 42). These endogenous constructs load on three exogenous second-order variables in the following pairs: Eros and Ludus on I, Storge and Pragma on II, and Mania and Agape on III. The second-order variables intercorrelate freely.

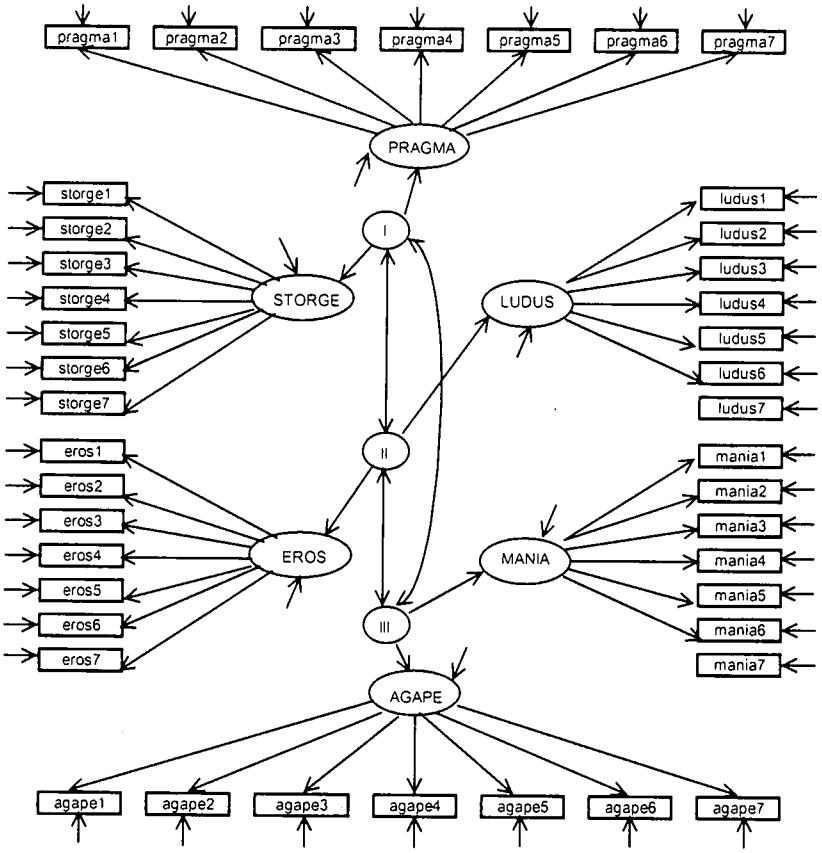


Figure 4 ***Postulate 4: 2nd Order factor model of the LAS with three 2nd order factors***

However, it was noted earlier (p. 62) that higher-order analysis should stop only when one factor or uncorrelated factors are derived. It was also noted (p. 60) that Thompson and Borrello could have added a third-order factor to the model represented in their third study.

Postulate 5: The Love Attitudes Scale measures six endogenous constructs: Eros (items 1 to 7), Ludus (items 8 to 14), Storge (items 15 to 21), Pragma (items 22 to 28), Mania (items 29 to 36) and Agape (items 37 to 42). These endogenous constructs load on three endogenous second-order variables in the following pairs: Eros and Ludus on I, Storge and Pragma on II, and Mania and Agape on III. These three second-order factors, in turn, load on a single exogenous third-order factor, perhaps called Love.

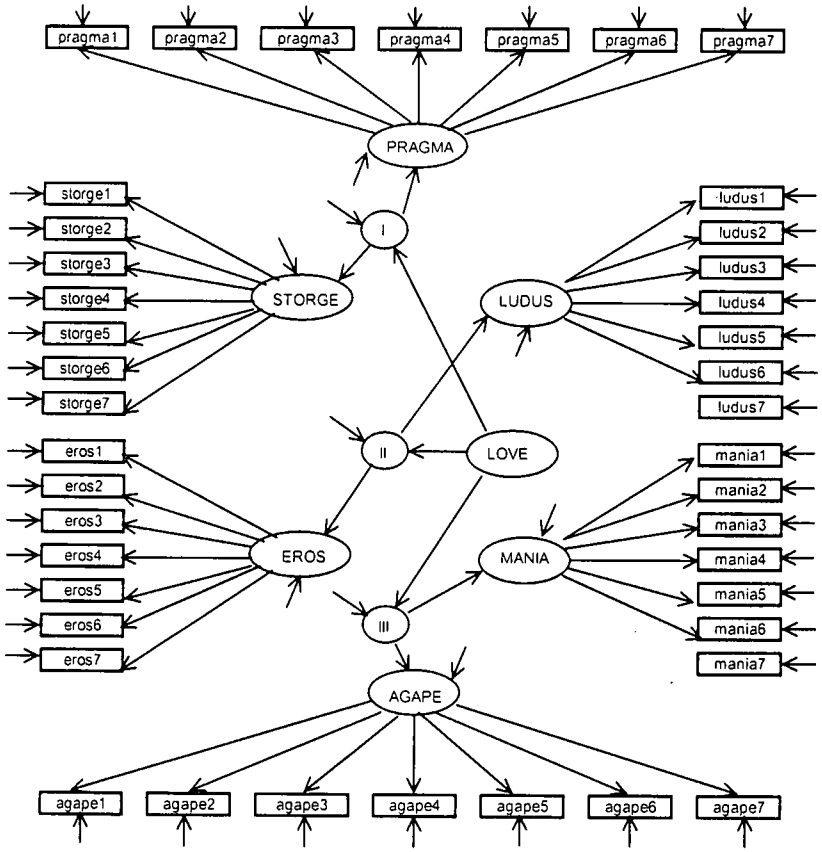


Figure 5 ***Postulate 5: 3rd Order factor model of the LAS***

It is, of course, also very plausible to think that all the love styles (as first-order factors) would be correlated to a single (second-order) factor which one might, without too far a stretch of the imagination, call Love. In their fourth study, Thompson and Borrello (1992b) did conceptualise such a scenario.

Postulate 6: The Love Attitudes Scale measures six endogenous constructs: Eros (items 1 to 7), Ludus (items 8 to 14), Storge (items 15 to 21), Pragma (items 22 to 28), Mania (items 29 to 36) and Agape (items 37 to 42). Each of these loads on a single exogenous second-order variable, Love.

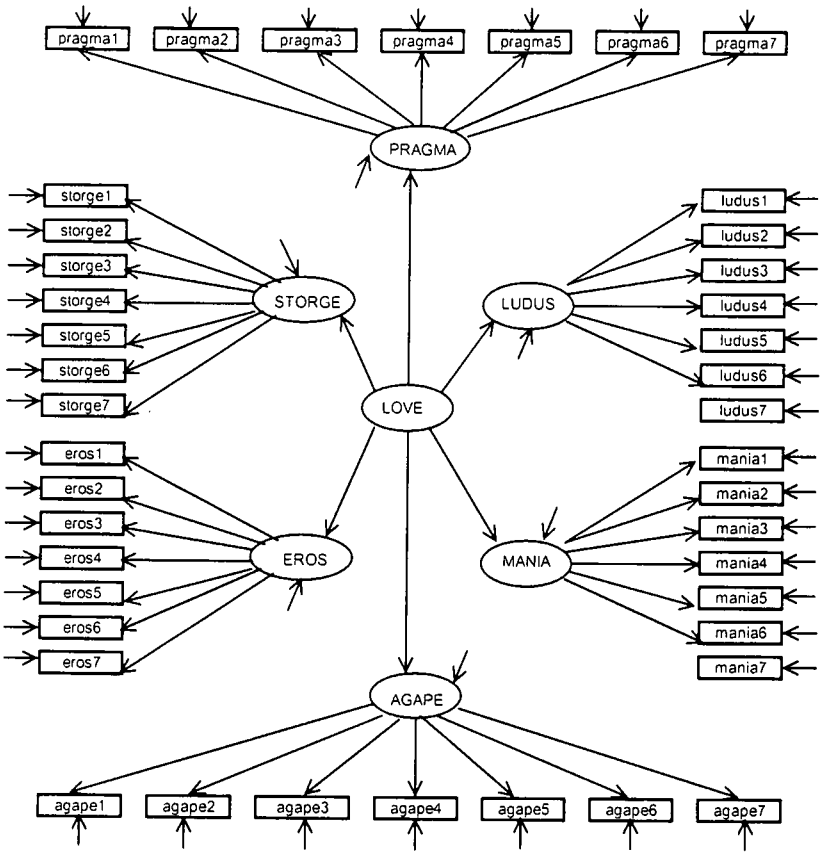


Figure 6 ***Postulate 6: 2nd Order factor model of the LAS with one 2nd order factor***

It was also noted earlier (p. 62) that the Hendricks did not necessarily construct the LAS in a manner which was true to Lee's conception of the love styles. They provided each of the secondary love styles with different sets of items, and did not conceptualise them as being merely the composite of the two primary love styles from which they were compounded. This methodology hamstrung Borrello and Thompson's (1990a) attempt at defining the secondary love styles as second-order factors. SEM provides the researcher with a novel new way of testing the original intent of Lee, while still working with the Hendricks' measuring instrument: In a normal CFA, all the LVs are allowed to freely intercorrelate (and each is thus considered exogenous). However, if one were to assume that the primary love styles were first-order factors, then they would be endogenous variables, and the secondary love styles (being compounded of pairs of the primary love styles) would then be exogenous variables (even

though still being first-order factors because of their respective measurement components). It would thus be possible to retain the measurement component of the LAS, while altering the structural relationships between them in such a way as to reflect Lee's conceptualisation of the love styles.

Postulate 7: The Love Attitudes Scale measures three endogenous constructs (the primary love styles): Eros (items 1 to 7), Ludus (items 8 to 14) and Storge (items 15 to 21), and three exogenous constructs (the secondary love styles, each a composite of two primary love styles): Pragma (items 22 to 28) – compounded of Ludus and Storge, Mania (items 29 to 36) – compounded of Eros and Ludus, and Agape (items 37 to 42) – compounded of Eros and Storge. In each instance, causal paths will be permitted only from the relevant secondary love style to the specific primary love styles.

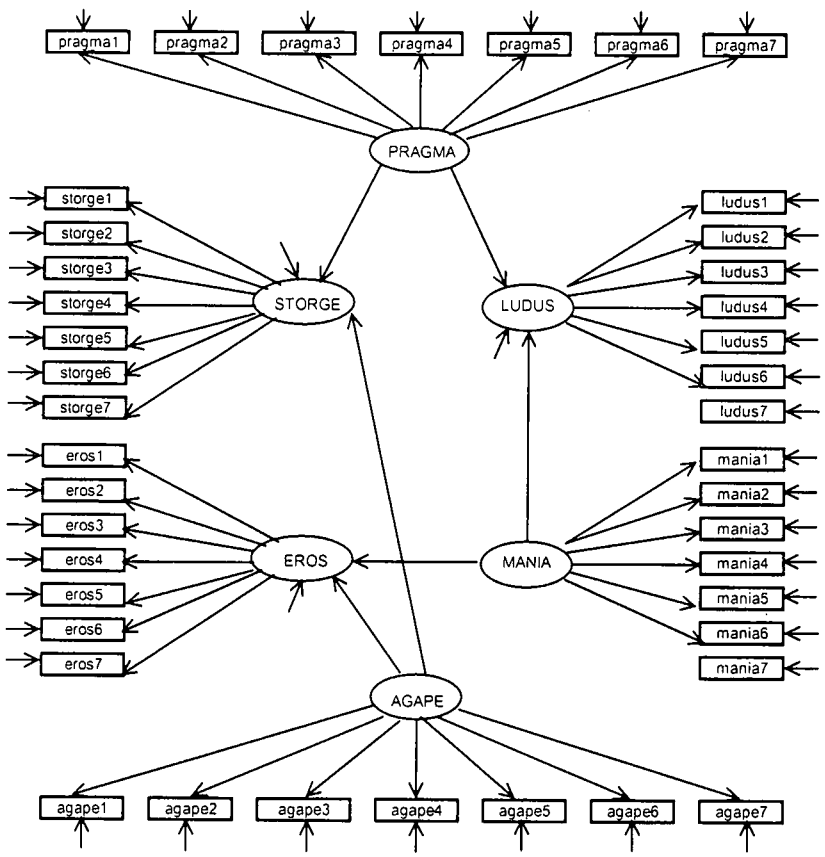


Figure 7 ***Postulate 7: Model of the LAS representing Lee's conception of love styles compounds***

4.2.1.2 Religious Orientation Scale

The measurement structure of the ROS has been studied on numerous occasions, and although not perfectly unanimous, sufficient evidence exists to suggest that the items tap two constructs: Intrinsic and Extrinsic (Donahue, 1985a).

Postulate 8: The Religious Orientation Scale measures two correlated exogenous constructs: Intrinsic (items 1 to 9) and Extrinsic (items 10 to 20).

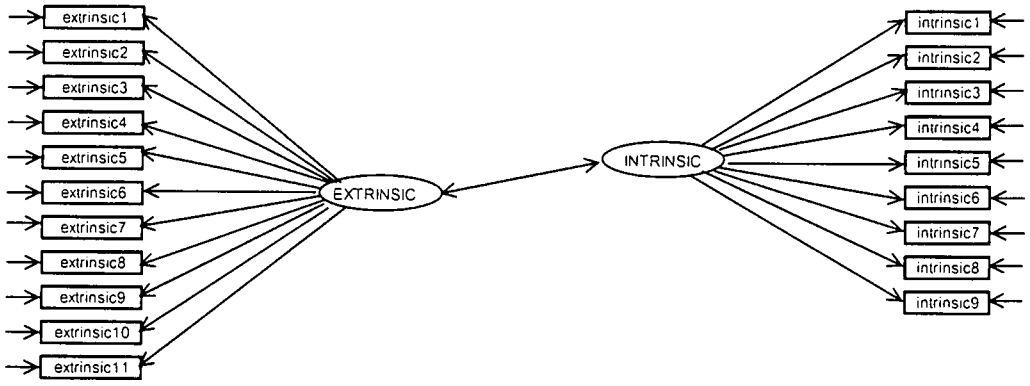


Figure 8 ***Postulate 8: Two-factor model of the ROS***

Allport (Allport & Ross, 1967) originally believed that Intrinsic and Extrinsic were merely opposite poles of the same continuum. If this were so, a single factor would underlie the ROS, with the Intrinsic items loading in an opposite direction to that of the Extrinsic items.

Postulate 9: The Religious Orientation Scale measures a single exogenous constructs with two opposite characteristics (loading in opposite directions): Intrinsic (items 1 to 9) and Extrinsic (items 10 to 20).

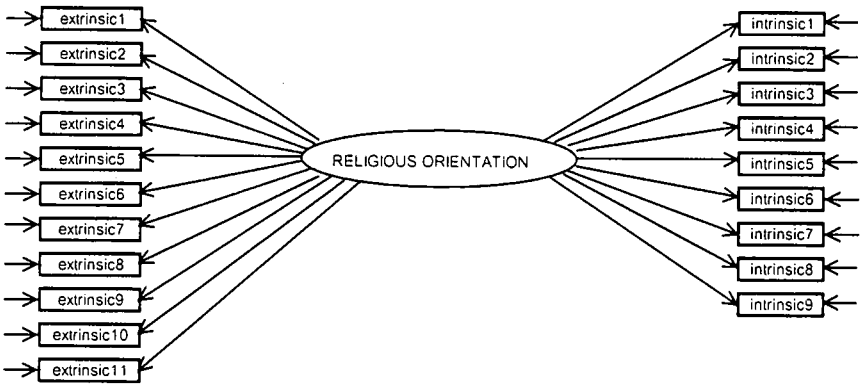


Figure 9 ***Postulate 9: One-factor model of the ROS***

An alternative way of viewing (and thus testing) Allport's belief that the ROS measures two opposites of a continuum would be to postulate that the ROS has a second-order factor underlying the two opposed first-order factors of Intrinsic and Extrinsic.

Postulate 10: The Religious Orientation Scale measures two endogenous constructs: Intrinsic (items 1 to 9) and Extrinsic (items 10 to 20). Both of these endogenous constructs load on a single exogenous construct: Religious Orientation.

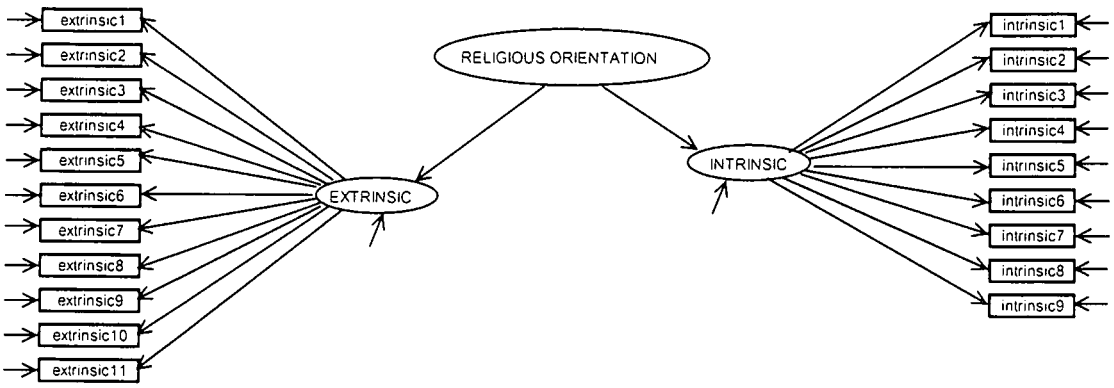


Figure 10 ***Postulate 6: 2nd Order factor model of the ROS***

4.2.1.3 Revised Shepherd Scale

Bassett et al. (1981) constructed the SS so that it consisted of two subscales, Belief and Christian Walk, with the first 13 items of the scale loading on Belief, and the last 25 on Christian Walk.

Postulate 11: The Revised Shepherd Scale measures two correlated exogenous constructs: Belief (items 1 to 13) and Christian Walk (items 14 to 38).

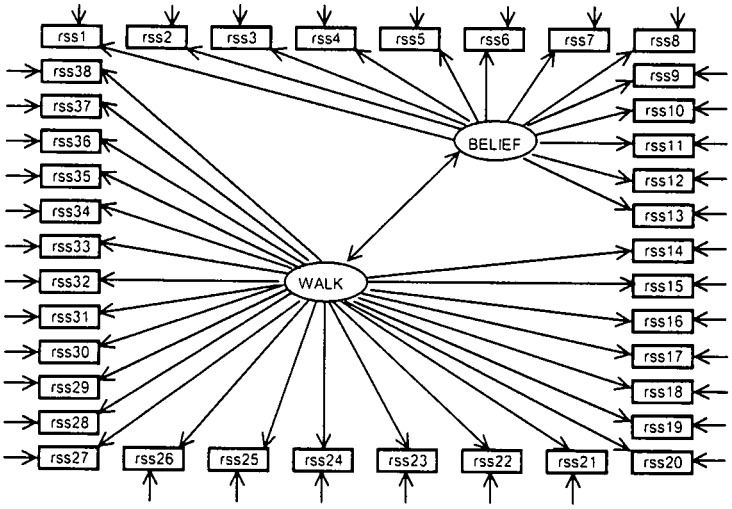


Figure 11 ***Postulate 11: Bassett et al.'s conceptualisation of the SS***

However, the original classification of the items into two subscales by Bassett et al. (1981) was based purely on the subjective distinction of those researchers, and not on the basis of any factor analytic work. Further factor analytic work (Pecnik & Epperson, 1985) showed that the items did not load as indicated by their subscales, and it was shown (2.3.1.1.2, p. 24) that it might even be better to view the SS as loading on a single factor.

Postulate 12: The Revised Shepherd Scale measures a single exogenous construct: Christian Faith, with all items loading on it.

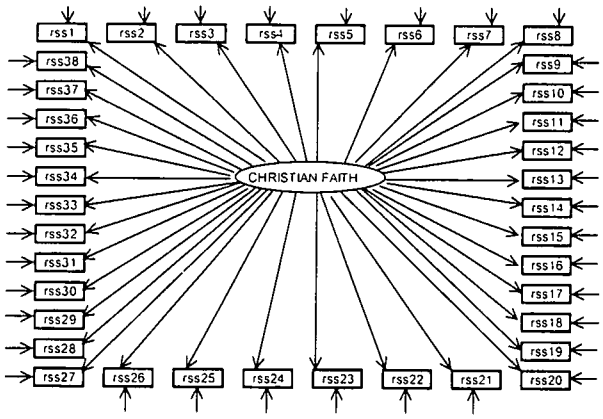


Figure 12 *Postulate 12: One-factor model of the SS*

Even though Bassett et al. (1981) intended the SS to measure two constructs, they believed that these two constructs could be summed to provide a total score for Christian faith. This may be tested in a model where the two latent variables are first-order factors which load on a single second-order factor.

Postulate 13: The Revised Shepherd Scale measures two endogenous constructs: Belief (items 1 to 13) and Christian Walk (items 14 to 38), both of which load on a single exogenous construct: Christian Faith.

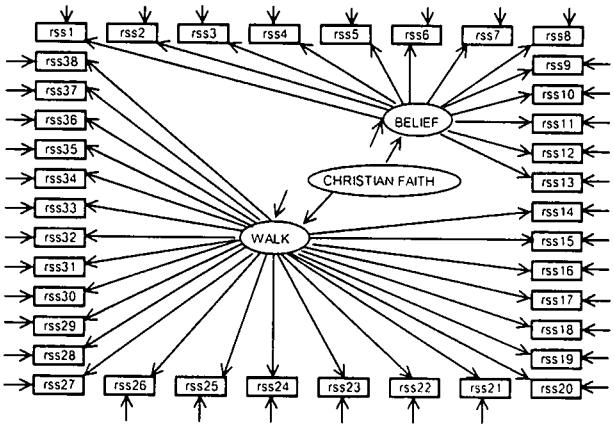


Figure 13 *Postulate 13: 2nd Order factor model of the SS*

On the basis of their factor analytic study, Pecnik and Epperson (1985) defined a different structure for the SS as that conceptually proposed by Bassett et al. (1981). Their first factor, Christian beliefs, values and behaviours (Beliefs), included 12 of the original 13 SS items from the first subscale, as well as eleven items from the second subscale. Their second factor, Identification with the Christian community (Identification), incorporated a further nine items from the original second subscale of the SS. The structure proposed by them can also be tested by means of a CFA.

Postulate 14: The Revised Shepherd Scale measures two correlated exogenous constructs: Christian beliefs, values and behaviours (items 1 to 9, 11 to 14, 20, 21, 31 to 38) and Identification/relatedness with the Christian community (items 22 to 30).

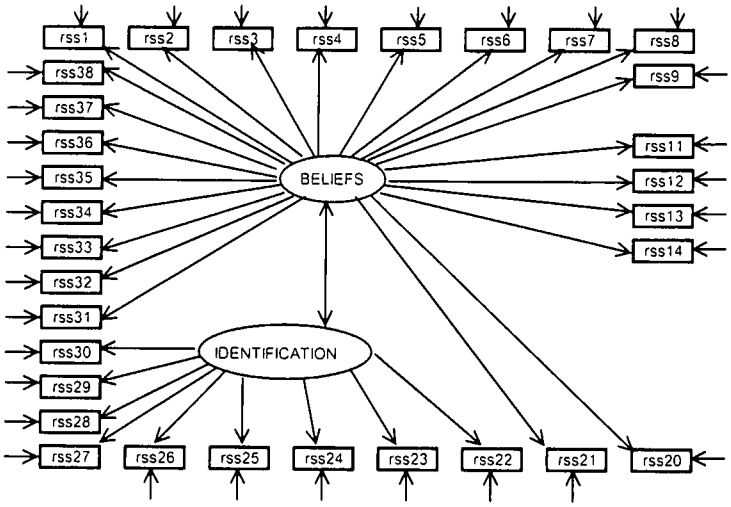


Figure 14 ***Postulate 14: Pecnik and Epperson's conceptualisation of the SS***

4.2.2 Latent variable models

As Gorsuch (1984, p. 235; 1990b) rightly noted, the problem with the emphasis on correct measurement methodology in the psychology of religion can be a mixed blessing. He pointed out that

> it is possible that psychologists studying religion will study the measurement of religion rather than religion itself.... Measurement is not a goal unto itself to provide us with interesting studies, but rather a means to lay the background for studying the development and impact of religious phenomena.

With the proper measurement models defined in the CFA stage of the study, one may construct latent variable models between the various latent constructs measured by the different scales (albeit with the caveat that changes to the measurement models may result in changes to these postulates). Since they have been described in the preceding postulates, the measurement components of the various constructs will not be described in the postulates below. As can be seen from the literature review (p. 65), there is no theoretical precedent for incorporating eros, pragma or mania into the LVMs, and they will thus be

excluded from the LVMs. Their inclusion in the LVMs, even with all relations to all other latent variables fixed at zero, cannot be justified, since their measurement models cannot be fixed to zero, and they will thus adversely affect the estimation of the fit of the structural models by unduly inflating the measurement component of the models (Mulaik et al., 1989).

Since agape is, as Lee (1977, p. 175) called it, "the official lovestyle of the Christian Church," it is expected to be influenced by Christian faith (as measured by the RSS) and Christian maturity (as measured by the Intrinsic scale of the ROS). Because the friendship involved in storge may be seen to be central to a Christian view of love, it is also expected to be influenced by Christian faith and Christian maturity. Since ludus is a decidedly un-Christian love style (Lee, 1997, p. 175), it is expected to have a negative relationship with Christian faith, and a positive relationship with the extrinsic religious orientation.

Postulate 15: Seven latent variables will be included in the model, four exogenous (Belief and Walk, Intrinsic, and Extrinsic) and three endogenous variables (Agape, Storge and Ludus). Causal paths will be permitted from Belief and Walk and Intrinsic to both Agape and Storge (posited to be positive) and also to Ludus (posited to be negative). Also, a causal path will be permitted from Extrinsic to Ludus (posited to be positive).

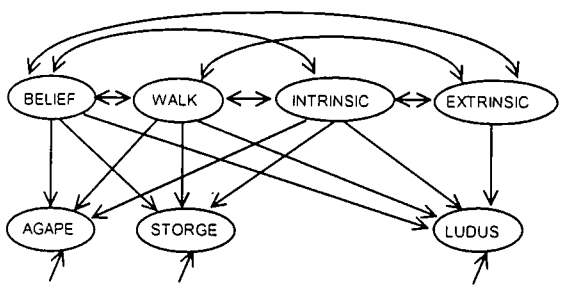


Figure 15 ***Postulate 15: LVM of the relationship between Christian faith and romantic love (MVs omitted)***

It is not certain, however, whether an "un-Christian" love style such as ludus merely sprouts from an "un-Christian" attitude towards religion such as the extrinsic religious orientation, or whether the more positive aspects of Christian faith actually directly work against such "un-Christian" ways of loving. Thus it may be reasonable to propose that the more extrinsically-oriented a person may be, the more ludic that person would be as well. The converse proposition, however, may or may not also hold true, viz., that the more intrinsically-oriented a person is, and the stronger that person's Christian belief and walk, the less ludic that person would be. Although the belief, Christian walk and intrinsic religious orientation of an individual can definitely be proposed to decrease as extrinsic increases, and vice versa, it is less certain whether the influence of these variables on a variable such as ludus is direct or indirect

(through Extrinsic). An alternative hypothesis to postulate 15 (direct influence on ludus) might be that the various positive measures of Christian faith only influence the "positive" love styles of agape and storge, and thus the causal influences of these variables on ludus may be constrained to zero. The review of the literature did indicate (3.2.2.1.4, p. 49) that love should precisely not consist of many of the qualities which are epitomised in ludus, and that Christian love is also a product of faith in the life of the believer. It may also be believed that Christian faith would not only nurture one in Christian virtues, but also keep one from un-Christian vices. Thus it would be expected that this model (which would be nested under the previous one) would not fit the data as well.

Postulate 16: Seven latent variables will be included in the model, four exogenous (Belief and Walk, Intrinsic, and Extrinsic) and three endogenous variables (Agape, Storge and Ludus). Causal paths will be permitted from Belief and Walk and Intrinsic to both Agape and Storge (posited to be positive). Also, a causal path will be permitted from Extrinsic to Ludus (posited to be positive).

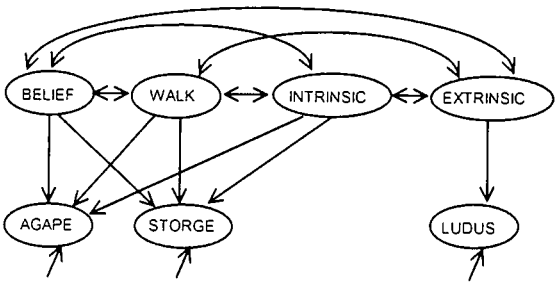


Figure 16 ***Postulate 16: LVM of the relationship between Christian faith and romantic love (MVs omitted) – influences on Ludus constrained***

One may, however, consider alternative hypotheses about the relationship between the various measures of Christian faith. It was shown (2.2.2.1, p. 18) that faith (here measured as Belief) leads to righteousness combined with obedience, true worship, and with a focus, not on the self, but on Christ. These qualities are in congruence with the intrinsic religious orientation. The extrinsic religious orientation is characterised by an association with the secular world rather than with the Church of Christ, and where such an association as the latter exists, it is purely for selfish motives. Both of these are opposite to the dissociation with the world and reliance in Christ rather than the self which are characteristic of Christian faith. One may thus postulate that a causal relationship exists between Belief and both Intrinsic (positive) and Extrinsic (negative). In this instance, belief would have both a direct influence on Agape and Storge, and also an indirect relationship on Agape and Storge (through Intrinsic) and on Ludus (through Extrinsic). One may go even further by noting that Christian faith is characterised also by renewed relationships (often expressed in merciful attitudes) and a faithful attitude towards God which should be seen in the life of the believer (expressed in various ways, such as the believer's testimony, obedience, dissociation with the world, perseverance in the face of trials for the faith, and various other actions).

One may thus also postulate that, as with Intrinsic and Extrinsic, Belief exerts a causal influence on Christian Walk. Thus Belief's influence on Agape and Storge is also extended to an indirect influence via Christian Walk.

Postulate 17: Seven latent variables will be included in the model, one exogenous (Belief) and six endogenous variables (Walk, Intrinsic, Extrinsic, Agape, Storge and Ludus). Causal paths will be permitted from Belief to Walk, Intrinsic, Extrinsic, Agape and Storge (all posited to be positive, barring Extrinsic). Causal paths will also be permitted from Walk and Intrinsic to Agape and Storge and from Extrinsic to Ludus (all posited to be positive).

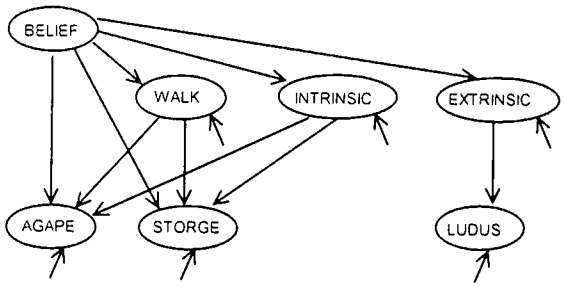


Figure 17 ***Postulate 17: LVM of the relationship between Christian faith and romantic love (MVs omitted) – Belief as primary Christian Faith variable***

The possibility does exist of there being alternative causal relationships between the various measures of Christian faith themselves, instead of merely allowing them to intercorrelate as in postulates 15 and 16, or simply being the product of doctrine, as in postulate 17. Should the models representing these three postulates not provide an adequate fit with the data, such possibilities may be investigated.

Chapter 5
Method

The current study is centred around an investigation of the relationship between Christian faith and romantic love. As such, it will involve firstly an investigation of the suitability of the scales used to measure these constructs, and secondly an investigation of the relationships hypothesised between these variables.

5.1 Measuring instruments

The questionnaires used for this study consisted of a biographical section and a battery of self-report tests: The SS (albeit slightly revised), the LAS and the ROS (in that order). All questionnaires had an identical format, barring that two versions of the batteries were compiled on the basis of the anticipated language groups to be encountered amongst the respondents: An English version (using the original scales) and an Afrikaans (translated) version. For ease of use, all the scales consisted of four-point Likert scales, with one indicating complete disagreement and four indicating complete agreement. An even number of response categories was used so as to limit the error of central tendency (Huysamen, 1989, p. 168).

The biographical section included questions about three categories of information. The first was demographic (gender, age and home language). Next, questions about the participants' faith included whether they were Christians (and if so, of what Christian denomination) or not (and if not, of what religion), and also frequency of both church attendance and prayer. Finally, questions related to the participants' love relationships gathered information on the current state of their romantic involvement (currently, previously, or never involved in a romantic relationship), and if currently in a romantic relationship, the length of that relationship, and if not currently in a romantic relationship, the time since the last relationship ended as well as the length of said relationship.

Instructions for the LAS required respondents to complete the scale with their current romantic relationship in mind. Should they not be in love, but have been in love within the past year (at the time of completing the questionnaire), they were to complete it with the past relationship in mind. Should they never have been in love or have last been in love more than a year before the time that they completed

the scale, they were to complete it with their ideal romantic relationship in mind. These instructions are reasonably similar to the instructions given by the scale developers (Hendrick & Hendrick, 1986, p. 394).

The Hendricks did note (1990, p. 253) that, despite the equivalence of the original and the relationship-specific measures, the relationship-specific version would be best suited for use with couples. Since it could not be assumed that the majority of respondents who would be involved in this study would be involved either as couples, or would be currently involved in romantic relationships, it was decided to use the original version of the LAS in this study.

The ROS was presented in a format similar to that of the original scale, and with no additional instructions.

In previous studies using the SS (Raubenheimer, 1994; 1997), feedback from the participants suggested that the SS was perceived as being very ambiguous. This necessitated a revision of the SS as a crucial first step in this study. The scale items were thus revised (some also being reversed) so as to remove ambiguity, and to reduce the influence of social desirability and acquiescence (Huysamen, 1989, pp. 156-169; Oppenheim, 1992, pp. 119-150), while still attempting to ensure that the original intent of Bassett et al. for each item was maintained (in terms of the original Scripture verses each item was based on, as supplied by Bassett et al., 1981).

The following items were reframed so as to have a negative scoring: 2, 3, 5, 6, 7, 14, 16, 17, 19, 20, 22, 24, 31, 33, 34, 35, 36, 38. Any ambiguous items which had not been rephrased into negatively scored items were then also rephrased. The items which were rephrased (sometimes by the addition of a single word, sometimes more), but left as positively worded items, were: 9, 10, 11, 13, 21, 23, 25, 26, 28, 30, 37.

The English versions of the original and revised Shepherd Scales are shown in Appendix A. The Revised Shepherd Scale (RSS) has the same basic structure as the original (2.3.1.1, p. 24), and it should also be noted that the aim of this researcher in the revision process was to retain the precise content of the individual items, and only to alter (hopefully improve) the presentation of that item content.

5.2 Analyses

Although the central focus of this study is the application of structural modelling, a number of other analyses will be performed prior to the SEM analyses. The methodology behind both the structural modelling and these other analyses will be explained briefly in the context of the progressive steps to be undertaken in the analysis procedure.

5.2.1 Model testing

Although the fit of specific models is evaluated with the various fit indices, there is also an overarching methodology according to which models are tested. Jöreskog (1993, p. 295) noted that model testing could be conducted along essentially three different lines: In rare cases, it can be strictly confirmatory, where a single model is tested with the data gathered. More often, it involves the selection of the "best" model from a number of competing models. Most often, though, it takes the form of model generation, where the researcher begins with a tentative model which does not fit the data adequately, and which is then modified on the basis of theoretical and empirical criteria, moving towards a better fitting model. Thus, in reality, initial models rarely fit the data well. If need be, the fitted models may be modified and re-fitted in an attempt to improve the fit. All modifications to the models during the testing process should be made only on the basis of theoretical assumptions (Bentler & Chou, 1987, p. 107; Jöreskog, 1993; Kline, 1998, pp. 132-137; Pedhazur, 1997, pp. 768-769).

Model testing will be conducted in a two-step process, as proposed by Anderson and Gerbing (1988). The measurement model of each scale (postulates 1 to 14) will be assessed, and this will then be confirmed by testing only the measurement aspect of all the scales together. Then only will the entire structural model be tested (Bagozzi, 1983; 1993, p. 297; Thompson, 2000, p. 277). In each instance, several models will be tested in order to select the best from among them, although it may be necessary to further modify even the selected model in order to obtain an acceptable degree of fit.

Finally, model testing also involves the construction and evaluation of equivalent models (Lee & Hershberger, 1990; Luijben, 1991; MacCallum et al., 1993; Stelzl, 1986). These are models which can be shown to have exactly the same fit as the researcher's model(s), but different causal configurations that may or may not be in agreement with theoretical considerations. Equivalent models to the final selected LVM will be generated according to the rules discussed in Lee and Hershberger (1990).

5.2.2 Model modification

Should the a-priori models posited in this study be modified to improve their fit, the examination and modification processes used for the measurement models and the latent variable models will differ.

5.2.2.1 Modification of measurement models

The requirement of a good measurement model is that it be both reliable and valid (Kline, 1998, pp. 192-198). It must measure the construct it claims to measure, and do so accurately and consistently. The different scales will be examined and adjusted so as to maximise these characteristics. Modifications to the measurement scales will centre around maximising their reliability and construct validity. Wille

(1996) proposed a stepwise method of examining the psychometric adequacy of the measurement aspect of LVMs. The first aspect of the scale which is examined and modified in this stepwise process is its reliability. Once the reliability of the scale has been maximised, its convergent and discriminant validity are examined and maximised, using exploratory factor analysis (EFA) in a similar stepwise fashion.

5.2.2.1.1 Reliability analyses

Meaningful research cannot proceed without reliable measuring instruments, and scales cannot be valid if they are not reliable. The stringent requirements of structural modelling dictated that the most reliable measurement instruments possible be used (Bollen, 1989, ch. 6; Kline, 1998, pp. 193-194). Nunnally (1978, pp. 245-246) required scales to have reliabilities equal to, or preferably higher than .70, a value supported by other researchers (Cortina, 1993; Peterson, 1994). The means of data gathering used in this study (single anonymous application of a battery of tests) necessitates an internal-consistency investigation of the reliability of the scales. The Cronbach's alpha will be calculated, with SPSS (SPSS inc., 1990), for each of the respective subscales of the LAS and the ROS, and for the total RSS scale. The RSS will tested as a whole for several reasons: Firstly, as was indicated previously (2.3.1.1.2, p. 24), uncertainty exists about the number of factors underlying the SS. Secondly, the reliability analyses available in the literature (Bassett et al., 1981; Pecnik & Epperson, 1985) were computed on the scale as a whole. Furthermore, the two subscales are only conceptual divisions, and have not yet been confirmed through examinations of the psychometric properties of the scale. A two-factor model may yet prove best, but it might have very different item-construct relationships than proposed by Bassett et al. (1981).

Subsequently, in a stepwise procedure, the least reliable item (as indicated by the expected increase in alpha for the scale) from each subscale will be removed (should the expected alpha be greater than the current alpha for the scale). The reliability analysis will then be repeated, the increase in reliability noted, and the next least reliable item removed. This process will be repeated until the removal of no items would lead to an increase in the scale's alpha.

5.2.2.1.2 Factor analyses

The items of a particular subscale should correlate well with their intended factor (they should show convergent validity) and they should not correlate with any other factors (they should display discriminant validity). Thus, after the reliability of the various scales has been determined, their convergent and discriminant validity will be maximised in terms of the stepwise procedure proposed by Wille (1996): The discriminant validity is assessed and improved by identifying and removing, one by one, the items which load significantly on multiple factors. The convergent validity is assessed and improved by identifying and removing, one by one, those items which do not load significantly on their intended factor. These two strategies are carried out simultaneously, and for each step the item which

reduces discriminant and/or convergent validity to the greatest extent is removed, until no items violate either forms of validity.

Determining what should be considered a salient loading is an imprecise science (Gorsuch, 1983, p. 208 ff.). Gorsuch (p. 210) noted that meaningfulness takes precedence in such cases, pointing to the popularity of .3 as an absolute minimum for a salient loading. Furthermore, Wille (1996, pp. 25-26) recommended different values for assessing the different aspects of an item's validity. Specifically, he recommended a value $\geq .4|$ (on the item's intended factor) for convergent validity – a value also noted by other researchers (Gorsuch, 1997a, p. 545; Velicer & Fava, 1998, p. 234) – and $\leq .25|$ (on all factors other than the item's intended factor) for discriminant validity.

A new development in the field of exploratory factor analysis has made this process more computationally rigorous. Browne (2001, p. 113) noted that many researchers use confirmatory factor analytic methods in an exploratory fashion, carrying out numerous modifications (whether guided by modification indices or other criteria) in an attempt to improve fit. In this context, EFA is more appropriate for the modification of the model, since the researcher has direct access to the total pattern of loadings, and can detect misspecified items on the basis of factor loadings, instead of modification indices. For this reason, should the measurement models be found not to fit the data properly, modifications will be made on the basis of EFA results, and not CFA. However, CFA is appealing because standard errors can be computed for the factor loadings (the loadings of the MVs on their LV). These standard errors were not available in the EFA components of standard statistical packages. The first programme to make this facility available in the framework of EFA is the Comprehensive Exploratory Factor Analysis (CEFA) programme (Tateneni, Mels, Cudeck & Browne, 2001). The programme can conduct a number of rotations not available in common statistical packages (Browne, 2001), and gives output such as standard errors of the rotated factor loadings, and confidence intervals (CIs) for the loadings themselves. Also, the fit of the factor model can be assessed, and the programme supplies measures of fit (as with CFA analyses) for the "model." CEFA thus offers all the advantages of CFA, but still in the context of EFA. In fact, CEFA may even be more advantageous to the process of scale evaluation than CFA, since Thompson (1997) found that researchers using CFA often neglected to examine the entire factor pattern and structure, a practice that could lead to the exclusion of important information relevant to the analysis of a scale. If modifications are made to the scales in this study, they will be made on the basis of an examination of the standard errors of the rotated factor loadings and the confidence intervals of the rotated factor loadings themselves, still in keeping with the cut-off criteria provided by Wille (1996). Furthermore, CEFA can be used in a confirmatory mode. As with CFA, the number of factors to be extracted have to be specified a priori for CEFA. The number of factors generally recommended in the literature (six for the LAS, and two for both the ROS and RSS) will be confirmed with a scree plot (Cattell, 1978, pp. 60-62, 76-86; Gorsuch, 1983, pp. 165-167) before

deciding on the number of factors to enter in the CEFA. In all instances, the Maximum Wishart Likelihood discrepancy function will be used, together with an Oblique Quartimax rotation.

Lastly, a limit will be set to this maximisation process, since the number of items per factor in SEM is crucial. Specifically, were a model to contain only one LV, it would require four MVs to be properly identified. In practice, models with numerous LVs may be identified with as little as two MVs per LV, although these should be seen as the exception. The usual case is that a minimum of three variables must load significantly on a factor for it to be successfully identified, and the more variables there are per factor, the better the chances of that factor replicating (Fabrigar, Wegener, MacCallum & Strahan, 1999; Gerbing & Anderson, 1985; Gorsuch, 1983, p. 332; Little, Lindenberger & Nesselroade, 1999; Velicer & Fava, 1998). In this study, an absolute minimum of three MVs per LV will be adhered to throughout.

5.2.2.1.3 Cross-validation of models

It may be argued that the modification process to which all of the measurement models will be subjected is akin to a specification search. The result of modifying structural models, especially by means of specification searches following the guidance of modification indices, is that these modified models rarely provide realistic approximations to real-world conditions (MacCallum, 1986; 1995; MacCallum, Roznowski & Necowitz, 1992). When a measurement model is modified, it may be that changes made to the model capitalised on chance, and it is thus advisable to validate modified models on either subsections of a sample, or preferably on a second sample (Anderson & Gerbing, 1988; Bagozzi, 1983; Bentler, 1980, p. 429; Bollen, 1989, pp. 298-305; Breckler, 1990; Browne & Cudeck, 1989; Cudeck & Browne, 1983; MacCallum, 1986; MacCallum et al., 1992; Reis, 1982). If the altered measurement model is validated in a second independent sample, it provides support for its use in further analyses. However, even then, unless sample size is extremely large, this is no absolute proof of having a model which accurately reflects the population situation (MacCallum et al., 1992, p. 493). Since cross-validation plays such an important role in SEM, the data set gathered for this researcher's master's thesis (Raubenheimer, 1997) will be used to cross-validate all the modified measurement models.

MacCallum et al. (1994) examined various strategies according to which models may be cross-validated in secondary samples. Specifically, the approach which will be followed in this study is that of determining configural invariance (akin to MacCallum et al.'s Fixed-Weights cross-validation). The models will be tested using LISREL's facility of testing models across groups (Fleishman & Benson, 1987; Hoyle & Smith, 1994, pp. 433-435; Jöreskog & Sörbom, 1993, pp. 52-61), with the current data set as the first group, and then with the 1997 data set as the second group. This will provide baseline fit indices. Next the models will be re-estimated, only with the variances and error variances of the second group set free. This will allow an evaluation of the degree to which the models have remained constant in terms of their relation to the MVs, as measured in two different samples.

5.2.2.2 Modification of latent variable models

Should none of the LVMs proposed a priori (postulates 15-17) provide an adequate fit with the data, some of them may have to be modified to improve their fit. As far as possible, modifications to the LVMs will centre around substantive evaluations of possible ways to increase the fit of the model, rather than the consideration of modification indices (Bentler & Chou, 1992; Jöreskog, 1993; Jöreskog & Sörbom, 1993; Kaplan, 1990; 1995). Since correlated errors are not warranted in the models to be tested in this study, they will not be used to improve the fit of any of the models. Since the measurement aspects of the models will have been completed in the prior examinations of the various scales, the modifications to the LVMs will focus only on different ways of interrelating the various LVs.

5.2.3 Model Identification

For a model to be tested successfully (i.e., the unknowns in the structural equations estimated), it must firstly be theoretically over-identified. An oversimplification of this is to state that there have to be more equations than unknowns (i.e., more correlations between individual variables than parameters to be estimated in the model) in the model for the unknowns to be estimated successfully (Judd, Jessor & Donovan, 1986, p. 159; Reis, 1982, pp. 265-266). When the number of knowns is less than the unknowns in the model, it is said to be under-identified. When these numbers are equal, it is just-identified, and when there are more knowns than unkowns, the model is over-identified. Since just-identified models deliver only one possible solution to the estimation of the parameters in the model, their fit is always perfect, and they are thus unsuitable for interpretation.

Each arrow (whether inter-relational or residual) in the graphical model represents a parameter to be estimated. The sum of these represent the unknowns. These correspond to all the specified relationships (since these are what must be estimated), plus all the residuals of all the endogenous variables. The number of knowns is equal to the sum of the variances and covariances of all the manifest (observed/measured) variables. This can readily be calculated with the formula $\frac{J \times (J+1)}{2}$, where J is the number of manifest variables (Long, 1983, p. 42).

This study will involve the testing of CFA models (structural equation models in which all the latent variables freely correlate, and MVs typically each load on only one LV), and LVMs (in which the LVs are not permitted to freely correlate). The different types of structural models have some additional requirements for identification, which will be summarised here. In the results chapter, the identification status of the various models tested in this study will be represented in tabular form.

5.2.3.1 Identification of standard CFA models

Standard CFA models are constructed in such a way that each indicator (MV) loads on one factor (LV) only (Anderson & Gerbing, 1988; Kline, 1998, p. 200). The requirements for the identification of the models is specified in Table 2 (Davis, 1993; Kline, 1998, p. 203; Reilly & O'Brien, 1996).

Table 2 *Conditions for Identification of Unidimensional CFA Models*

Conditions for identification		Necessary / sufficient?
1 factor (LV)	**≥ 2 factors (LVs)**	
1. Estimated parameters ≤ observations		Necessary
2. Scale for every factor		Necessary
3. ≥ 3 indicators	≥ 2 indicators / factor	Sufficient

Regarding the first condition, in terms of a standard CFA model, the number of parameters to be estimated is equal to double the number of MVs (each has one residual and one loading on a factor), plus the number of interrelationships between the LVs. Since the LVs are all intercorrelated in a standard CFA model, the number of LV interrelationships can be determined with the formula $\frac{j(j-1)}{2}$, where j is the number of LVs. Throughout, only the total number of parameters will be shown.

The third condition is related to the first, in that each factor needs to be defined by a minimum number of variables in order to be estimable. As was mentioned previously (p. 89), the upper limit (3 MVs per LV) will be adhered to throughout this study.

The second condition refers to the issue of scaling. Basically, the LVs in a structural model need to be estimated from the MVs, but since they are only hypothetical constructs, they do not have a metric of their own. Consequently, the values in each LV-MV portion of a model may assume any arbitrary value, and innumerable possible solutions exist for that portion. Thus even if there are sufficient equations with which to estimate all the unknown quantities, the model is still not identified, as multiple solutions exist (Steiger, 2002). Identification is thus additionally obtained by fixing some part of the system to an arbitrary value, which then allows all other values to be estimated to only one value. This may be done either by setting the variance of each of the LVs to a fixed value, or by fixing the value of one of the loadings of the MVs (called the reference variable) on each LV to a fixed value. In both cases, the fixed value is usually taken to be unity, and in the latter case, the specific MV to fix is chosen arbitrarily, usually the first of the MVs for each LV.

Where possible, LISREL 8's improved ability to scale the variances of LVs will be used (Jöreskog & Sörbom, 1993), although this approach does not use constrained estimation, and it generally only allows the variances of exogenous LVs to be fixed (constrained-estimation programmes allow the variances of

both exogenous and endogenous LVs to be fixed directly) (Jöreskog & Sörbom, 2001). Where necessary, the loading of the first MV for each LV will be set to unity to scale the LV (Jöreskog, Sörbom, du Toit & du Toit, 1999).

5.2.3.2 Identification of higher-order CFA models

The identification status of higher-order CFA models is reasonably similar to that of standard CFA models. The conditions specified in Table 2 (p. 91) also apply here, although the last condition is slightly expanded: Since the first-order factors act as the "indicators" for the second-order factors, a model with a single second-order factor would require at least three first-order factors to be identified, and a model with multiple second-order factors at least two first-order factors per second-order factor. Since there are inherently more than two factors in a higher-order model, each first-order factor requires at least two MV indicators (Kline, 1998, p. 233-236).

5.2.3.3 Identification of latent variable models

LVMs share the same two necessary conditions for identification as CFA models listed in Table 2 (p. 91). Additionally, the identification of LVMs should be evaluated both against their measurement and structural components. The identification of the measurement component of a LVM is done by respecifying the model as a CFA model (i.e., all LVs intercorrelate). If the model is still identified according to the identification requirements of standard CFA models, then its measurement component is identified (Rigdon, 1995).

The identification of the structural component of a LVM is evaluated as follows: If the model is recursive (i.e., the flow of "causation" hypothesised in the model is unidirectional), then it is identified. If not (i.e., the causal path from a variable returns to itself after being mediated by one or more other variables), a number of other considerations come into play (Bollen, 1989, pp. 88-104, 326-333; Kline, 1998, pp. 156-169, 247-251; Rigdon, 1995). Since all the models postulated in this study are recursive, these conditions will not be dealt with.

5.2.4 Model evaluation

Once the researcher has specified the model to be tested, a computer programme is used to create the covariance matrix implied by the model, and fit it to the sample covariance matrix. The researcher has to enter the theoretical model into a computer programme, and then select a suitable fitting function with which to test the model. After that, the fit indices and the residual matrix (indicating the discrepancies between the implied and sample covariance matrices) may be examined to assess the fit of the model.

5.2.4.1 Fitting functions

Although a technical description of a fitting function is beyond the scope of this study, a brief explanation of the process will help explain the choice of fitting functions and the way in which the fit indices (5.2.4.2, p. 94) relate to the fitting function. Since a model needs to be over-identified to be fitted successfully, it stands to reason that there are numerous "solutions" to the model testing, which are ideally not too different from each other. The discrepancies between these different solutions are minimised by means of a fitting function: an equation with which the smallest overall discrepancy between the implied and sample covariance matrices may be achieved (usually in an iterative process).

Likert-scale data (such as that arising from this study) is traditionally viewed as being ordinal (Bollen, 1989, p. 433; Jöreskog, 2001a; 2001b; Kaplan, 1991; Kline, 1998, p. 237; Muthén, 1993; Muthén & Kaplan, 1985; 1992; Olsson, 1979a). The computer programmes which are generally accepted as sufficient to deal with ordinal data are Mplus (Muthén & Muthén, 2000) and LISREL (Jöreskog & Sörbom, 2001). Although Mplus uses the models proposed by Muthén (1983; 1984; 1993; Muthén & Kaplan, 1985; 1992; Muthén, Kaplan & Hollis, 1987), LISREL 8.51 uses its companion program PRELIS 2.51 to generate a polychoric correlation matrix (Olsson, 1979b) and an asymptotic covariance matrix (Jöreskog, 1994) from the data, which is then analysed using the Generally Weighted Least Squares (WLS) fitting function of LISREL (Bollen, 1989, p. 443; Jöreskog, 2001b, p. 27; Muthén, 1993; Olsson, 1979b; Rigdon & Ferguson, 1991, p. 496; Rigdon & Ferguson, 1991; Wothke, 1993, pp. 268-269). However, WLS is an implementation of the Asymptotically Distribution Free methods developed by Browne (1984), and, as such, it requires *extremely* large sample sizes (Bollen, 1989, pp. 425-432; Hoogland & Boomsma, 1998; Hu, Bentler & Kano, 1992; Jöreskog, 2001b; Kaplan, 1991; Kline, 1998, pp. 145, 209; Mels, 2000; Rigdon & Ferguson, 1991, p. 492; Yuan & Bentler, 1997; 1999). Also, calculating the asymptotic covariance matrix requires that there be a sample size of $N \geq \frac{J \times (J-1)}{2}$, where J is the number of items. Solving for J with an N of 369, as in this study, the maximum number of items for which an asymptotic covariance matrix can be computed is 27. This is problematic, since the three scales used in this study – the RSS, the LAS, and the ROS – have 38, 42 and 20 items respectively. The theoretical LVM using all three scales (albeit only half of the LAS – cf. postulate 15, p. 81) would require an N of 3081 (for 79 items). Thus, on two counts, the small sample size of this study does not permit the use of the WLS estimator.

Another option would be to use the Robust Maximum Likelihood (RML) (Browne, 1987), which performs better than WLS at smaller sample sizes, and computes a corrected chi-square (the Satorra-Bentler chi-square) for the model fit, as well as corrected standard errors for the parameters (Chou, Bentler & Satorra, 1991; Hu & Bentler, 1995; Jöreskog & Sörbom, 2001; Jöreskog, Sörbom, du Toit & du Toit, 1999; Mels, 2000; Satorra & Bentler, 1988; 2001; West, Finch & Curran, 1995). This rescaled

chi-square has been shown to be the fitting function most robust against non-normality while still being used with the small sample sizes found in most common research (Hu et al., 1992; Jöreskog, 2001b, p. 19). However, this still requires the computation of the asymptotic covariance matrix (although the data are now specified as continuous), which means that in certain instances in this study it is again prohibited by sample size.

Studies have shown that the Maximum Likelihood (ML) fitting function, while not ideal, can still be used under some (but not all) of the conditions associated with both ordinal data and non-normality (Bartholomew, 1983; Hu et al., 1992). Furthermore, it has been shown that, given certain caveats, Likert-scale data do not necessarily underperform in analyses intended for continuous data, nor is the interval assumption for these data that untenable (De Leeuw, 1983; Gaito, 1980; Kenny, 1979, p. 253; Rasmussen, 1989; Velleman & Wilkinson, 1993). The analysis of Likert-scale data with four or more categories as if it were continuous has even been recommended for SEM (Bentler & Chou, 1987, p. 88; Jöreskog & Yang, 1996, p. 80).

For these reasons, this researcher has deemed it better to treat the data as continuous, and analyse it, where possible, with the RML fitting function (also available through LISREL), and where not possible, with the ML fitting function. Since the comparisons between the various models proposed for each scale will be made on the basis of estimations done with the same fitting function, the effect of the fitting function will be controlled to an extent. Fit indices will also be selected which are relatively independent of the estimator used, thus allowing for a more stable comparison.

5.2.4.2 Fit indices

Once a model has been successfully estimated, the suitability of the model is estimated in terms of a plethora of fit statistics. The aim of this study favours a methodology where the models will not be evaluated on a strict accept/reject basis according to presumed cut-off values for the various fit indices. Rather, a number of a priori models (and possibly models generated a posteriori) will be compared on the basis of the different fit indices so as to ascertain which of the models best represent the data.

The following fit indices will be reported in this study:

Since the fit function used to estimate the model has a distribution approaching the chi-square distribution as the sample size increases (Bollen, 1989, pp. 110, 115), the chi-square value will be reported (together with its degrees of freedom), and, where the RML fitting function is used, the Satorra-Bentler rescaled chi-square as well. Contrary to conventional applications of the chi-square statistic, in SEM it is evaluated inversely (Fornell, 1983, p. 443-444). Thus a model is accepted if the chi-square is *non-significant*. This carries with it the implication that it is impossible to support the correctness of a model, since a non-significant chi-square means only that the null hypothesis has not been rejected, in

other words, the model is not contradicted by the data (Judd et al., 1986, p. 161; Pedhazur, 1997, p. 818). Furthermore, because of the large sample sizes required to satisfy the requirements for structural models, the chi-square statistic is often significant even if the model fit is good (MacCallum, Browne & Sugawara, 1996, p. 132).

The chi-square test statistic may also be used to compare improvements in fit of nested models (models in the same sequence of variables, but with differing numbers of specified parameters) through the chi-square difference test (Garson, 1998, p. 12; Hoyle & Panter, 1995; Kelloway, 1998, pp. 36-37; Loehlin, 1987, p. 64). In this regard, a definition needs to be given of model parsimony. Parsimonious models are models which have fewer parameters, but are still capable of providing theoretically justifiable explanations for the relationships between the variables under examination. In the chi-square difference test, the chi-square and degrees of freedom of the more parsimonious model are subtracted from those of the less parsimonious model to yield a third chi-square value with accompanying degrees of freedom, which, if it is significant, indicates that the less parsimonious model fits better than the more parsimonious one.

The root mean square error of approximation (RMSEA) was proposed by Steiger and Lind (Steiger & Lind, 1980) and further developed by Steiger (Steiger, 1990; 2000) and others (Browne & Cudeck, 1992; MacCallum et al., 1996; Nevitt & Hancock, 2000). The RMSEA favours parsimonious models, is relatively unaffected by sample size (Steiger, 1990; 2000; Steiger & Lind, 1980), stands up well to model misspecification, differences in estimation method, changes in sample size, and data non-normality (Fan & Wang, 1998; Hu & Bentler, 1998). Its CIs also provide a better assessment of the overall fit of a model than a single point index (MacCallum et al., 1996). In accordance with Browne and Cudeck (1992, p. 239), Fabrigar et al. (1999, p. 280) MacCallum et al. (1996, p. 134) and Steiger (1990), the RMSEA – which is not normed per se, apart from the truncation of negative values – will be interpreted as follows: Values of zero indicate perfect fit between the model and the data, values below 0.05 would indicate good fit, values between 0.05 and 0.08 would indicate fair fit, values between 0.08 and 0.1 mediocre fit, and values above 0.1 would indicate poor fit.

Browne and Cudeck's (Browne & Cudeck, 1989; 1992; Cudeck & Browne, 1983) expected cross-validation index (ECVI) will also be reported. Expected cross-validation indices for the fitted model which are lower than those for the saturated model typically indicate good fit, and the smaller the ECVI, the better the fit of the model. The ECVI also takes model parsimony into account, and is relatively stable across different estimation methods (Hu & Bentler, 1998). The ECVI gives the same rank order to different models as do other parsimony-based fit indices such as the Akaike Information Criteria (Akaike, 1987) and the related Consistent Akaike Information Criteria (Bozdogan, 1987). However, the ECVI is favoured above these fit indices, as it can also provide CIs, allowing for a better comparison of

the nature of different models. For the ECVI and RMSEA, the CIs will be shown around the point estimate, the three values being separated by vertical bars.

Jöreskog and Sörbom's Standardised Root Mean Square Residual (SRMR) is the mean of the remaining residuals (the discrepancies between the reproduced covariance matrix and the sample covariance matrix after the model has been fit) divided by their standard errors (Jöreskog & Sörbom, 2001). Kline (1998, p. 131) recommended that the value of the SRMR be less than .10, while Hu and Bentler (1998) found the SRMR to be particularly adept at detecting model misspecification, and recommended its use as a fit index with a cut-off value of .08. The SRMR provides a summary of the fit of the individual parameters of the model in a standardised (i.e., scale-free) form – information that is vitally important to the assessment of a model's fit (Kline, 1998, p. 278), and which will thus be reported.

Jöreskog and Sörbom's (2001) Goodness of Fit Index (GFI) attempts to determine the degree to which the covariance matrix produced by the fitting function agrees with the sample covariance matrix. It has a normal range of 0 to 1, although negative values are possible, and a higher positive score indicates better fit. The GFI was found to be a fairly stable fit index, outperforming a number of other indices (Marsh, Balla & McDonald, 1988; Mulaik et al., 1989). Values greater than .9 are generally taken to indicate good model fit.

Bentler's (1990) Comparative Fit Index (CFI) functions as a measure of centrality. The scores of the CFI may vary between 0 and 1, and higher values indicate better fit. Hu and Bentler (1995, p. 91) and Fan and Wang (1998) found that the CFI fared well with a range of sample sizes under most conditions, although dependency amongst the latent variables did influence it at smaller sample sizes. The CFI has been found to function better than most other incremental indices, especially with non-normal data (West, Finch & Curran, 1995), and it will thus be selected as an incremental fit index.

5.2.5 Reporting

The stepwise results of the reliability analyses will be reported in a table that indicates, for each step, the item removed and the resulting reliability. Similarly, for the stepwise CEFA analyses, each step will show the item removed, the reasons (in terms of aberrant item loadings) for its removal, and the resultant fit index (RMSEA) of the model.

The fit indices for groups of similar models will be summarised in tabular form. Tables will be used to present the parameters (i.e., MV loadings on LVs and LV intercorrelations) of the final models resulting from the stepwise CEFA analyses, as well as for the standard CFA models, in keeping with their close factor analytic heritage. Model diagrams will be used to present the parameters of the more complex LVMs (Hoyle, 1995).

It was noted (5.2.1, p. 86) that model testing usually centres around the comparison of several competing models. This comparison may also be done against the background of various contextual models, which provide upper and lower limits of fit. The fit of two contextual models will be provided in this study prior to the analysis of the theoretical LVMs. The CFA model, being the most saturated, will provide the best possible fit with the data. This model, however, is of no theoretical value, as it does not reflect any possible causal relations between the variables. Its fit thus only serves as an upper limit of possible model fits. The poor fit of the uncorrelated factors model (UFM) will set a lower limit of baseline fit which all theoretical models should surpass substantially.

SEM is essentially a technique suited to the analysis of covariance structures, and not correlation structures (Bentler & Chou, 1987, p. 90; Cudeck, 1989; Xie, 1989, p. 330). Software programmes do exist which can compute proper estimation of structural models from correlation matrices (e.g., RAMONA (Browne & Mels, 1999) and SEPATH (Steiger, 1995)), but these programs are suitable only for the analysis of Pearson product-moment correlation matrices, and proper methods for the analysis of other correlation structures are still in development (Mels, 2000). When using LISREL, as in this study, it remains best to analyse the data covariance matrix, and not the correlation matrix. Although analysing correlation matrices delivers standardised results, most SEM programmes can generate standardised results after having analysed the covariance matrix, but without the liabilities of analysing the correlation matrix. Since the Likert scales used in this study have essentially arbitrary scales, all the results will be presented in standardised format (i.e., in terms of scales with means of zero and standard deviations of one).

Chapter 6
Results

Structural equation modelling is a method in which the measurement component and the nature of the relationships between latent constructs can be evaluated simultaneously, and with the inclusion of measurement error. Nevertheless, the proper investigation of the relationships between latent constructs depends on the appropriate and accurate measurement of those constructs. This study will thus first investigate the latter premise: Whether the latent constructs are measured properly by the scale items which are hypothesised to represent them. Once proper measurement models have been established for each of the latent constructs, the LVMs investigating the relationship between Christian faith, religious orientation and the love styles will be tested.

6.1 Data

All the data were gathered by means of self-report questionnaire batteries completed over a period of one year in the Bloemfontein area.

6.1.1 Questionnaire completion

A total of 2000 (500 English and 1500 Afrikaans) questionnaires were printed and distributed, of which 505 were returned. These were trimmed down according to several theoretical and practical considerations (cf. 6.1.2, p. 99), yielding a final sample of 369 respondents. The questionnaires were completed at three main source categories: From student hostels (n=210), from local Churches (n=145), and from Bible study groups (n=14) of friends. A complete exposition of the number of questionnaires distributed and returned from each specific source is given in Table 41 (Appendix C), for each source category and language group in the initial sample (N=505) in Table 42 (Appendix C), and for each source category and language group in the final sample (N=369) in Table 43 (Appendix C).

Student questionnaires were gathered by contacting the house committee member responsible for spiritual matters of each hostel on the campus of the University of the Free State, and requesting to have the questionnaires completed during a house committee meeting which all hostel members were required to attend. One hostel from the Free State Technikon was also involved in the study.

The pastor/minister/reverend (hereafter pastor) of 53 churches in the Bloemfontein area was also contacted, and the best strategy for obtaining information from that Church was discussed. In three instances, Bible study groups were contacted through friends of this researcher, instead of a pastor. Either the pastor or this researcher then contacted the Bible study or cell group leader (as indicated by the pastor) to arrange for the completion of the questionnaires. Questionnaires were then taken to the meeting by this researcher, the pastor, or an honours student acting as a research assistant. With some Churches, the members fitting the sample profile were contacted telephonically and invited to a gathering (typically, after a church service) where the questionnaires were completed.

The final response rate may be calculated at 32.6%.

6.1.2 Sample Characteristics

The sample profile required that respondents would be young (already finished with schooling, but also not more than a decade ago), unmarried (and never been married or engaged – to control for marriage as a nuisance variable), White (to control for cultural influences in both faith and love) South African Evangelical Christians (belonging to a mainstream Evangelical denomination), and either be studying, or entering the job market, in Bloemfontein. The exclusions carried out to trim the 505 questionnaires so that the sample met these criteria, are shown in Table 44 (Appendix C). In all, 116 respondents were excluded from the sample.

6.1.2.1 Demographic characteristics

The sample consisted of 87 (23.6%) males and 282 (76.4%) females. The gender distribution according to source category is shown in Figure 43 (Appendix D). Even though each category delivered more female than male respondents, this was especially marked for the student hostels. The most probable explanation for this phenomenon is that the female student hostel leaders were much more enthusiastic and thorough in their co-operation with this researcher than the male student hostel leaders (the almost equal gender distribution on campus could not account for the differences).

Although the respondents' age distribution (shown in Table 46 - Appendix D) spanned a decade, the sample still tended towards the younger side, with a modal age of 19, a median age of 20 and a mean age of 20.897. The age break-up for source category is shown in Figure 44 (Appendix D).

Most of the participants (342 / 92.7%) were Afrikaans-speaking. The various home languages of the respondents are shown in Table 47 and language by source category in Table 48 (both in Appendix D).

Just more than two thirds (66.4%) of the sample came from the Dutch Reformed (N.G.) denomination, the single largest denomination in South Africa (Johnstone, 1993, pp. 494, 497), which is especially

strong amongst white Afrikaans-speaking South African Christians. The remainder of the sample was comprised of other reformed Churches (15.5%), and various other Evangelical denominations. The various denominations represented in the sample are shown in Table 49 (Appendix D).

More than 85% of the participants attended church at least on a weekly basis. Only 53 of the 369 participants did not go to church at least once a week. Most of the participants (83%) spent a part of each day in prayer. Only 63 participants did not pray daily. In Appendix D, the precise distribution of church attendance is shown in Table 50, that of prayer behaviour in Table 51, and the combination of these two variables in Figure 45. In general, it was found that those respondents who prayed more, also attended church more often.

At the time of questionnaire completion, less than half (157 / 42.5%) of the respondents were involved in a romantic relationship, 173 (46.9%) were not, but had been previously, and 39 (10.6%) had never yet been involved in a romantic relationship. The relationship status of the respondents is shown in Table 52 (Appendix D). The mean relationship length for the romantically involved respondents was 18 months (although the mode was a very low 1, and the median 14). For the 175 respondents who provided an indication of when their last relationship had ended, the mean was 15 months (also with a mode of 1, but a median of 10) prior to completion of the questionnaire, and for the 169 respondents who indicated how long their previous relationship had lasted, the mean was 13 months (with a mode of 3 and a median of 5). The complete descriptive statistics for the various length-of-relationship variables is shown in Table 53 (Appendix D).

6.1.3 Data preparation

Data used in structural models must show no systematic patterns of data loss, data must show both univariate and multivariate normality (although methods do now exist to deal with non-normality), and the data must show no signs of multicollinearity.

6.1.3.1 Missing observations

After the sample had been reduced to 389 by removing respondents who did not fit in with the intended description of the sample (cf. Table 44 - Appendix C), the number of missing observations per variable was determined (Figure 18). No specific patterns could be distinguished in the missing data.

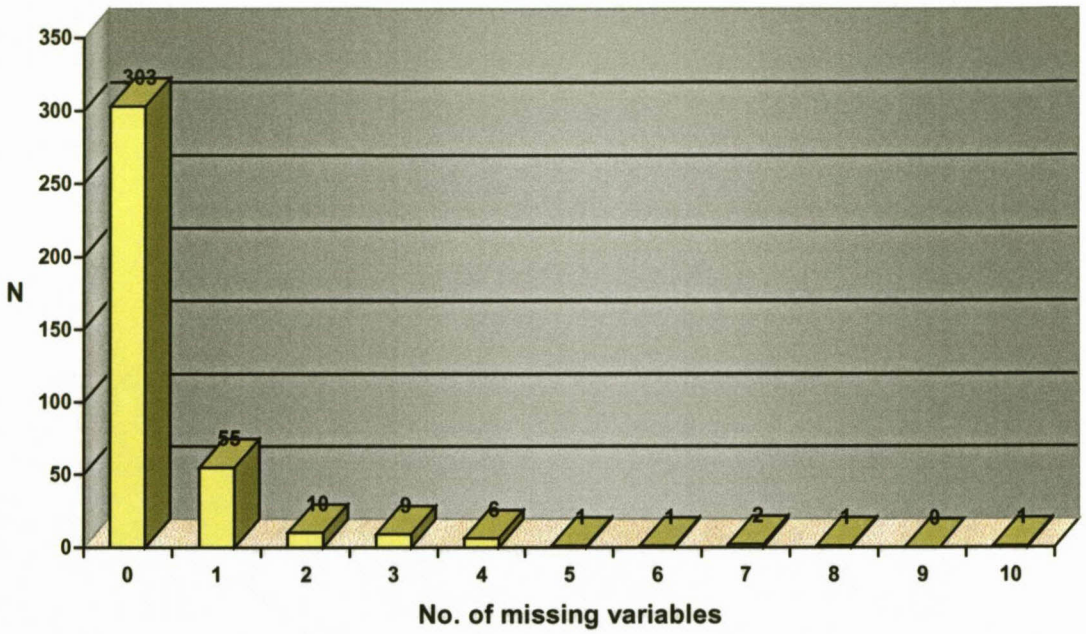


Figure 18 *No. of cases by no. of missing variables (N=389)*

The 169 missing observations were imputed by means of LISREL's Matching Imputation procedure (Jöreskog, 2001a; Jöreskog & Sörbom, 2001). For each scale, the items which had been completed by all the respondents were used as the matching variables, and the incomplete responses for the remaining items were imputed. Not all the imputations were successful – there were 22 unsuccessful imputations (11 items for 20 different respondents, with two respondents having two unimputed items each). Any respondents who still had incomplete responses after imputation, were dropped, leaving a final sample of 369. In all, 147 values (of 38900 – 389 respondents x 100 items), or 0.38% of the data points were imputed, which is, by all counts, small enough not to be problematic (Kline, 1998, pp. 74-77). The largest number of data points per item which were imputed was 23 (5.91% of the respondents), and this was for the single item RSS1, with RSS18 and Eros3 being next, with eight data points each. The largest number of items to be imputed for any single respondent was 10 (10.0% of the items), with the next being one respondent with eight imputed items. Altogether 303 respondents did not have any missing data. More detailed information about the imputations is presented in summarised form in Appendix E.

6.1.3.2 Normality

Although most structural methods do stand up quite well to non-normality (Babakus, Ferguson & Jöreskog, 1987; Curran, West & Finch, 1996; Hoogland & Boomsma, 1998), the univariate normality of the data and the skewness and kurtosis of item distributions were checked (DeCarlo, 1997; Mardia, 1970). As seen in Table 3, A small number of variables showed signs of univariate non-normality – kurtosis values above 10, and skewness values outside of |3.0|, according to Kline (1998, p. 82).

Table 3 *Items With Signs of Univariate Non-Normality*

Item	Skew	Kurtosis	Item Wording
RSS4	-3.555	12.279	I believe that it is possible to have a personal relationship with God through Christ.
RSS6	-3.499	10.728	God did not raise Jesus from the dead.
RSS9	-3.238	11.014	My confidence in God allows me to believe that He can perform miracles.
RSS13	-4.194	18.011	I believe that everyone's life has been twisted by sin, and that Jesus Christ is the only one who can save them from this.
RSS23	-4.596	22.912	I find it important that Christians show love and respect to one another.
RSS34	-3.006	*8.945*	My accomplishments are the result of my own hard work, and not the presence of God in my life.
RSS35	-3.949	15.189	It is not necessary to admit my faults to God.
Agape1	-3.573	15.670	I try to always help my loved one through difficult times.

Although several different transformations were attempted in order to normalise their distributions, none succeeded. This was probably due to the extreme L-shaped distributions these items had, and the limited number of categories used in the Likert scales. Since these items were substantively meaningful, and the nature of the items could be expected to deliver L-shaped distributions with the sample in question (Evangelical Christians), and since these items would be balanced out in their respective scales – an examination of Table 54 (Appendix F) will confirm that none of the scales or subscales have excessive skew or kurtosis – they were retained in the analyses.

Although LISREL does not compute the multivariate normality of non-continuous variables (Jöreskog & Sörbom, 2001), it does provide estimates of the bivariate normality of the data (Jöreskog, 2001b). It was found that only one item, RSS31, did not satisfy the requirements of bivariate normality. Although Jöreskog (2001b, p. 16) recommends removing such items from the analysis, it was decided to retain the item initially and test the RSS as is. Should the RSS not deliver satisfactory fit, the scale could be trimmed, during which time the problematic item would in all likelihood be removed.

Lastly, an examination of the intercorrelations between the individual items showed that the highest correlation was .573, which, although it does not, in itself, provide sufficient evidence that there is no multicollinearity, is in an indication that there should be no redundant items per se (Kline, 1998, pp. 77-79). Also, none of the items had excessive squared multiple correlations, again suggesting an absence of multicollinearity.

The distribution of the scores for the various scales is shown in Appendix F.

6.2 Measurement models

The examination and maximisation of the reliability of the various scales will be presented together, after which the examination and maximisation of their convergent and discriminant validity will be examined for each scale in turn. After that, the testing of the various hypothesised CFA models will be presented for each scale in turn.

6.2.1 Reliability

Table 4 *Increase in Reliability of Scales and Subscales*

Step	Reliability	RSS	ROS		LAS					
			Intrinsic	Extrinsic	Eros	Ludus	Storge	Pragma	Mania	Agape
0	Initial α	.8671	.6652	.7477	**.6769**	**.6961**	.6081	**.7230**	**.6642**	.7720
1	Item removed	*RSS31*	*Intrinsic6*	*Extrinsic1*			*Storge1*			*Agape1*
	Adjusted α	.8651	.7352	**.7586**			.6663			**.7862**
2	Item removed	*RSS19*	*Intrinsic4*				*Storge2*			
	Adjusted α	.8689	**.7410**				.6689			
3	Item removed	*RSS18*					*Storge3*			
	Adjusted α	.8713					.6911			
4	Item removed	*RSS10*					*Storge6*			
	Adjusted α	.8733					**.7071**			
5	Item removed	*RSS1*								
	Adjusted α	.8753								
6	Item removed	*RSS15*								
	Adjusted α	.8756								
7	Item removed	*RSS22*								
	Adjusted α	.8759								
8	Item removed	*RSS7*								
	Adjusted α	.8763								
9	Item removed	*RSS5*								
	Adjusted α	.8774								
10	Item removed	*RSS4*								
	Adjusted α	**.8775**								

The items which were removed in order to increase scale reliability for the RSS, ROS and LAS are shown in Table 4. While this procedure attempted to maximise the reliability of all the (sub)scales used in this study, not all the final reliabilities had reached the hoped-for target of .70. Specifically, three of the LAS subscales (Eros, Ludus and Mania) had lower reliabilities than this. However, they, together with Pragma, showed no expected increase in reliability for the removal of any of their items, and were thus left unaltered. Very few ROS items (two Intrinsic items and one Extrinsic item) were removed before the reliabilities of the two subscales peaked. However, ten RSS items had to be removed before it

reached its highest level. It is also noteworthy that the item which did not satisfy the requirements for bivariate normality (RSS31) was the first item removed in improving the RSS's reliability.

The scales used in all the subsequent analyses were the original scales less the items mentioned in Table 4, and the final reliability of each scale can be seen as the lowermost reliability score in the table (shown in bold type). It should also be noted that the reliabilities reported in the literature for the LAS (3.2.4.1, p. 56), the ROS (2.3.2.4.1, p. 32), and the SS (2.3.1.1.1, p. 24) do not differ substantially from those found in this study.

6.2.2 Validity

After the reliability of the (sub)scales had been determined, their convergent and discriminant validity was investigated by means of a CEFA analysis (Browne, 2001, pp. 113, 130-131; Tateneni, Mels, Cudeck & Browne, 2001).

6.2.2.1 CEFA of the Love Attitudes Scale

The most reliable items of the LAS (as determined in 6.2.1) were then submitted to a process of repeated CEFAs. After each analysis, the items which did not meet the criteria specified on p. 88 were identified. The single item which fared worst was then removed and the analysis repeated. The process was continued until all items shown in Table 5 were removed. In the twelfth step, the item Ludus5 would have been removed because of a loading of .252 on the Mania factor. However, this led to a drop in reliability of the Ludus subscale from .6252 to .5498. This was attributable chiefly to the unreliability of the item Ludus4 (dropping it increased the alpha of the remaining items (Ludus3 and Ludus7) to .6847, whereas the reliability coefficient for Ludus3, Ludus5 and Ludus7 was .6677). Furthermore, examining the correlation matrix of the Ludus items showed that the three items Ludus3, Ludus5 and Ludus7 had the highest intercorrelations. Furthermore, the loading of Ludus4 on the Ludus factor in this step was only .40, it had a higher standard error than Ludus5 (.061 > .058) and slightly wider CIs. Lastly, removing Ludus5 caused the loading of Ludus4 on the Ludus factor to drop to .39, at which stage it could not be removed without reducing the number of items loading on the factor to two, which is less than the permitted minimum of three items per factor set in this study. It was thus decided to drop Ludus4 from the analysis rather than Ludus5. Only one further item (Agape6) was removed before all the items loaded properly and only on their intended factors.

The final rotated matrix is shown in Table 6. It is also unfortunate that, as expected, the removal of additional items further decreased the reliability of the subscales. The Mania subscale was most affected by this, with its reliability dropping by more than .05. Nevertheless, these reliabilities do not lie too far below the values reported in the literature. The discriminant validity of the LAS also seems to be

reasonably adequate, as evidenced by the low inter-scale correlations for the trimmed version (Table 6). Of the 15 intercorrelations, only five are ≥|20|, and only two ≥|30|, with the highest intercorrelation being that of Agape and Eros (.31).

Table 5 *Stepwise CEFA of the LAS*

Step	Item	Aberrant loading(s) [a]	RMSEA after removal
LAS with 37 items (unreliable items removed)			.040 | **.045** | .051
1	Ludus6	Ludus = .176	.039 | **.044** | .050
2	Eros1	Eros = .305, Mania = .275	.040 | **.046** | .051
3	Ludus1	Ludus = .221	.040 | **.046** | .052
4	Eros5	Eros = .326	.041 | **.047** | .053
5	Mania3	Mania = .350	.040 | **.046** | .052
6	Mania1	Mania = .363	.040 | **.046** | .053
7	Eros3	Eros = .371	.031 | **.039** | .046
8	Ludus2	Ludus = .371	.029 | **.037** | .045
9	Eros2	Eros = .376	.028 | **.037** | .045
10	Mania5	Mania = .380	.028 | **.037** | .045
11	Mania2	Mania = .376	.025 | **.035** | .043
12	Ludus4	Ludus = .40	.022 | **.033** | .043
13	Agape6	Agape = .39	.021 | **.033** | .043

a: Only the point estimate of the loading is given

The final set of 24 items thus chosen for the LAS are: Eros: 4, 6, 7; Ludus: 3, 5, 7; Storge: 4, 5, 7; Pragma: 1-7; Mania: 4, 6, 7; Agape: 2-5, 7.

The results of available principal components analyses in the literature which used all the LAS items were compared with the 24 items selected here (Butler et al., 1995; Cho & Cross, 1995; Davis & Latty-Mann, 1987; Hendrick & Hendrick, 1986; 1989; 1990; Neto, 1993; 1994). Of eight analyses (Neto's two articles appear to have been on the same data set, and Butler et al.'s study used two data sets), 19 items always loaded on the correct factor, 15 items showed an errant loading in one study, three items had errant loadings in two studies, there were two items each which had errant loadings in three and four studies, and one item (Storge1) had errant loadings in five studies. By comparison, 13 of the 24 items selected in the CEFA process here loaded on the same factor in all of the analyses from the literature, and the remaining eleven each only loaded differently in one of the various analyses from the literature. Thus the CEFA process succeeded in retaining only those items which also had a history of not being problematic.

Furthermore, the Hendricks (Hendrick et al., 1998) developed two shorter versions of the LAS, one with 24 items and one with 18 items. The agreement between the selection made here and that of the Hendricks is indicated in Table 6. Of the 18 items in the Hendricks' shortest version, only two (Eros2 and Ludus2) were not included in the selection made by this researcher. Of the 6 items added to the 18 to

make the Hendricks' 24-item version, a further two (Storge6 and Mania5) were not selected by this researcher (i.e., four of the 24 items do not correspond).

The selection made here thus shows good agreement with the literature, and it was thus decided to continue with the trimmed version of the LAS developed in this study.

Table 6 *Rotated CEFA Factor Matrix of the Trimmed LAS*

Item	Factor Loadings					
	Eros	Ludus	Storge	Pragma	Mania	Agape
α	.6624	.6677	.7071	.7230	.6123	.7611
Eros4 [a b]	.78	-.05	.03	-.02	.07	.01
Eros6 [a]	.72	.00	.00	-.02	-.12	.00
Eros7 [a b]	.41	-.03	-.13	.16	.02	.10
Ludus3 [a b]	-.05	.84	-.01	.00	-.04	.01
Ludus5 [a b]	.03	.49	.07	.03	.26	.01
Ludus7 [a]	.00	.61	-.07	.01	.03	-.04
Storge4 [a b]	-.08	-.05	.66	.02	.02	-.06
Storge5 [a b]	.20	.09	.62	.00	-.03	.02
Storge7 [a b]	-.04	-.05	.73	.04	.00	.07
Pragma1	-.05	.16	.00	.44	.01	-.11
Pragma2	-.01	.07	.12	.49	-.01	-.08
Pragma3	.02	-.07	-.05	.49	-.10	-.04
Pragma4 [a b]	-.02	-.04	.01	.68	-.02	.04
Pragma5 [a b]	.08	-.06	.07	.46	.08	.05
Pragma6 [a b]	-.05	.00	.03	.57	.04	.02
Pragma7 [a]	.05	.13	-.03	.46	.09	-.07
Mania4 [a b]	.03	-.06	-.12	.13	.46	.11
Mania6 [a b]	-.05	-.04	.01	.01	.74	-.01
Mania7 [a b]	.04	.16	.00	-.05	.56	-.04
Agape2 [a b]	.09	-.19	.00	-.03	.09	.41
Agape3 [a b]	.06	-.03	-.02	.01	.01	.67
Agape4 [a b]	-.09	-.01	.02	.01	-.04	.80
Agape5	.10	.10	-.03	-.01	.01	.60
Agape7 [a]	.05	.00	.09	-.07	.04	.53
Factor	**Factor correlations**					
Ludus	-.20					
Storge	.17	-.07				
Pragma	-.10	.13	.27			
Mania	-.03	.23	-.01	.15		
Agape	.31	-.30	.19	-.09	.05	

a: Selected by Hendrick et al. (1998) for their 24 item LAS scale.

b: Selected by Hendrick et al. (1998) for their 18 item LAS scale.

6.2.2.2 CEFA of the Religious Orientation Scale

Three items had been removed from the ROS in the attempt to increase the reliability of its subscales. The remaining 17 items were examined with a CEFA, and again the items which least fit the criteria specified on p. 88 were removed (step-by-step) until the items shown in Table 7 had been removed from the ROS, with all other items meeting the criteria for convergent and discriminant validity, as shown in Table 8. The inter-scale correlation between the two factors is -.39, which is higher than those obtained for the LAS, and which is also in line with the nature and relationship of the ROS constructs. These more reliable and valid items (Intrinsic: 1-3, 5, 7-9; Extrinsic: 4, 6-11) may be used to test the various postulates concerning the ROS.

Table 7 *Stepwise CEFA of the ROS*

Step	Item	Aberrant loading [a]	RMSEA after removal
ROS with 17 items (unreliable items removed)			.065 | **.075** | .084
1	Extrinsic5	Intrinsic = -.280, Extrinsic = .345	.065 | **.075** | .085
2	Extrinsic3	Intrinsic = .314	.052 | **.064** | .075
3	Extrinsic2	Extrinsic = .367	.053 | **.066** | .078

a: Only the point estimate of the loading is given

Table 8 *Rotated CEFA Factor Matrix of the Trimmed ROS*

Item	Factor loadings	
	Intrinsic	Extrinsic
α	.7410	.7540
Intrinsic1	**.61**	.02
Intrinsic2	**.57**	-.04
Intrinsic3	**.70**	-.01
Intrinsic5	**.47**	-.18
Intrinsic7	**.40**	-.09
Intrinsic8	**.51**	.07
Intrinsic9	**.52**	.05
Extrinsic4	-.08	**.55**
Extrinsic6	.11	**.52**
Extrinsic7	-.15	**.48**
Extrinsic8	-.07	**.62**
Extrinsic9	.04	**.74**
Extrinsic10	-.16	**.51**
Extrinsic11	.19	**.49**

6.2.2.3 CEFA of the Revised Shepherd Scale

The first priority in analysing the RSS was to determine the ideal number of factors to extract, as the available literature on the scale was sparse. Bassett et al. (1981) had only made a conceptual division of the items, something which would not necessarily stand up to the rigours of testing. Pecnik and Epperson (1985) had found a two-factor solution best, but Raubenheimer (1997) had found one factor to better represent the nature of the scale.

The 28 items derived from the reliability analyses were first subjected to a common factor analysis. Although the Kaiser-Guttman number-of-eigenvalues ≥1 criterion indicated a seven-factor solution, a scree plot suggested at the most two factors. Subsequently, repeated CEFAs were computed with one to seven factors specified. For the rotated solutions (i.e., for two to seven factors), the rotated matrix always included one or more trivial factors (factors with no more than one salient item loading) for all but the two-factor solution. This confirmed the known fact that the eigenvalue ≥1 criterion tends to overestimate the number of factors (Cattell, 1978, p. 62; Gorsuch, 1983, p. 162; Velicer & Fava, 1998, p. 248; Wood, Tataryn & Gorsuch, 1996). Next, the one- and two-factor CEFAs were compared with each other. The chi-square values for the two models were compared – the one-factor model had a chi-square of 979.449 with 350 *df*, and the two-factor model 691.819 with 323 *df*. The chi-square difference of 287.63 with 27 *df* was significant, and thus favoured the two-factor model.

A two-factor CEFA was thus conducted on the RSS, and the most problematic items removed, resulting in the removal of the items shown in Table 9. In all, 22 of the RSS items were removed in the reliability and CEFAs together. This suggests that the conceptual division of Bassett et al. (1981) was not psychometrically justified by the data used in this study.

Table 9 *Stepwise CEFA of the Trimmed RSS*

Step	Item	Aberrant loading [a]	RMSEA after removal
RSS with 28 items (unreliable items removed)			.050 | **.056** | .061
1	RSS21	1st factor = .265, 2nd factor = .238	.050 | **.056** | .062
2	RSS37	1st factor = .287, 2nd factor = .251	.050 | **.056** | .062
3	RSS17	1st factor = .282, 2nd factor = .233	.049 | **.055** | .062
4	RSS8	1st factor = .255, 2nd factor = .194	.044 | **.051** | .058
5	RSS25	1st factor = .304, 2nd factor = .191	.042 | **.049** | .057
6	RSS27	1st factor = .294, 2nd factor = .336	.042 | **.050** | .058
7	RSS3	1st factor = .330, 2nd factor = .199	.043 | **.051** | .059
8	RSS11	1st factor = .341, 2nd factor = .204	.040 | **.049** | .058
9	RSS12	1st factor = .337, 2nd factor = .148	.040 | **.050** | .059
10	RSS24	1st factor = .340, 2nd factor = .045	.038 | **.048** | .058
11	RSS2	1st factor = .375, 2nd factor = .079	.037 | **.048** | .059
12	RSS29	1st factor = .255, 2nd factor = .396	.038 | **.050** | .061

a: Only the point estimate of the loading is given

The 16 remaining items of the RSS are shown in Table 10. 12 items load on the first factor, and four on the second. The two factors defined here have an inter-scale correlation of only .23, which is quite low. It is interesting to note the slight resemblance between the factor matrices obtained in this study and that obtained by Pecnik and Epperson (1985). Since these two factors no longer resemble the theoretical division of the items made by Bassett et al. (1981) or the psychometric division of Pecnik and Epperson (1985), it was decided to re-examine the items and rename the factors, as is shown in Appendix B. To avoid confusion, the original numbering of the RSS items will be retained throughout this study, with items 26, 28, 30 and 32 loading on the "Relational aspects of faith" factor, and items 6, 9, 13, 14, 16, 20, 23, 33-36 and 38 loading on the "Doctrinal beliefs and applications" factor. These newly-defined factors will be used in subsequent testing and applications of the RSS is thus study.

Table 10 *Rotated CEFA Factor Matrix of the RSS*

Item	Factor loadings	
	Doctrine	Relationship
α	.8212	.6655
RSS6	**.63**	-.13
RSS9	**.49**	.08
RSS13	**.47**	.03
RSS14	**.56**	.18
RSS16	**.48**	.04
RSS20	**.42**	.16
RSS23	**.55**	.00
RSS26	.13	**.50**
RSS28	.18	**.51**
RSS30	-.08	**.77**
RSS32	.04	**.46**
RSS33	**.64**	-.04
RSS34	**.71**	-.09
RSS35	**.67**	-.04
RSS36	**.42**	.20
RSS38	**.59**	.12

6.2.3 Testing the Measurement Models with CFA

The measurement models proposed in the various postulates were next tested on the trimmed versions of the various scales.

6.2.3.1 Love Attitudes Scale

The basic measurement models for the LAS (which examined the nature of the relationship between the MVs and their respective LVs) as well as the more complex models (which examined the nature of the interrelationships between the LVs) were examined using the trimmed LAS.

6.2.3.1.1 Identification of the Love Attitudes Scale Models

From Table 11 it is clear that the models proposed by postulates 1, 2 and 3 for the trimmed LAS are over-identified.

Table 11 ***Identification Status of the Standard CFA Models of the Trimmed LAS***

Model	Model Characteristics				
	MVs	LVs	Indicators/LV	Parameters	Observations
Postulate 1 [a]	24	6	Eros, Ludus, Storge, Mania - 3:1 Agape – 5:1 Pragma – 7:1	48	300
Postulate 2	24	6	Eros, Ludus, Storge, Mania – 3:1 Agape – 5:1 Pragma – 7:1	63	300
Postulate 3	24	5	Eros, Ludus, Storge – 3:1 Pragma – 7:1 Mania/Agape – 8:1	58	300

a: Postulate 1 is not a Standard CFA model as the LVs do not intercorrelate. This also explains the reduced number of estimable parameters.

The identification status of the higher-order models is summarised in Table 12. For all the models, there are more knowns than estimable parameters. On the first-order level, each factor has three or more indicators, and should thus be identified. On the second-order level, there are also two or more indicators per second-order LV. Since there are more than one LVs in all of the models, two indicators per second-order LV should be sufficient. Postulate 5 has a third-order level. Since there is only one third-order factor, it requires three indicators to be identified, which it has. All the models should thus be theoretically over-identified.

Postulate 7 proposes a model which can better be seen as a LVM rather than a CFA model. The identification status of the model thus needs to be evaluated against the requirements for LVMs (5.2.3.3). The over-identification of the model set forth in postulate 7 can be confirmed as follows: Should it be recast as a CFA model, the result will be the same as the model proposed by postulate 2, which is over-identified. Thus the measurement component of the model is over-identified. Furthermore, since the structural component of the model is fully recursive, the structural model, and thus also the model as a whole, is over-identified.

Table 12 *Identification Status of the Higher-Order Models of the Trimmed LAS*

Model Characteristics	Model		
	Postulate 4	Postulate 5	Postulate 6
Parameters	63	66	60
Observations	300	300	300
MVs	25	25	25
1st Order LVs	6	6	6
MV : LV	Eros, Ludus, Storge, Mania - 3:1 Agape – 5:1 Pragma – 7:1	Eros, Ludus, Storge, Mania - 3:1 Agape – 5:1 Pragma – 7:1	Eros, Ludus, Storge, Mania - 3:1 Agape – 5:1 Pragma – 7:1
2nd Order LVs	3	3	1
1st Order LVs : 2nd Order LVs	All – 2:1	All – 2:1	6:1
3rd Order LVs		1	
2nd Order LVs : 3rd Order LVs		3:1	

6.2.3.1.2 Testing of the Love Attitudes Scale Models

Since the trimmed version of the LAS has only 24 items, it can be estimated with the RML estimator. The fit of the standard CFA models (postulates 1 - 3) are shown in Table 13. Postulate 2 is supported best by the data.

When the loadings of postulates 2 and 3 are compared (Table 13), it is clear that the notion that the Mania and Agape items all load on a single factor is not tenable for the trimmed LAS (a CFA on the full scale showed that this postulate was also invalid there). For postulate 2, the Mania and Agape items loaded well on their respective factors. However, for postulate 3, none of the Mania items loaded well on the factor (in fact, the highest absolute loading was only .11), while all the Agape items did. Clearly, two factors underlie these items. Furthermore, the fit indices (Table 13) for postulate 2 were significantly better than those for postulate 3. For example, the RMSEA's upper CI for postulate 2 was equal to the lower RMSEA CI of postulate 3, the SRMR was much lower for postulate 2 (.057) than for postulate 3 (.073), and the other fit indices were also higher for postulate 2 than for postulate 3.

The fit indices for postulate 1 were also markedly worse than for either postulates 2 or 3, showing clearly that the assumption that the love styles are uncorrelated is not borne out by the data. The intercorrelations between the various LAS factors for postulates 2 and 3 are shown in Table 15. The smaller number of items has led to the intercorrelations (to the second decimal) being practically the same for both solutions. In other words, adding the three Mania items did not really change the correlations between Agape and any of the other factors. If one compares these intercorrelations with those obtained for the CEFA analysis of the trimmed version of the scale (Table 6, p. 106), it can be seen that these

intercorrelations are generally somewhat higher than those obtained in the CEFA analysis. It is also interesting to note the differences between the RMSEA value computed for the CEFA model and the CFA model here. The differences are caused by the additional unrestricted parameters in the CEFA model, where all the MVs load on all the LVs. Nevertheless, even as the RMSEA in the CEFA model improved from .044 (computed after the removal of the unreliable items) to .033 (computed after the removal of the items not loading properly on their factors), so also the full model of all 42 items (not shown) had an RMSEA of .058, which increased quite drastically to .038 for the trimmed version of the scale.

Table 13 *RML Fit Measures for the Proposed CFA Models of the Trimmed LAS*

Postulate	*df*	χ^2	S-B χ^2	ECVI [a]	RMSEA	SRMR	GFI	CFI
1	252	547.72*	507.00*	1.47 | **1.64** | 1.82	.046 | **.052** | .059	.097	.89	.83
2	237	404.35*	362.59*	1.20 | **1.33** | 1.48	.030 | **.038** | .046	.057	.92	.91
3	242	551.88*	517.20*	1.55 | **1.72** | 1.91	.049 | **.056** | .062	.073	.88	.83

a: ECVI for the saturated model: 1.63

ECVI for the independence model: 5.74

* $P = 0.00$

Although the initial three CFA analyses have confirmed that the LAS taps six distinct constructs, and that these constructs should not be seen as being uncorrelated, questions still remain as to the exact nature of the relationships between the six constructs. Are they all components of something else, an overriding second-order factor, or are they related to each other in more complex ways, such as that originally conceived of by Lee (1973)? Testing the remaining LAS models will shed light on this.

The models proposed by postulates 6 and 7 were estimated without any problems, but the models proposed by postulates 4 and 5 would not converge properly. Since it was thought that the latter result might have been as a result of LISREL's manner of scaling endogenous variables, the scaling of the models was altered. The first-order factors were scaled by setting the loading of the first MV on each first-order factor to 1. The second-order variables were scaled by setting the loadings of the first-order factors on each second-order factor equal (thus reducing the number of parameters to be estimated in the structural portion of the model), and by setting the error variances of the first-order factors Eros, Storge and Mania (one for each of the three second-order factors) to 0. For the model proposed by postulate 5 the third-order factor was also scaled by setting the error variance of the first second-order factor to 0. These steps, however, did still not lead to convergent solutions in either of the models. It was next surmised that the strong negative correlations between Ludus and both Agape and Eros were leading to estimation problems, and to counter this the Ludus items were rescaled. This provided a proper convergent estimation of the model proposed by postulate 4. The model proposed by postulate 5 failed the admissibility check which LISREL computes after 50 iterations. However, the complexity of the

model was felt to be sufficient grounds to turn the admissibility check off. After 450 iterations, the programme could still not come to a properly convergent solution. This postulate was thus not tested successfully in this study.

Table 14 *RML Item Loadings for standard CFA models of the Trimmed LAS*

	Eros			Ludus			Storge			Pragma			Mania		Agape		
Postulate	1	2	3	1	2	3	1	2	3	1	2	3	1	2	1	2	3
Eros4	.75	.79	.79														
Eros6	.76	.73	.72														
Eros7	.42	.41	.41														
Ludus3				.86	.82	.86											
Ludus5				.54	.56	.53											
Ludus7				.61	.64	.62											
Storge4							.64	.62	.62								
Storge5							.62	.63	.63								
Storge7							.76	.77	.77								
Pragma1										.48	.50	.50					
Pragma2										.54	.56	.56					
Pragma3										.44	.42	.43					
Pragma4										.66	.64	.65					
Pragma5										.45	.44	.44					
Pragma6										.58	.58	.58					
Pragma7										.50	.51	.51					
Mania4													.46	.46			.11
Mania6													.69	.65			.01
Mania7													.61	.65			-.06
Agape2															.51	.54	.54
Agape3															.70	.70	.71
Agape4															.76	.74	.74
Agape5															.59	.59	.58
Agape7															.58	.59	.59

Note: Mania and Agape item loadings shown on Agape factor for postulate 3, where they load on the same factor.

Table 15 *LV Intercorrelations for Standard CFA Models of the Trimmed LAS*

	Eros		Ludus		Storge		Pragma		Mania
Postulate	2	3	2	3	2	3	2	3	2
Ludus	-.28	-.28							
Storge	.21	.21	-.11	-.11					
Pragma	-.12	-.12	.21	.20	.27	.27			
Mania	-.07		.34		-.04		.19		
Agape	.38	.38	-.34	-.33	.24	.24	-.15	-.15	.03

Note: Mania correlations not shown for postulate 3, Agape correlations for postulate 3 show factor underlying all Agape and Mania items.

: Variables presumed to be uncorrelated for postulate 1.

The fit indices for the various models are shown in Table 16 (the fit of the model proposed by postulate 2 is shown for reference). Since the testing of these models is not easily represented in conventional factor analysis tables, the item loadings and relationships between factors will be shown diagrammatically

(Figure 19 – Figure 22). When examining these models, it should be borne in mind that the Ludus items were rescaled for postulate 4 (Figure 20).

Table 16 *RML Fit Measures for the Proposed Higher-order Models of the Trimmed LAS*

Postulate	*df*	χ^2	S-B χ^2	ECVI [a]	RMSEA	SRMR	GFI	CFI
2	237	404.35*	362.59*	1.20 | **1.33** | 1.48	.030 | **.038** | .046	.057	.92	.91
4	249	652.38*	588.36*	1.69 | **1.88** | 2.08	.055 | **.061** | .067	.104	.87	.77
6	246	456.77*	409.07*	1.26 | **1.41** | 1.57	.035 | **.042** | .050	.072	.91	.88
7	243	442.41*	408.44*	1.28 | **1.42** | 1.58	.036 | **.043** | .050	.068	.91	.89

a: ECVI for the saturated model: 1.63

ECVI for the independence model: 5.74

* $P = 0.00$

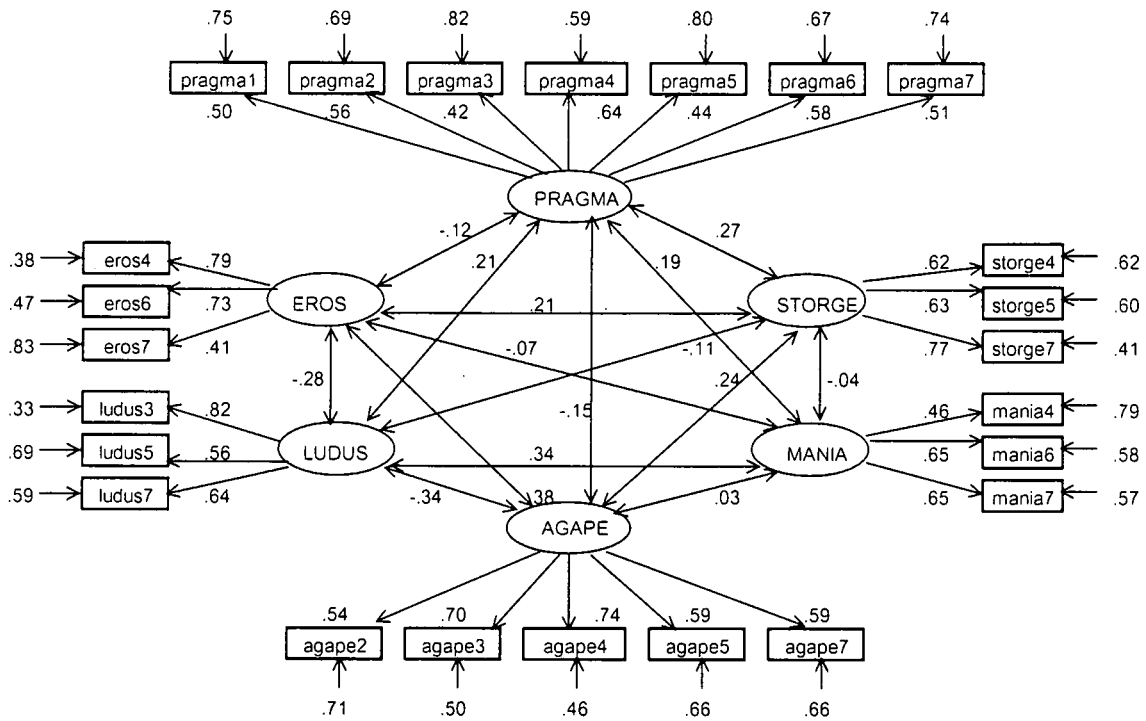


Figure 19 *Standardised solution for postulate 2 of the LAS*

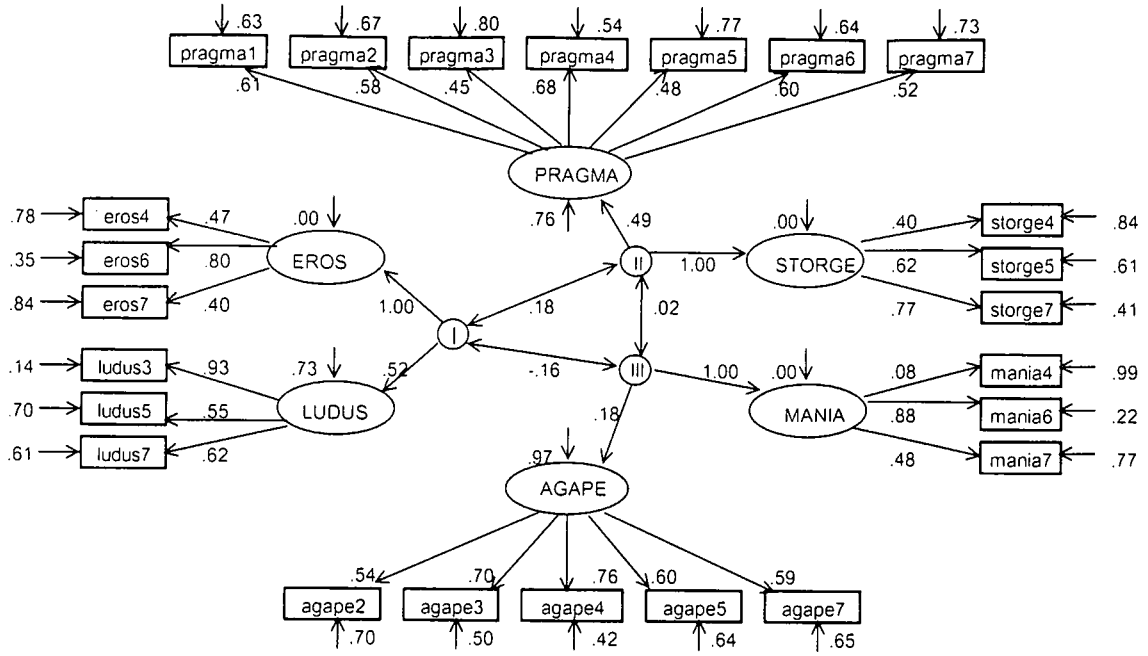


Figure 20 *Standardised solution for postulate 4 of the LAS*

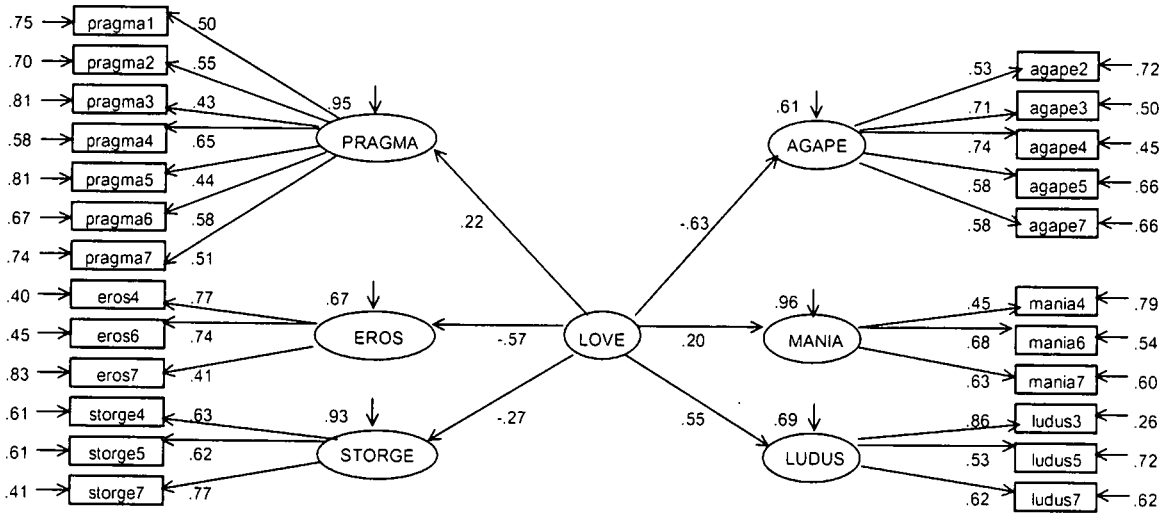


Figure 21 *Standardised solution for postulate 6 of the LAS*

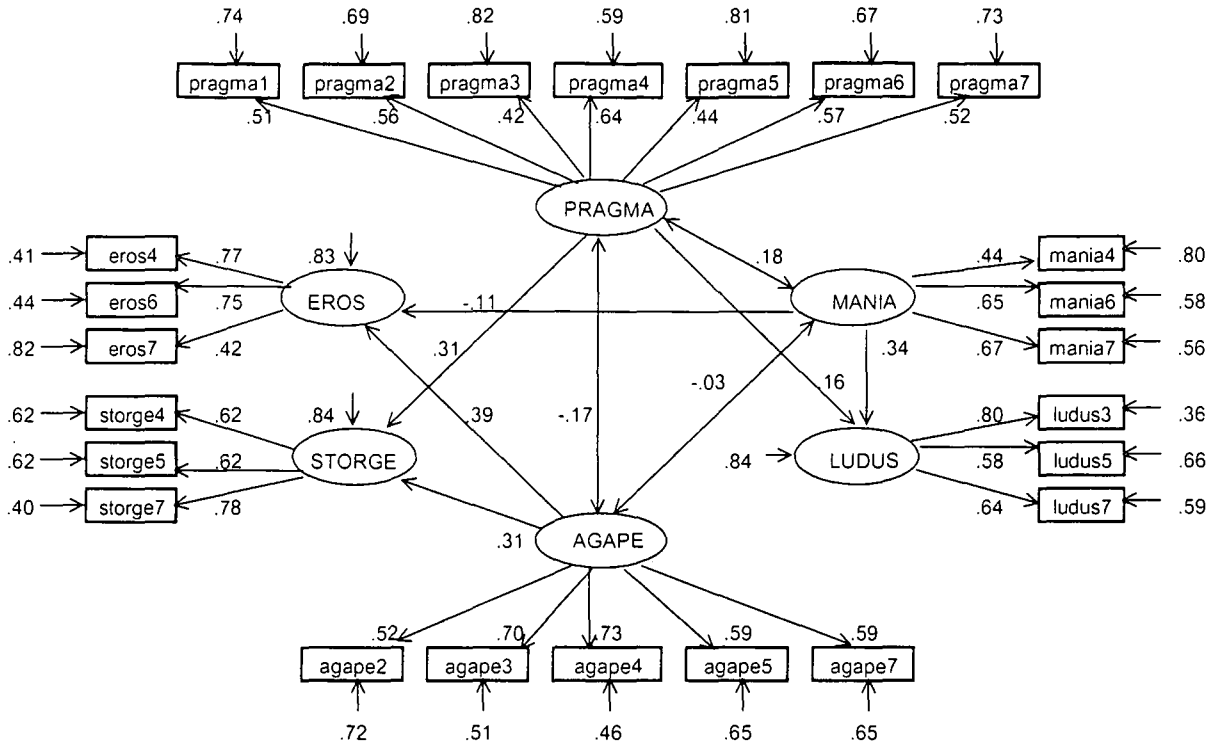


Figure 22 ***Standardised solution for postulate 7 of the LAS***

It is evident that the model proposed by postulate 4 (in which the Ludus items were rescaled) fit the data considerably worse than the standard CFA model, where the factors were merely allowed to correlate freely. The item loadings of the various MVs were mostly as expected (i.e., similar to that of the standard CFA model proposed in postulate 2), with the notable exception of the Mania items. The loading of Mania4 on Mania dropped from .46 to .08, and that of Mania7 from .65 to .48. In contrast, the loading of Mania6 shot up from .65 to .88. Furthermore, in postulate 4 the unconstrained second-order loadings were reasonably strong for Pragma (.49) and Ludus (.52), but weak for Agape (.18). Also, the intercorrelations between the three second-order factors were quite low ($<|.19|$), showing that the three factors were relatively distinct. In view of these findings, this model may be discounted as a viable explanation for the structure underlying the LAS.

The models proposed by postulates 6 and 7 fit the data quite well. Also, despite postulate 7's marginally higher CFI and slightly lower chi-square values, the values and CIs of its ECVI and RMSEA were slightly higher than for postulate 6. Nevertheless, the ideas represented by the two models are very different, even while each of them does not differ that much from the model proposed by postulate 2. For postulate 7, some correlations in postulate 2 have been restricted to zero, and others have been changed to causal paths. Although this model had reasonably good fit indices, the proposed loadings of some of the endogenous variables on their posited exogenous variables were quite low. The significance of these parameter estimates is indicated by LISREL with a *t*-value. Given the current sample size, a value of $t \geq 2.59$ would be significant on the 1% level. Two of the six second-order loadings (Eros on Mania and

Ludus on Pragma) were not significant. Thus a shadow of doubt has been cast over the nature of two of the three second-order factors. Also, two of the intercorrelations between the three second-order factors were not significant, with only Pragma/Agape being significant ($t = -2.59$).

The model proposed by postulate 6 is even more similar to postulate 2 – the only real difference is that the intercorrelations between the factors were replaced by correlations with a single second-order factor which is common to all the first-order factors. A number of the second-order loadings were quite strong, especially those of Agape (-.63), Eros (-.57) and Ludus (.55). This only partially confirms Thompson and Borrello's (1992b) finding that the Agape and Mania items accounted for the strongest loading on a second-order factor – in this instance the Mania loading was very weak (.20). The *t*-values associated with the loadings of the first-order factors on the second-order factor were not significant for both Pragma and Mania.

However, the fit for the standard CFA models still betters considerably that of any of the alternative models. In the end, then, it may be better to view the six loves styles (at least as measured by the trimmed version of the LAS) as being six different, but correlated, factors.

6.2.3.2 Religious Orientation Scale

The three postulates proposed for the ROS may be tested with the trimmed version of the scale.

6.2.3.2.1 Identification of the Religious Orientation Scale Models

It can be seen from Table 17 that the two models which reflect postulates 8 and 9 are theoretically over-identified.

Table 17 Identification Status of the Standard CFA Models of the Trimmed ROS

Model	Model Characteristics				
	MVs	LVs	Indicators/LV	Parameters	Observations
Postulate 8	14	2	Intrinsic, Extrinsic – 7:1	29	105
Postulate 9	14	1	Religious Orientation – 14:1	28	105

The higher-order model proposed by Postulate 10 has 32 estimable parameters (14 item loadings of the MVs on the first-order factors, 14 MV residuals, two loadings of the first-order factors on the second-order factor, and two residuals of the first-order factors), sufficiently less than the 105 observations provided by the MVs. The first-order factors both have more than 2 indicators (seven each). As before, an equality constraint was added, setting the value of the two loadings on the second-order factor as equal, and thus overcoming the problem associated with the limited number of indicators for the second-

order factor. Theoretically, thus, the model should be over-identified, although, as was noted previously, it may still be empirically under-identified.

6.2.3.2.2 Testing of the Religious Orientation Scale Models

The estimation of the model proposed by postulate 10 produced an inadmissible result. The same approach was taken previously, in that the loading of one MV (in each case, the first) on each first-order LV was set to unity, and the error variance of one of the first-order MVs (Intrinsic) was set to 0. This strategy succeeded in providing a proper solution, although LISREL's admissibility check had to be turned off (a convergent solution was obtained after 65 iterations). It was thus not necessary to rescale the Extrinsic items as with the LAS' Ludus scores.

The RML estimation results for the models proposed by postulates 8, 9 and 10 are shown in Table 18 (fit indices), and Table 19 (item loadings). The intercorrelation between Intrinsic and Extrinsic for postulate 8 was -.49, and the loadings of Intrinsic and Extrinsic on Religious Orientation for postulate 10 were 1.00 and 0.09 respectively.

Table 18 RML Fit Measures for the Proposed Models of the Trimmed ROS

Postulate	*df*	χ^2	S-B χ^2	ECVI [a]	RMSEA	SRMR	GFI	CFI
8	76	207.18*	180.66*	0.55 | **0.65** | 0.77	.050 | **.061** | .073	.062	.92	.88
9	77	435.83*	487.48*	1.30 | **1.48** | 1.68	.110 | **.120** | .130	.097	.81	.68
10	77	377.43*	315.25*	0.87 | **1.01** | 1.17	.081 | **.092** | .100	.150	.87	.85

a: ECVI for the saturated model: .57

ECVI for the independence model: 5.83

* $P = 0.00$

Table 19 RML Item Loadings for the Trimmed ROS Models (N=369)

	Intrinsic		Extrinsic		Religious Orientation
Postulate	**8**	**10**	**8**	**10**	**9**
Intrinsic1	**.60**	.08			**.46**
Intrinsic2	**.60**	**.58**			**.48**
Intrinsic3	**.70**	**.69**			**.55**
Intrinsic5	**.57**	**.55**			**.54**
Intrinsic7	**.44**	**.42**			**.40**
Intrinsic8	**.48**	**.52**			.35
Intrinsic9	**.48**	**.50**			.36
Extrinsic4			**.59**	**.63**	**-.54**
Extrinsic6			**.45**	**.48**	-.35
Extrinsic7			**.56**	**.56**	**-.54**
Extrinsic8			**.67**	**.67**	**-.59**
Extrinsic9			**.70**	**.72**	**-.58**
Extrinsic10			**.60**	**.59**	**-.57**
Extrinsic11			.37	**.41**	-.26

Although the signs of the ROS items on the single factor proposed by postulate 9 were as expected, the fit indices indicated that it did not fit the data very well. Its RSMEA of .12 indicated a very poor fit. Also, three of its items did not load properly on the single factor, again showing problems with this conception of the ROS.

The model proposed by postulate 10 also did not fit well. An examination of the item loadings showed additional problems. Intrinsic1's loading on Intrinsic fell to .08, and the loading of Extrinsic on the second-order Religious Orientation factor, which was not fixed, was only .09.

In contrast to that, the model proposed by postulate 8 fit considerably better, even though its fit was still only moderate. Even though it still had an RMSEA value above .05 and its ECVI was slightly above that for the saturated model, the values of its other fit indices did show an acceptable degree of fit. The SRMR was relatively low, and the GFI (.92) and CFI (.88) values were fairly good. Also, the RMSEA's upper CI was still below .08, showing fair fit. It is also interesting to note that in the results for postulate 8, one item (Extrinsic11) did not load as strongly (.37) on Extrinsic as it did in the CEFA (.49). However, it was decided to retain it in further analyses for the following reasons: The trimmed scale had been developed with CEFA, and not a CFA specification search, and thus consistency of method would require the item to be retained. Also, the item loading was good in the CEFA analysis, and even in the CFA it was not too far below the cut-off value of .40 used in the CEFA process. Lastly, the *t*-value associated with the parameter was significant, despite its lower loading.

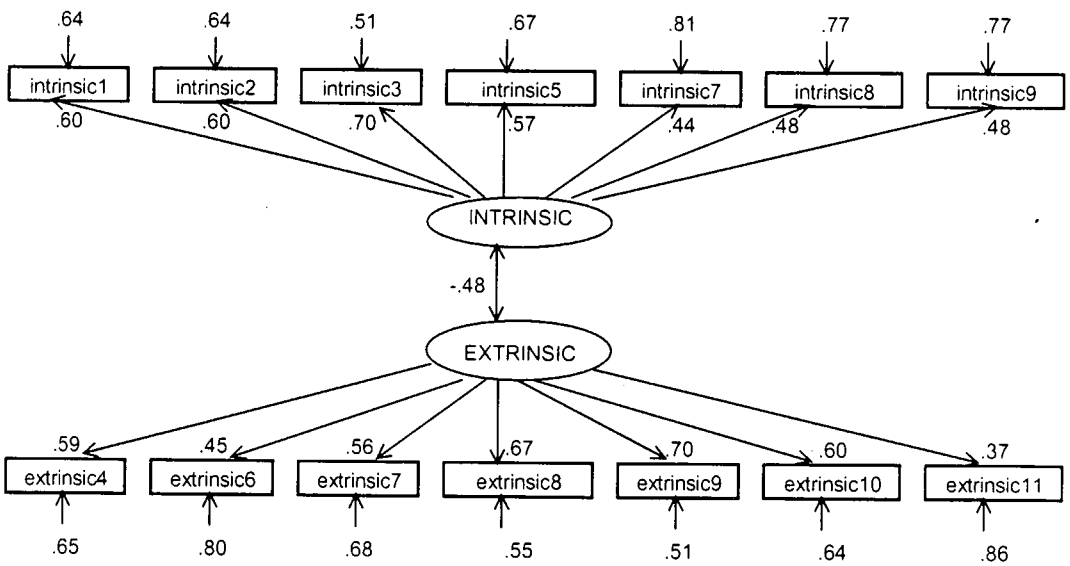


Figure 23 ***Standardised solution for the final CFA model of the ROS***

It would seem as if the model generally accepted to hold for the ROS (postulate 8) is indeed the best (if not perfectly) fitting model, albeit minus a few items. The opposite signs of item loadings observed in the testing of postulate 9 are in line with the findings for postulate 8, where the two factors had a

correlation of -0.48. The model finally accepted for the ROS (postulate 8 of the trimmed version of the ROS) is displayed in Figure 23.

6.2.3.3 Revised Shepherd Scale

Since a number of items had fallen away from the RSS which were included in Pecnik and Epperson's (1985) model of the SS, it seemed fruitless to test postulate 14. However, the remaining postulates (11, 12 and 13) were revised to reflect the newly defined factors (instead of Bassett et al.'s conceptual factors) and tested with the trimmed version of the RSS.

6.2.3.3.1 Identification of the Revised Shepherd Scale models

The identification status of the two standard CFA models proposed for the RSS is shown in Table 20, and it is evident that both of the models are theoretically over-identified.

Table 20 Identification Status of the Standard CFA Models of the Trimmed RSS

Model	Model Characteristics				
	MVs	LVs	Indicators/LV	Parameters	Observations
Postulate 11	16	2	Relationship – 4:1 Doctrine - 12:1	33	136
Postulate 12	16	1	Christian Faith – 16:1	32	136

The model posited in postulate 13 is a higher-order model. The first-order factors both have more than 2 items loading on them (4 for Relationship and 12 for Doctrine), and all the factors are scaled by having their variances set to unity. Furthermore, the 16 MVs deliver 32 parameters, with the two first-order factors adding another four (their two residuals, since they are now endogenous, and their two loadings on the second-order factor). There are thus less parameters to be estimated than knowns ($36 \leq 136$), and thus that condition is met. The value of the two loadings on the second-order factor are also set as equal, overcoming the problem related to the number of indicators for the second-order factor.

6.2.3.3.2 Testing of the reconstructed Revised Shepherd Scale models

The reduced number of items allowed the use of the RML fitting function. The results of the model fitting are shown in Table 21 (fit indices), and Table 22 (item loadings). For the second-order model (postulate 13), the loadings of the first-order factors were 1.00 for Doctrine (the value fixed for identification) and .55 for Relationship. For postulate 11, the standard CFA model, the intercorrelation between Doctrine and Relationship was .37.

Table 21 *RML Fit Measures for the Proposed Models of the Reconstructed RSS*

Postulate	*df*	χ^2	S-B χ^2	ECVI [a]	RMSEA	SRMR	GFI	CFI
11	103	233.74*	150.88*	.51 | **.59** | 0.69	.022 | **.036** | .047	.058	.93	.90
12	104	379.81*	282.80*	.82 | **.94** | 1.09	.059 | **.068** | .078	.077	.87	.80
13	104	260.30*	164.52*	.54 | **.62** | 0.73	.028 | **.040** | .051	.074	.92	.89

a: ECVI for the saturated model: 0.74

ECVI for the independence model: 4.15

* $P = 0.00$

Table 22 *RML Item Loadings for the Reconstructed RSS models*

	Doctrine		Relationship		Christian Faith
Postulate	11	13	11	13	12
RSS6	.59	.45			.57
RSS9	.52	.52			.52
RSS13	.48	.48			.48
RSS14	.61	.62			.62
RSS16	.49	.49			.49
RSS20	.47	.47			.47
RSS23	.56	.55			.55
RSS26			.56	.67	.30
RSS28			.61	.62	.35
RSS30			.65	.63	.19
RSS32			.50	.50	.20
RSS33	.62	.62			.62
RSS34	.66	.66			.65
RSS35	.65	.65			.64
RSS36	.48	.48			.48
RSS38	.63	.63			.63

The fit indices indicate that postulate 11 fit the data the best, although all three of the models fit the data reasonably well. Postulate 11 had a very low SRMR (.058) and even the upper CI of its RMSEA was <.05. Both its GFI (.93) and CFI (.90) values were exceptionally high, and its ECVI value was also very low, all indicating good fit with the data.

When the item loadings for the different models are compared, it can be seen that for both postulates 11 and 13, all the items loaded on their respective factors as expected. Only the four items belonging to the Relationship factor did not load on the single factor proposed by postulate 12. The item loadings for postulate 11 were, with the exception of only RSS14 and RSS26, always equal to, or larger than those for postulate 13. It is also interesting to note that the two factors proposed by postulate 11 only correlated .37, compared to the extremely high intercorrelation of .86 found for the two full factors proposed by Bassett et al. (1981).

This researcher doubted whether any further modifications would improve on the RSS, and it was decided to retain it as is for further analyses. The model proposed by postulate 11 is shown in Figure 24.

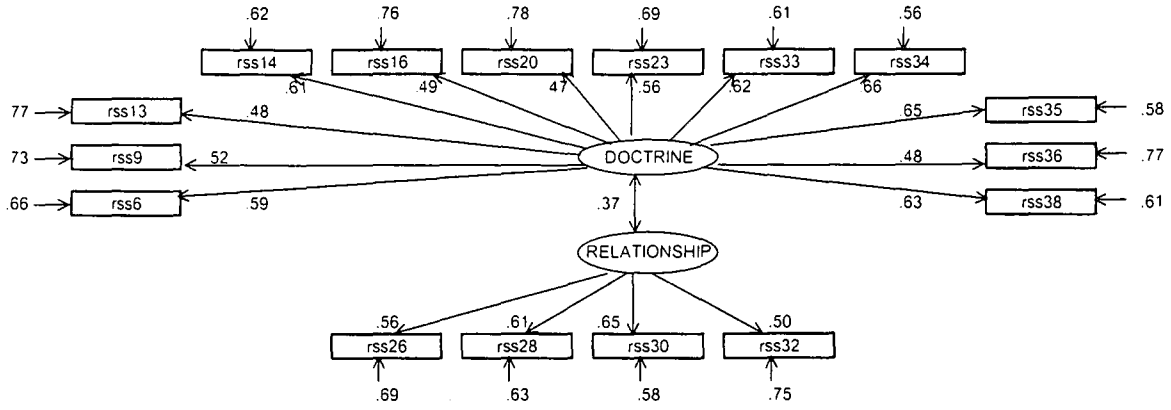


Figure 24 ***Standardised solution for the final CFA model of the RSS***

6.2.3.4 CFA model including all trimmed scales

Once the construct and discriminant validity of the three scales to be used in this study had been determined, the CFA model including all the scales had to be tested. This would provide final confirmation of the discriminant validity of the scales, as the presence of additional scales should not significantly alter the item loadings on their scales. It would also support the notion that the fit of the measurement model for the various LVMs is adequate, allowing the researcher to proceed with alterations to the structural portions of the models in order to test the postulates underlying the LVMs.

Table 23 ***ML Fit Measures for the CFA Model Incorporating All Trimmed Scales***

df	χ^2	ECVI [a]	RMSEA	SRMR	GFI	CFI
1332	2176.59*	6.35 | **6.68** | 7.04	.038 | **.041** | .044	.059	.82	.94

a: ECVI for the saturated model: 8.07

ECVI for the independence model: 41.3

* $P = 0.00$

It is evident from Table 23 that the fit of the full CFA model is quite good. The values of the fit indices for this model are not as good as those for the individual scales (Table 13; Table 18; Table 21) – its RMSEA and SRMR values are only better than those of the model for the ROS, and its GFI value is worse than all the individual models. However, the model does still reflect a more-than-adequate fit with the data, and its CFI value actually exceeds those of the individual models. The intercorrelations between the LVs (Table 24) also show nothing to indicate a poor fit for the model. The item loadings (Table 25) show that, again with the exception of Extrinsic11, which still has a fair loading, all the items have loaded well on their LVs. It should be borne in mind here that three of the LAS subscales (Eros, Pragma

and Mania) shown in Table 24 and Table 25 will not be included in the LVMs to be tested in the structural models (section 6.3).

Table 24 *LV Intercorrelations for the CFA Model Incorporating All Trimmed Scales*

	Doctrine	**Relationship**	**Intrinsic**	**Extrinsic**	***Eros***	**Ludus**	**Storge**	***Pragma***	***Mania***
Relationship	.36								
Intrinsic	.44	.83							
Extrinsic	-.70	-.37	-.49						
Eros	*.21*	*.18*	*.16*	*-.15*					
Ludus	-.62	-.30	-.32	.50	*-.28*				
Storge	.11	.32	.22	.07	*.22*	-.11			
Pragma	*-.11*	*-.01*	*.06*	*.19*	*-.12*	*.22*	*.27*		
Mania	*-.30*	*-.31*	*-.21*	*.38*	*-.06*	*.37*	*-.04*	*.18*	
Agape	.27	.36	.36	-.15	*.38*	-.34	.24	*-.15*	*.02*

Note: LAS subscales not used in LVMs shown in italics.

6.2.4 Cross-validating the measurement models

Validation of the models selected here was conducted using a data set gathered in an earlier study (Raubenheimer, 1997). Since the models which were re-tested with the new data set had been found to be identified in the previous sections, the identification of these models will not be discussed again.

6.2.4.1 Love Attitudes Scale

Since the trimmed version of the LAS contains 24 items, a sample size of 300 is required to compute the asymptotic covariance matrix. As the 1997 data set contains only 144 cases, the LAS models were tested with the ML estimator.

The ML fit indices for postulate 2 computed on the 1997 and the current data sets are shown in Table 26. Because the ML estimator was used, and not the RML, the ECVI and RMSEA values for the current data set differ from those shown in Table 13 (p. 112). It can be seen that the fit for the 1997 data set is worse than for the data set gathered in this study, but nevertheless reasonably acceptable. Furthermore, postulate 2 was still the best fitting of the various LAS models for the 1997 data set.

When the item loadings (Figure 25) are examined, it is evident that the item loadings do not mimic those for the data set of this study exactly. Four of the 24 items (Eros7, Ludus5, Pragma2 and Pragma3) did not load well on their intended LVs, although all these loadings are still ≥ .30. most of the intercorrelations between the LVs stayed relatively constant, with those between Storge and Pragma (.27 to .06), Storge and Mania (-.04 to .21), and Mania and Agape (.03 to .18) showing the greatest amount of change.

Table 25 *ML Item Loadings for the CFA Model Incorporating All Trimmed Scales*

Item	Doctrine	Relationship	Intrinsic	Extrinsic	Eros	Ludus	Storge	Pragma	Mania	Agape
RSS6	.58									
RSS9	.51									
RSS13	.47									
RSS14	.60									
RSS16	.50									
RSS20	.45									
RSS23	.56									
RSS26		.58								
RSS28		.56								
RSS30		.67								
RSS32		.51								
RSS33	.64									
RSS34	.67									
RSS35	.65									
RSS36	.48									
RSS38	.64									
Intrinsic1			.60							
Intrinsic2			.57							
Intrinsic3			.69							
Intrinsic5			.60							
Intrinsic7			.44							
Intrinsic8			.48							
Intrinsic9			.49							
Extrinsic4				.62						
Extrinsic6				.43						
Extrinsic7				.58						
Extrinsic8				.68						
Extrinsic9				.67						
Extrinsic10				.59						
Extrinsic11				.36						
Eros4					.79					
Eros6					.72					
Eros7					.41					
Ludus3						.75				
Ludus5						.55				
Ludus7						.71				
Storge4							.62			
Storge5							.65			
Storge7							.74			
Pragma1								.51		
Pragma2								.56		
Pragma3								.42		
Pragma4								.64		
Pragma5								.44		
Pragma6								.57		
Pragma7								.52		
Mania4									.44	
Mania6									.62	
Mania7									.70	
Agape2										.54
Agape3										.71
Agape4										.73
Agape5										.58
Agape7										.59

Table 26 *ML Fit Measures for Postulate 2*

Data set	N	*df*	χ^2	ECVI	$ECVI_{sat}$	$ECVI_{ind}$	RMSEA	SRMR	GFI	CFI
1997	144	237	341.15*	2.77 | **3.06** | 3.41	4.20	7.68	.031 | **.047** | .060	.078	.85	.87
2001	369	237	404.35*	1.30 | **1.44** | 1.61	1.63	5.74	.037 | **.044** | .051	.057	.92	.91

*$P = 0.00$

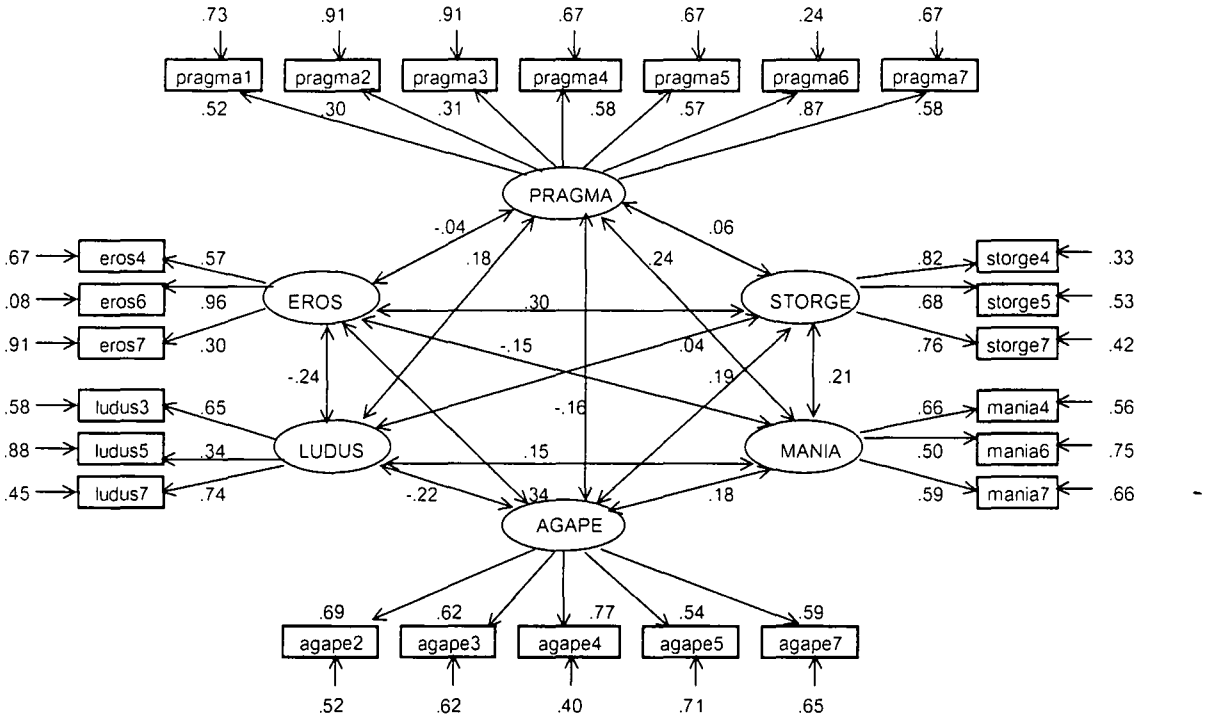


Figure 25 *Standardised solution for Postulate 2 - 1997 data set (N=144)*

Apart from comparing the relative fit of the models, one may also assess the difference in fit statistically, using the cross-validation methods mentioned in 5.2.2.1.3 (p. 89). Using LISREL, a two-group model was specified. The "null" hypothesis for the cross-validation test estimates both data sets together. The "alternative" hypothesis estimated the model as usual for the first (current) data set, but set the variances and covariances of the LVs, as well as the error variances of the MVs for the second data set free. The results for this testing are shown in Table 27. It is again evident that the model does not fit the 1997 data set as well as it does the current data set (e.g., the 1997 data set's higher SRMR and lower GFI values under both conditions). However, it is interesting to note that the second condition actually produced better fit indices than the first (e.g., RMSEA from .048 to .045, ECVI from 1.92 to 1.90, SRMR and CFI improved, GFI stayed constant or improved). Thus it would seem to indicate that the model has found support for its configural invariance in this test of cross-validation.

Table 27 *ML Fit Measures for Two-Group Model of Postulate 2*

Condition	*df*	χ^2	ECVI [a]	RMSEA	SRMR		GFI		CFI
					1997	2001	1997	2001	
H_0	537	956.73*	1.77 | **1.92** | 2.08	.042 | **.048** | .054	.100	.068	.77	.91	.89
H_1	481	760.98*	1.76 | **1.90** | 2.05	.038 | **.045** | .052	.082	.058	.84	.91	.92

a: ECVI for the saturated model: 1.17

ECVI for the independence model: 8.46

* $P = 0.00$

6.2.4.2 Religious Orientation Scale

The RML fit indices for the two data sets are shown in Table 18. It is again evident that the model does not fit the 1997 data set as well as it does the current data set, although this may also be as a result of the smaller sample size. Its fit for the 1997 data set is, at least, adequate. Also, when the item loadings are examined (Figure 26), it can be seen that none of the loadings have changed drastically, and that all of the items still load well on their intended LVs. Postulate 8 also fit the 1997 data better than the other two models, again highlighting its preferrability.

Table 28 *RML Fit Measures for Postulate 8*

Data set	N	*df*	χ^2	S-B χ^2	ECVI	$ECVI_{sat}$	$ECVI_{ind}$	RMSEA	SRMR	GFI	CFI
1997	144	76	153.14*	120.92*	1.07 | **1.25** | 1.49	1.47	4.07	.042 | **.064** | .085	.091	.86	.83
2001	369	76	207.18*	180.66*	0.55 | **0.65** | 0.77	0.57	3.33	.050 | **.061** | .073	.062	.92	.88

* $P = 0.00$

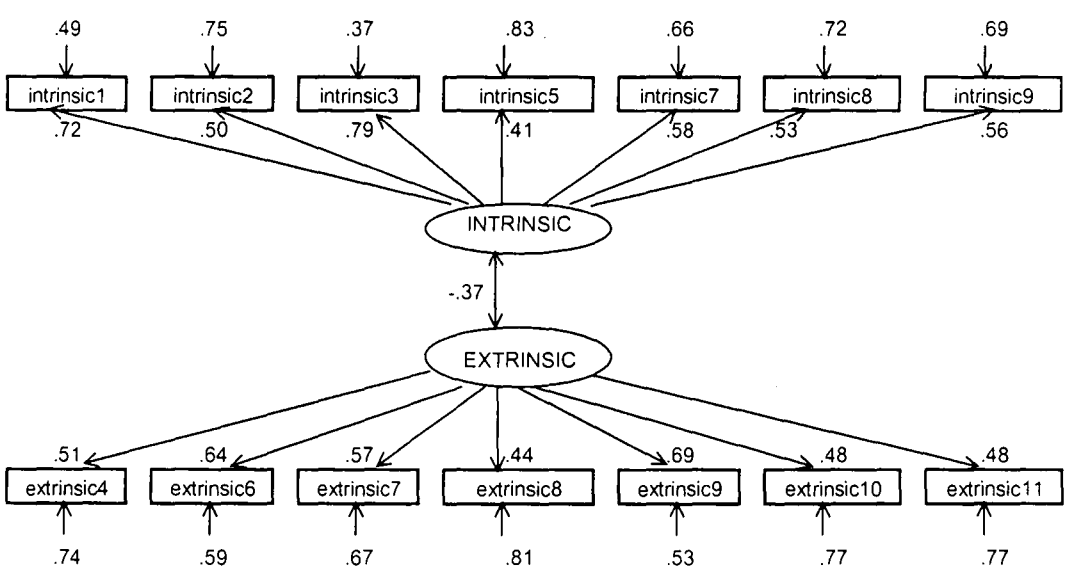


Figure 26 *Standardised solution for Postulate 8 - 1997 data set (N=144)*

The fit of the model was again cross-validated in terms of its configural invariance against the 1997 data set. The results are shown in Table 29. Interestingly, the model still did not fit either of the data sets that

well. It's RMSEA values for both conditions indicated only mediocre fit, and its SRMR and GFI values degraded substantially from the current to the 1997 data set. Interestingly, the SRMR, GFI and CFI values improved from the more to the less restricted conditions, while the RMSEA and the ECVI values deteriorated slightly. Its configural invariance is thus only partially supported by the cross-validation.

Table 29 *ML Fit Measures for Two-Group Model of Postulate 8*

Condition	*df*	χ^2	ECVI [a]	RMSEA	SRMR		GFI		CFI
					1997	2001	1997	2001	
H_0	181	547.64*	0.95 | **1.07** | 1.21	.073 | **.082** | .090	.15	.089	.70	.91	.77
H_1	154	487.58*	0.96 | **1.08** | 1.21	.076 | **.085** | .095	.11	.070	.77	.91	.79

a: ECVI for the saturated model: 0.41

ECVI for the independence model: 3.48

* $P = 0.00$

6.2.4.3 Revised Shepherd Scale

The sample size of the 1997 data set allowed the use of the RML fitting function. The results of the model fitting are shown in Table 30 (fit indices). All the Relationship items loaded well on the Relationship LV (Figure 27), although three items (RSS6, RSS9 and RSS16) loaded <.40 on the Doctrine LV. As with the other scales, the model proposed by postulate 11 delivered the best fit of the various hypothesised models with the 1997 data set as well.

Table 30 *RML Fit Measures Postulate 11*

Data set	N	*df*	χ^2	S-B χ^2	ECVI	$ECVI_{sat}$	$ECVI_{ind}$	RMSEA	SRMR	GFI	CFI
1997	144	103	207.17*	137.52*	1.24 | **1.42** | 1.67	1.90	6.95	.023 | **.048** | .069	.071	.84	.88
2001	369	103	233.74*	150.88*	0.51 | **0.59** | 0.69	0.74	4.15	.022 | **.036** | .047	.058	.93	.90

* $P = 0.00$

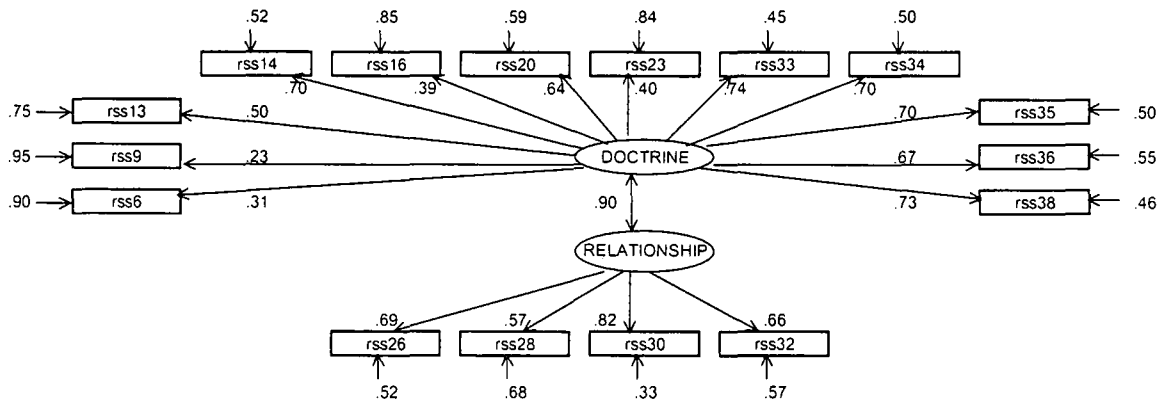


Figure 27 *Standardised solution for Postulate 11 - 1997 data set (N=144)*

The configural invariance of the new RSS model was also cross-validated from the current to the 1997 data set. The results in Table 31 show that, of the three scales, this model is the one that cross-validated

the worst. Its SRMR and GFI values worsened significantly from the 2001 to 1997 data sets, even though all its fit indices improved slightly from the more to the less restricted conditions.

Table 31 *ML Fit Measures for Two-Group Model of Postulate 11*

Condition	*df*	χ^2	ECVI [a]	RMSEA	SRMR		GFI		CFI
					1997	2001	1997	2001	
H_0	239	1024.44	1.67 | **1.84** | 2.02	.095 | **.100** | .110	.19	.093	.55	.89	.65
H_1	209	842.96	1.56 | **1.72** | 1.89	.093 | **.100** | .110	.15	.078	.65	.90	.71

a: ECVI for the saturated model: 1.17

ECVI for the independence model: 8.46

$^{*}P = 0.00$

It is thus evident that not all of the models cross-validated properly. However, the models here represent the best possible solutions for an adequate measurement of the constructs to be used in the LVMs. Since gathering a third data set was not feasible, it was decided to proceed with the testing of the LVMs, albeit with the knowledge that the measurement instruments may deliver results which are specific to this study only.

6.3 Structural models of Christian faith and the love styles

The LVMs proposed in postulates 15 to 17 could now be tested on the basis of the redefined measurement scales. Since the nature of the RSS's factors had been redefined, the LV models would also have to be adapted accordingly. At its most basic, they could be altered by replacing the Belief variable with Doctrine, and the Walk variable with Relationship. Although it may be possible that the nature of these variables had changed as a result of the restructuring of the RSS, it was felt that the existing hypotheses could be left unaltered by this process. Certainly it would be expected, at the least, that a measure of the relationship component of Christian Faith would, as is hypothesised, have an influence on the love styles, which are essential relational components. It could also be expected that the doctrines to which Christians adhere would influence the way in which they live, and also specifically the way in which they love.

6.3.1 Identification of the Latent Variable Models

Since all the models represented by postulates 15 - 17 have the same number of MVs and LVs, an examination of their identification status is simplified. As noted in 5.2.3.3 (p. 92), the measurement component of a LVM is estimated as if the model were a CFA model. The 41 MVs deliver 82 estimable parameters, and the 7 LVs a further 21 parameters, to give a total of 103. However, 41 MVs also deliver a total of 861 knows, thus satisfying the first condition for identification (Table 2, p. 91). LISREL allows

the LVs to be scaled, satisfying the second, and the smallest ratio of variables to LVs is 3:1, satisfying the third. The measurement components of all three models are thus over-identified. Since all the models are recursive, their structural components are thus also over-identified.

6.3.2 Contextual models

The fit of the CFA model and the UFM, are shown in Table 32. The fit of the CFA model reported here differs slightly from that reported in Table 23 (p. 122) as three of the LAS subscales have been excluded here. The item loadings of the CFA model and UFM are shown in Table 33. The LVs in the UFM are by definition uncorrelated, and the intercorrelations for the CFA model are the same as those shown in the non-italicised portions of Table 24 (p. 123).

As can be expected, the CFA model, being the most saturated, provides the best fit with the data. The poor fit of the UFM provides the baseline level of fit which the theoretical models should exceed. The item loadings have remained very similar to those delivered in the CFA testing of the individual scales, with the only item not loading quite as well as would be hoped on its LV being Extrinsic11.

Table 32 *ML Fit Measures for the Contextual Models*

Postulate	*df*	χ^2	ECVI [a]	RMSEA	SRMR	GFI	CFI
CFA	758	1383.15*	4.04 | **4.31** | 4.61	.043 | **.047** | .051	.060	.85	.85
UFM	779	1950.62*	5.83 | **6.19** | 6.58	.065 | **.068** | .072	.150	.78	.72

a: ECVI for the saturated model: 4.68

ECVI for the independence model: 13.68

* $P = 0.00$

CFA – Confirmatory Factor Analysis model

UFM – Uncorrelated factors model

6.3.3 Theoretical models

Having tested the contextual models, the models proposed in postulates 15-17 may now be tested.

6.3.3.1 a priori models

The fit of the three models proposed by postulates 15-17 is shown in Table 34. In order to allow emphasis to be placed on the interrelationships between the LVs, the item loadings of the three models are reflected in Table 35, while the structural portions of the models are shown in Figure 28 to Figure 30.

Table 33 *ML Item Loadings for LVM Contextual Models*

	Doctrine		Relationship		Intrinsic		Extrinsic		Ludus		Storge		Agape	
Postulate	CFA	UFM	CFA	UFM	CFA	UFM	CFA	UFM	CFA	UFM	CFA	UFM	CFA	UFM
RSS6	.58	.60												
RSS9	.51	.51												
RSS13	.47	.48												
RSS14	.60	.61												
RSS16	.50	.49												
RSS20	.45	.46												
RSS23	.56	.56												
RSS26			.58	.54										
RSS28			.56	.57										
RSS30			.66	.71										
RSS32			.51	.50										
RSS33	.64	.63												
RSS34	.67	.67												
RSS35	.65	.66												
RSS36	.48	.47												
RSS38	.64	.62												
Intrinsic1					.60	.61								
Intrinsic2					.57	.60								
Intrinsic3					.68	.70								
Intrinsic5					.60	.55								
Intrinsic7					.43	.42								
Intrinsic8					.49	.49								
Intrinsic9					.50	.50								
Extrinsic4							.63	.58						
Extrinsic6							.42	.47						
Extrinsic7							.58	.55						
Extrinsic8							.67	.66						
Extrinsic9							.67	.71						
Extrinsic10							.59	.58						
Extrinsic11							.35	.40						
Ludus3									.76	.86				
Ludus5									.53	.54				
Ludus7									.72	.61				
Storge4											.63	.64		
Storge5											.64	.62		
Storge7											.75	.76		
Agape2													.52	.51
Agape3													.70	.70
Agape4													.75	.76
Agape5													.58	.59
Agape7													.58	.58

When examining the fit of the three a priori models, it can be seen that as the models become more restricted, the fit deteriorates. The first two models (postulates 15 and 16) have ECVI values below that

of the saturated model, and RMSEA values <.05. The values of their SRMR, GFI and CFI are also not too different from that of the CFA model. It is evident that both of these models fit the data better than that of postulate 17. The table containing the loadings of the MVs on their LVs also show that, as expected, all the theoretical models reproduced the measurement portions of the model quite well. The largest difference between the CFA item loadings and the corresponding item loadings in postulates 15-17 was .04.

However, examining the fit indices only provides a global indication of the fit of a model, and these indices may not bring to light other important indications that the fit of a model is not adequate. An examination of the item loadings and residual matrix to assess the detailed fit of the individual components of the model revealed that the model representing postulate 15 (Figure 28) delivered an inadmissible value, a so-called Heywood case (Rindskopf, 1984). The standardised loading of Storge on Relationship is 1.21, well above the limit of 1.00 allowed for a standardised coefficient. This model had other problems as well. Where Table 24 shows that the correlations between the Intrinsic LV and Agape and Storge are moderate and positive, in Figure 28 the loadings of these two endogenous LVs on Intrinsic are large and negative. Also, the loading of Ludus on Intrinsic is large and positive in Figure 28, while the simple correlation between these two LVs is moderate and negative. Examining the structural portion of the model representing postulate 16 (Figure 29), it can be seen that although the Heywood case has been eliminated, the loading of Storge on Relationship is still inordinately large, while the loadings of Agape and Storge on Intrinsic are still negative. These negative loadings stand against both the theoretical expectations and the statistical considerations underlying the complete set of variables. Furthermore, the loading of Ludus on Extrinsic diminished from .56 (postulate 16 - Figure 29) to .27 (postulate 15 - Figure 28) when a path was added from Doctrine to Ludus. Some form of mediation (a hidden indirect effect) may have been taking place in the structural model which reversed the effect of Intrinsic on Agape and Storge, and interfered with the strong loading of Extrinsic on Ludus. The fact that these effects were not accounted for in the models meant that they did not properly account for the data, despite their reasonable fit indices.

When postulate 17 (Figure 30) is examined, it can be seen that, despite the poor fit of the model, the various loadings of the endogenous variables on the exogenous variables reflect the correlation matrix and the underlying theoretical considerations to a better extent than the preceding two postulates. However, the fit of this model is worse than desired, and also a number of the loadings are close to zero, with non-significant *t*-values (Relationship's influence on Agape, and Doctrine and Intrinsic's influences on Storge and Agape), and may thus just as well be fixed at zero.

Table 34 *ML Fit Measures for Postulates 15-17*

Postulate	*df*	χ^2	ECVI [a]	RMSEA	SRMR	GFI	CFI
15	763	1401.53*	4.06 | **4.33** | 4.63	.044 | **.048** | .052	.060	.84	.85
16	766	1436.37*	4.13 | **4.41** | 4.71	.045 | **.049** | .052	.064	.84	.84
17	769	1573.41*	4.50 | **4.80** | 5.12	.050 | **.054** | .057	.075	.83	.81

a: ECVI for the saturated model: 4.68

ECVI for the independence model: 13.68

* $P = 0.00$

Table 35 *ML Item Loadings for Postulates 15-17*

	Doctrine			Relationship			Intrinsic			Extrinsic			Ludus			Storge			Agape		
Postulate	15	16	17	15	16	17	15	16	17	15	16	17	15	16	17	15	16	17	15	16	17
RSS6	.58	.58	.56																		
RSS9	.51	.51	.51																		
RSS13	.47	.47	.47																		
RSS14	.60	.61	.61																		
RSS16	.50	.50	.49																		
RSS20	.45	.46	.46																		
RSS23	.56	.56	.56																		
RSS26				.56	.57	.56															
RSS28				.52	.54	.60															
RSS30				.62	.64	.65															
RSS32				.49	.51	.49															
RSS33	.64	.64	.63																		
RSS34	.67	.67	.66																		
RSS35	.65	.65	.64																		
RSS36	.48	.48	.49																		
RSS38	.64	.64	.64																		
Intrinsic1							.59	.59	.59												
Intrinsic2							.56	.56	.60												
Intrinsic3							.67	.67	.72												
Intrinsic5							.61	.61	.56												
Intrinsic7							.43	.43	.45												
Intrinsic8							.48	.49	.45												
Intrinsic9							.49	.49	.48												
Extrinsic4										.63	.63	.63									
Extrinsic6										.42	.40	.40									
Extrinsic7										.58	.58	.58									
Extrinsic8										.67	.66	.66									
Extrinsic9										.67	.65	.65									
Extrinsic10										.59	.59	.59									
Extrinsic11										.35	.33	.34									
Ludus3													.75	.79	.79						
Ludus5													.53	.55	.55						
Ludus7													.72	.68	.68						
Storge4																.63	.64	.63			
Storge5																.64	.64	.63			
Storge7																.75	.74	.75			
Agape2																			.52	.52	.52
Agape3																			.70	.71	.71
Agape4																			.76	.75	.74
Agape5																			.58	.58	.57
Agape7																			.58	.58	.58

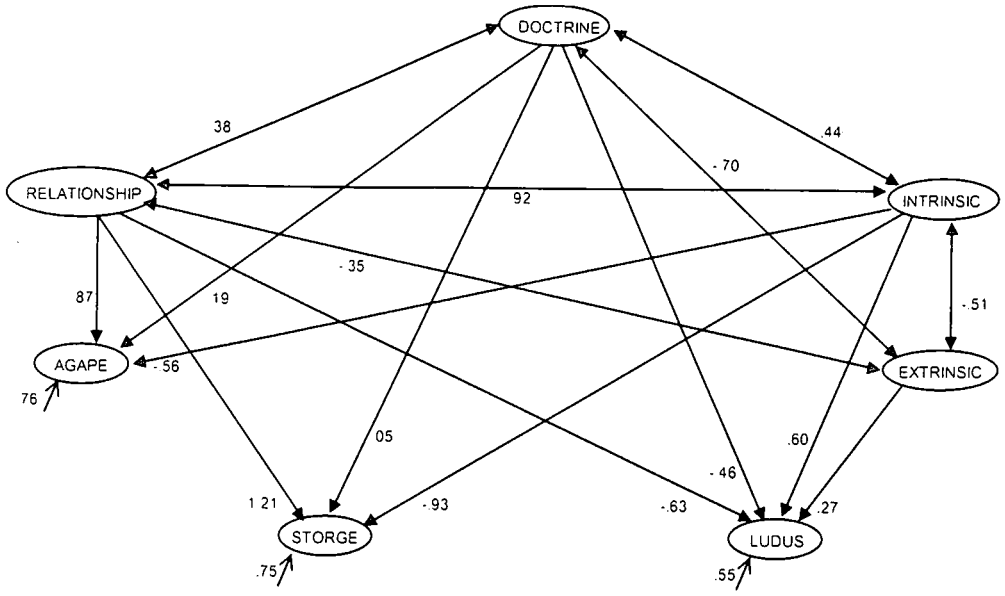


Figure 28 *Standardised solution for structural portion of Postulate 15*

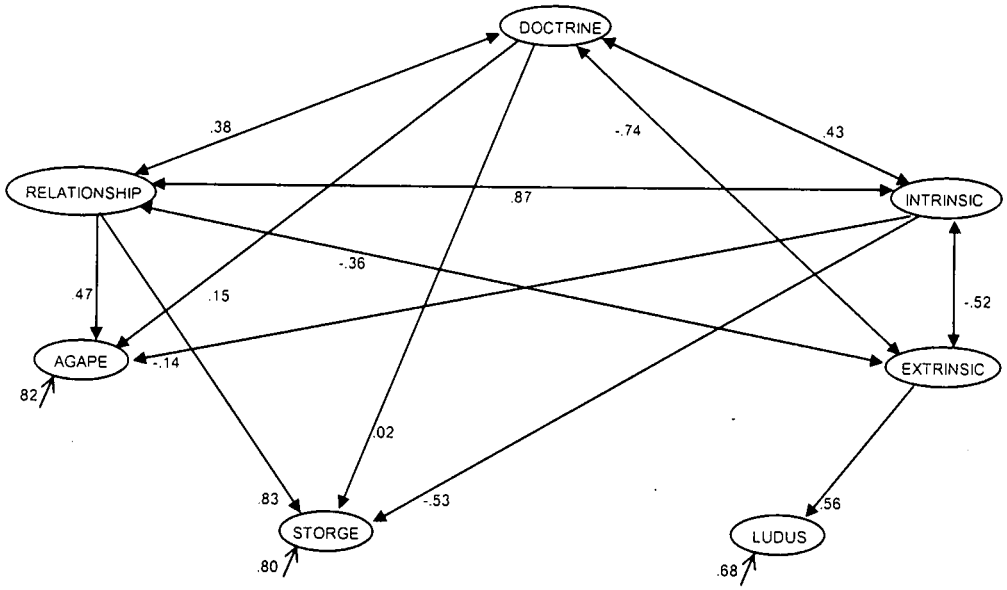


Figure 29 *Standardised solution for structural portion of Postulate 16*

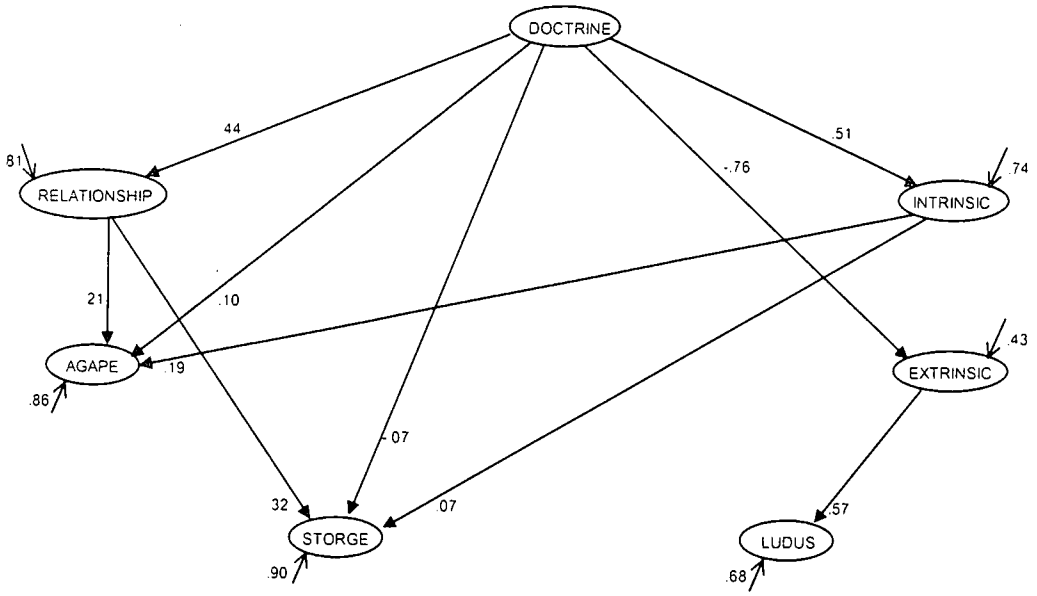


Figure 30 *Standardised solution for structural portion of Postulate 17*

Thus, as noted by Jöreskog (1993), the models posited a priori by the researcher seldom fit the data well enough that post hoc modifications to the models are not needed. This is also the case in the current study, and further (theory-guided) examination of the models will be conducted in order to find a model which reflects proper theoretical considerations, while also providing adequate fit to the data.

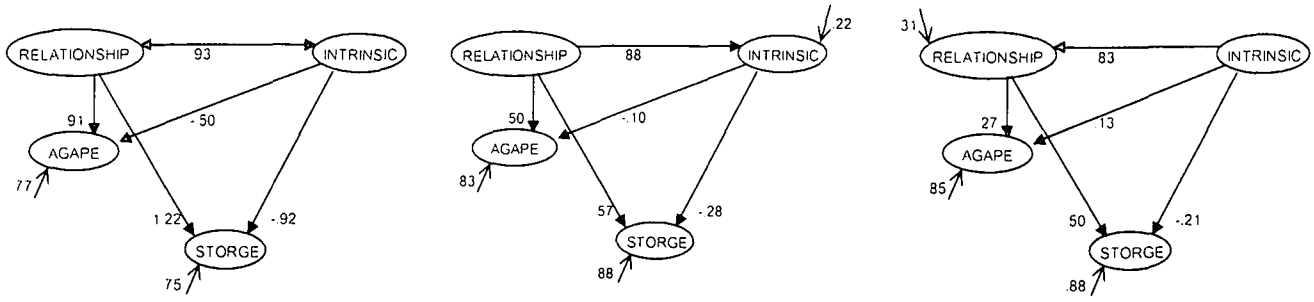
6.3.3.2 Mediator effects

Before attempting to propose alternative theoretical models, an attempt was made to examine the nature of the indirect effects on the LAS variables. In order to do this, the variables were examined in isolation, with only the relevant loadings being specified (all other LVs and their respective MVs were excluded from these models).

6.3.3.2.1 Relationship, Intrinsic, Agape and Storge

It was evident from the preceding models that the effect on Agape and Storge was created by the interplay between Relationship and Intrinsic (e.g., in Figure 30, where the relationship between Relationship and Intrinsic is removed, Intrinsic loads as expected on Agape and Storge). Three new models were specified in which Agape and Storge were allowed to load on both Intrinsic and Relationship. In the first model, Relationship and Intrinsic were merely correlated – this would provide a basis of comparison for the subsequent models. In the second model, a causal path was drawn from Relationship to Intrinsic, and in the third the path was reversed from Intrinsic to Relationship. The relevant loadings of the three models are shown in Figure 31. It can be seen that the Heywood case reported in postulate 15 may well be as a result of collinearity caused by the very strong correlation

between Relationship and Intrinsic. When they are allowed to covary, their scores on Agape and Storge are inflated unduly. When the effect is postulated as a causal path, the scores decrease noticeably, more so when Intrinsic is postulated as a cause of Relationship.



1. Relationship – exogenous Intrinsic – exogenous

2. Relationship – exogenous Intrinsic – endogenous

3. Relationship – endogenous Intrinsic – exogenous

Figure 31 *Different relationships between Agape, Storge, Relationship and Intrinsic*

Next, the direct and indirect effects of these variables on the endogenous variables of Agape and Storge may be examined. Since they correlate in the first model, there are obviously no indirect effects. The indirect effects may be computed by multiplying the coefficients of all paths linking two variables directly, and the total effect is equal to the sum of the direct effect and indirect effects (Mueller, 1996, pp. 32-36). Thus for the model where Relationship is the exogenous variable, it's indirect effect on Agape may be computed as .88 x .10 = -0.088 ([Relationship→Intrinsic]x[Intrinsic→Agape]). Its total effect on Agape is thus .50 + -0.088 = .412. The total and indirect effects for the two models in which Relationship and Intrinsic are exogenous variables are shown in Table 36 (the direct effects may be read off from Figure 31).

Table 36 *Direct and Indirect Effects of Relationship and Intrinsic on Agape and Storge*

	Relationship – exogenous Intrinsic – endogenous				**Relationship – endogenous Intrinsic – exogenous**			
	Relationship		**Intrinsic**		**Relationship**		**Intrinsic**	
	Total	**Indirect**	**Total**	**Indirect**	**Total**	**Indirect**	**Total**	**Indirect**
Relationship	-	-	-	-	-	-	.83	-
Intrinsic	.88	-	-	-	-	-	-	-
Agape	.41	-.09	-.10	-	.27	-	.36	.23
Storge	.32	-.25	-.28	-	.50	-	.21	.42

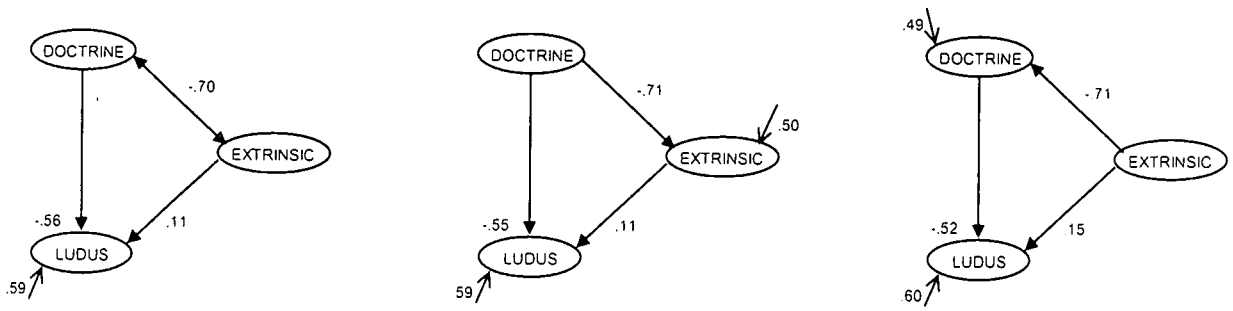
When these effects are examined, it can be seen that Relationship strongly mediates the effect which Intrinsic has on Agape and Storge, so much so that when Intrinsic is posited as an exogenous variable, its indirect effect (i.e., through Relationship) is twice the magnitude of its own direct effect for Storge, and

almost double for Agape. This also accounts for the negative loadings of Agape and Storge on Intrinsic (these loadings are indeed moderate and positive when the loadings from Relationship to these two variables is fixed to zero). Using the critical value of 2.59 determined for the *t*-values used in this study, the *t*-values of the parameters in these models were also examined. When both Relationship and Intrinsic were tested as correlated exogenous variables, only the loadings of Relationship on Agape and Storge were significant. When either Intrinsic or Relationship were posited as endogenous variables, only the parameter between Intrinsic and Relationship was significant. However, in both of these cases the *t*-value of Relationship on Agape and Storge was close to significant, and exceeded the *t*-values for Intrinsic by far. Intrinsic's indirect effect when posited as the exogenous variable was also far greater than that of Relationship when it was posited as the exogenous variable.

Because of this strong mediating effect of Relationship, it may be better to posit it as the sole cause of the Agape and Storge, excluding Intrinsic (Doctrine has relatively small effects on these two variables, and has thus already been excluded, and Extrinsic was excluded on theoretical grounds, and its effects on these two variables was even smaller than that of Doctrine).

6.3.3.2.2 Doctrine, Extrinsic and Ludus

Doctrine and Extrinsic, however, are the next two variables between which a mediational effect could exist in terms of their influence on the third LAS variable: Ludus. The same approach as above was followed in examining this effect: Three models were tested, one with Doctrine and Extrinsic merely correlated, one with Doctrine as a causal variable of Extrinsic, and vice versa. It can be seen from Figure 32 that Doctrine and Extrinsic are also correlated quite strongly, and negatively.



1. Doctrine – exogenous
Extrinsic – exogenous

2. Doctrine – exogenous
Extrinsic – endogenous

3. Doctrine – endogenous
Extrinsic – exogenous

Figure 32 ***Different relationships between Ludus, Doctrine and Extrinsic***

In all of the three models tested, the *t*-values of the parameters between Doctrine and both Extrinsic and Ludus were always significant, and the parameter between Extrinsic and Ludus was never significant. When Extrinsic was the sole exogenous variable, its direct effect on Ludus was not significant, although its indirect effect was. Precisely the converse was true for Doctrine.

Thus the strong negative relationship between Doctrine and Ludus is such that it accounts almost entirely, after taking the strong negative relationship between Doctrine and Extrinsic into account, for the relationship between Extrinsic and Ludus. This is also clearly seen when the total and indirect loadings (Table 37) are examined. A large proportion of Extrinsic's effect on Ludus is mediated by Doctrine, while a very small proportion of Doctrine's effect on Ludus is mediated by Extrinsic. Thus it may be better to model the effect of Extrinsic on Ludus, not directly, but rather via Doctrine.

Table 37 *Direct and Indirect Effects of Doctrine and Extrinsic on Ludus*

	Doctrine – exogenous Extrinsic – endogenous				**Doctrine – endogenous Extrinsic – exogenous**			
	Doctrine		**Extrinsic**		**Doctrine**		**Extrinsic**	
	Total	**Indirect**	**Total**	**Indirect**	**Total**	**Indirect**	**Total**	**Indirect**
Doctrine	-	-	-	-	-	-	-.71	-
Extrinsic	-.71	-	-	-	-	-	-	-
Ludus	-.63	-.08	.11	-	-.52	-	.52	.37

6.3.3.3 Post hoc models

Having determined these indirect effects, the models tested previously may be modified and re-tested accordingly. Modifying postulates 15 and 16 according to the findings above would lead to more or less the same result:

Postulate 18: Seven latent variables – four exogenous (Doctrine, Relationship, Intrinsic and Extrinsic) and three endogenous (Agape, Storge and Ludus) – are related in the following ways: Causal paths will be permitted from Doctrine to Ludus (negative), and from Relationship to both Agape and Storge (positive), while the exogenous variables may correlate freely.

This model, however, does not allocate Intrinsic and Extrinsic any definite causal positions in the model. Although an alternative would be to remove them from the model, the desire to incorporate theoretical advances in the modelling process would rather impel the researcher to include them, but to allow them to play an active role by positing causal relations amongst the Christian faith LVs as well. Since it has been shown that both Relationship and Doctrine mediate the effects of Intrinsic and Extrinsic respectively, it makes sense to posit them as endogenous variables which are "caused" by the ROS variables:

Postulate 19: Intrinsic is an exogenous variable with a positive causal path flowing from it to Relationship (endogenous). Relationship, in its turn, has two positive causal paths, one to Agape, and one to Storge (both also endogenous). The effect of Intrinsic on the latter two is thus mediated by Relationship. Extrinsic is the second exogenous variable, with a negative causal path linking it to Doctrine (endogenous). Doctrine has a single negative causal path to Ludus (endogenous). The effect of Extrinsic on Ludus is thus mediated by Doctrine. The two exogenous variables may freely intercorrelate.

Both of the models representing these two postulates are identified, as they share the same (identified) measurement components as postulates 15-17 (6.3.1), and are both recursive.

The results of the testing of these two models is shown in Table 38 (fit measures), Figure 33 (postulate 18) and Figure 34 (postulate 19).

Table 38 *ML Fit Measures for Postulates 18 and 19*

Postulate	*df*	χ^2	ECVI [a]	RMSEA	SRMR	GFI	CFI
18	770	1417.90*	4.07 | **4.35** | 4.65	.044 | **.048** | .052	.063	.84	.94
19	773	1425.95*	4.07 | **4.35** | 4.64	.044 | **.048** | .052	.066	.84	.94

a: ECVI for the saturated model: 4.68

ECVI for the independence model: 13.68

* $P = 0.00$

It can be seen from Table 38 that the fit of both these models is very similar. Postulate 19 has a slightly higher SRMR, but the upper CI of its ECVI value is slightly lower. The point estimates of their ECVI and RMSEA values are precisely the same, as is that of their GFI and CFI values. Postulate 19 also has a slightly higher chi-square value, although it has higher *df* (when their χ^2/df is computed, it is less than .0033 higher). Lastly, a chi-square difference test between them gives $\chi^2_{diff} = 8.05$ with 3*df*, which is not significant at the 1% level. Postulate 18 is thus not a statistically significant improvement on postulate 19.

Furthermore, both of these models compare very well with the fit of the a priori models. Their ECVIs are only slightly higher than that of postulate 15, and lower than that of the other models; their RMSEA and GFI values are equal to that of postulate 15; their SRMR values are only slightly worse; and their CFI values are actually much better than any of the original postulates. They also have fit which is not much worse than that of the CFA model. The CFA model's RMSEA is, in its point estimate and CIs, only .001 lower; the point estimate of the CFA's ECVI value is only .04 lower; its SRMR is only between .003 and .006 lower; its GFI .01 higher; and its CFI value is actually .09 higher. Considering the chi-square difference test between these models and the CFA model, the values of both postulate 18 ($\chi^2_{diff} = 34.75$ with 12*df*) and 19 ($\chi^2_{diff} = 42.80$ with 15*df*) are significant at the 1% level. They do thus fit significantly

worse than the CFA model, although they do provide, by all other counts, adequate fit, and the trade-off between substantive meaning and fit is more than worthwhile.

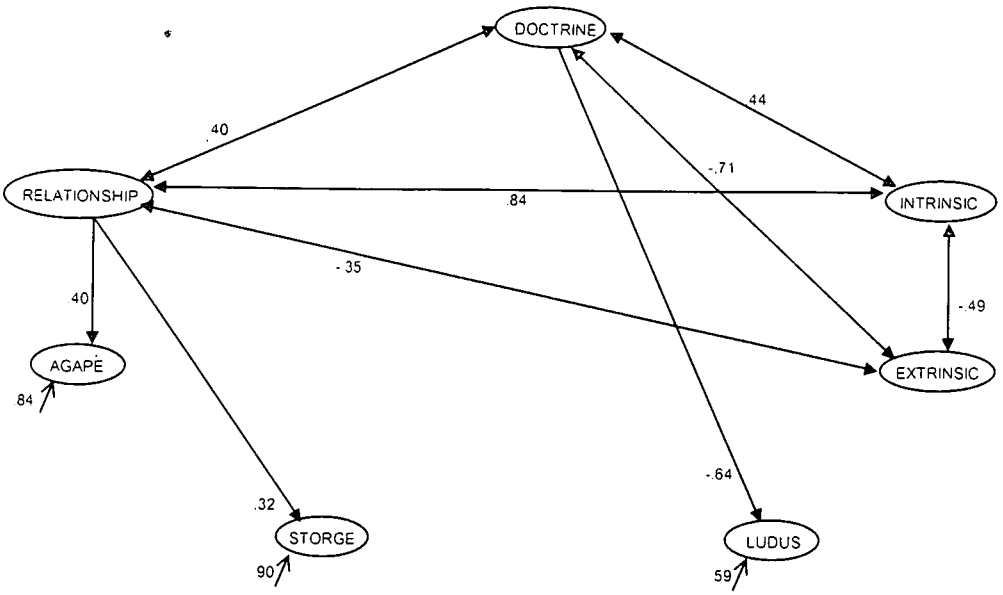


Figure 33 *Standardised solution for structural portion of Postulate 18*

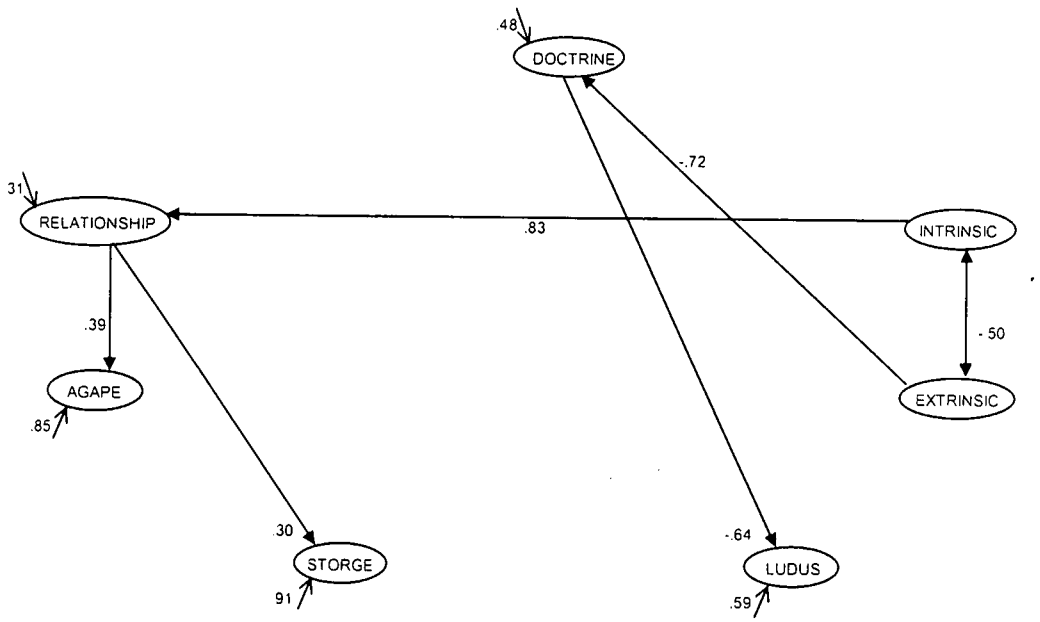


Figure 34 *Standardised solution for structural portion of Postulate 19*

An examination of the loadings of these models provides further confirmation of their adequacy. All the *t*-values associated with all the parameters estimated in both models are significant at the 1% level. All the loadings are also in the direction and of the magnitude hoped for. The full models (structural and measurement) for these two postulates are shown in Figure 35 and Figure 36.

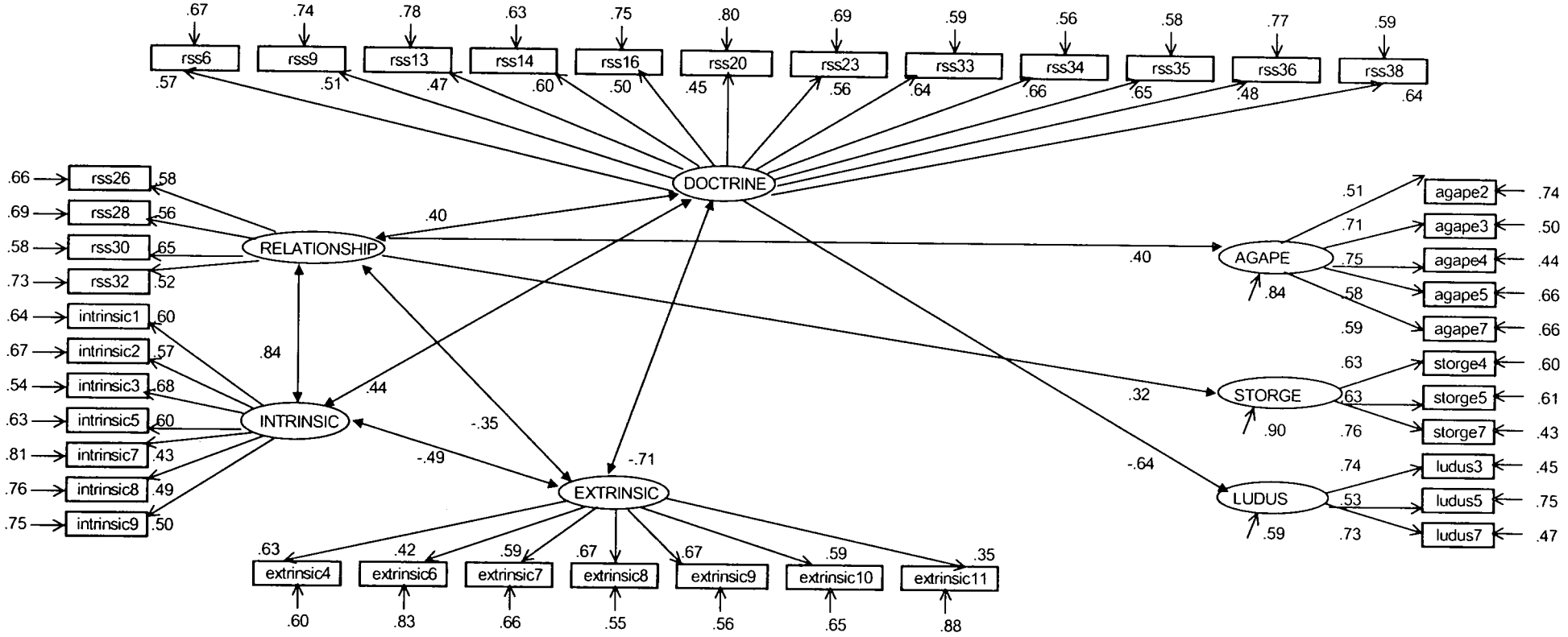


Figure 35 *Standardised solution for Postulate 18*

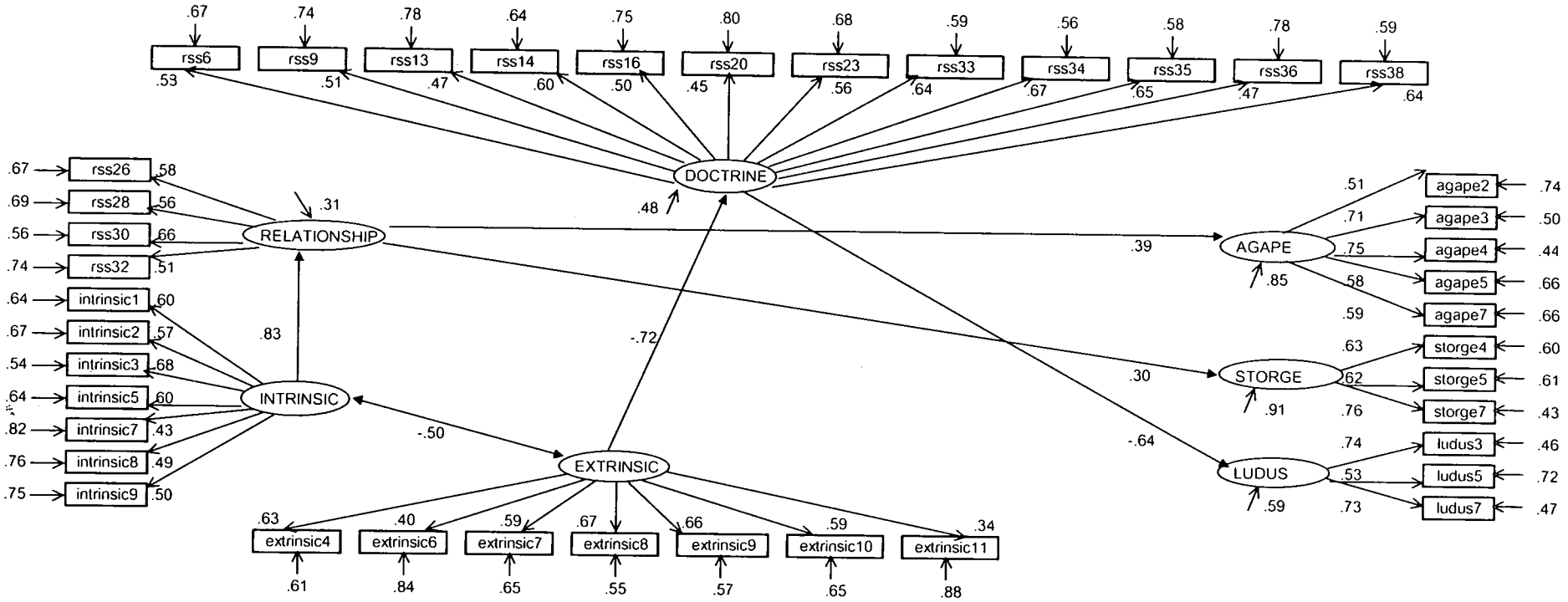


Figure 36 ***Standardised solution for Postulate 19***

6.3.4 Equivalent models

Two final models were derived in this study – those representing postulates 18 and 19. The replacing rule (Lee & Hershberger, 1990) may be used to generate alternative equivalent models for these two models.

6.3.4.1 Postulate 18

When postulate 18 is considered, it can be seen that no equivalent models can be generated when the endogenous variables are considered, as there are no alterable relationships between them. Adding different paths will not result in equivalent models (Luijben, 1991). The replacing rule also states that saturated blocks may be transformed into any other saturated blocks which will be equivalent. However, since the exogenous variables in postulate 18 are all linked by covariances, there are chiefly two ways to achieve a different saturated block.

The first would be to make any two (arbitrarily chosen) exogenous variables endogenous, and correlating their error variances (without the correlated disturbances, the block will no longer be saturated). Since correlated disturbances were excluded in this study on the basis of there being no clear theoretical grounds for such a step (cf. 5.2.2, p. 86), this will not be done.

A second means of generating equivalent models would be to make one exogenous variable endogenous, and then to turn all the covariances between it and the other exogenous variables into causal paths. This may be done for each of the exogenous variables in turn, but not for more than one, as that would again require correlated error variances. The four possible equivalent models are shown in Figure 37 - Figure 40.

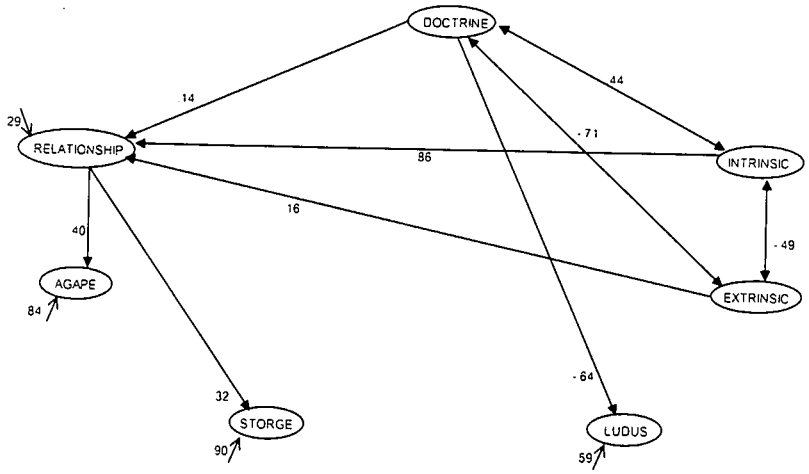


Figure 37 *Standardised solution for Postulate 18 equivalent model: Relationship as endogenous*

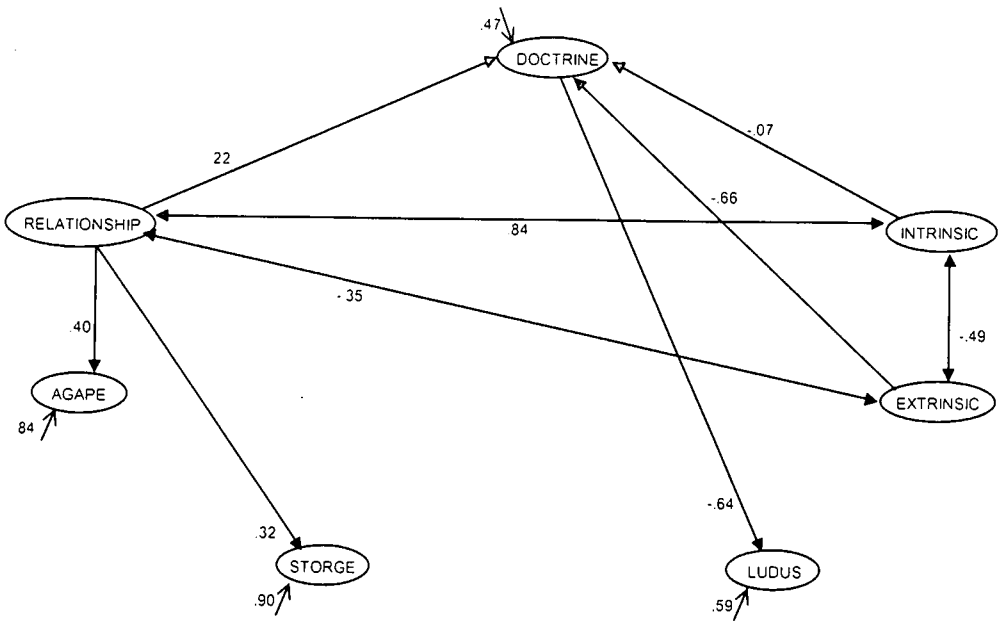


Figure 38 *Standardised solution for Postulate 18 equivalent model: Doctrine as endogenous*

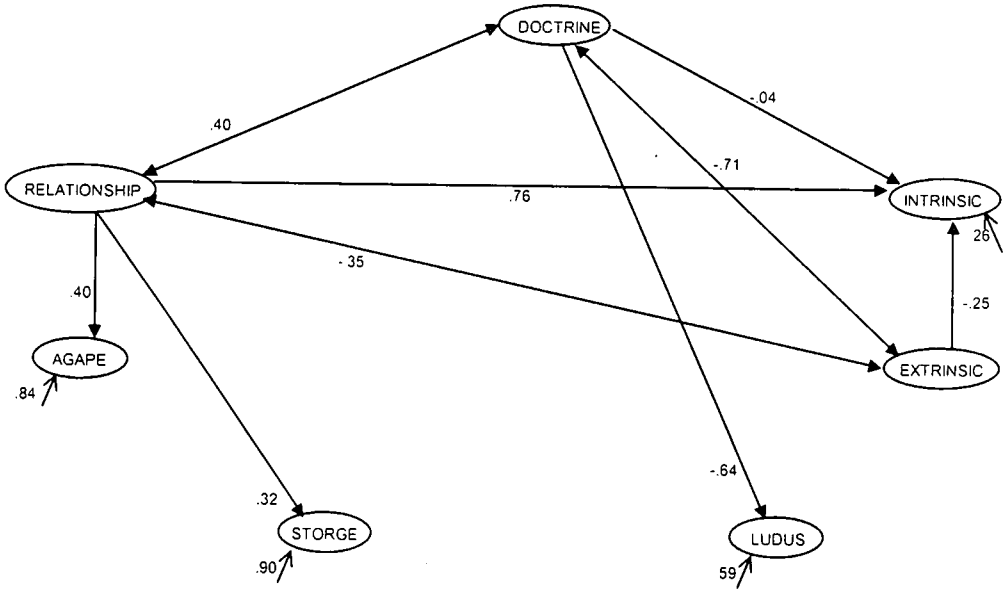


Figure 39 *Standardised solution for Postulate 18 equivalent model: Intrinsic as endogenous*

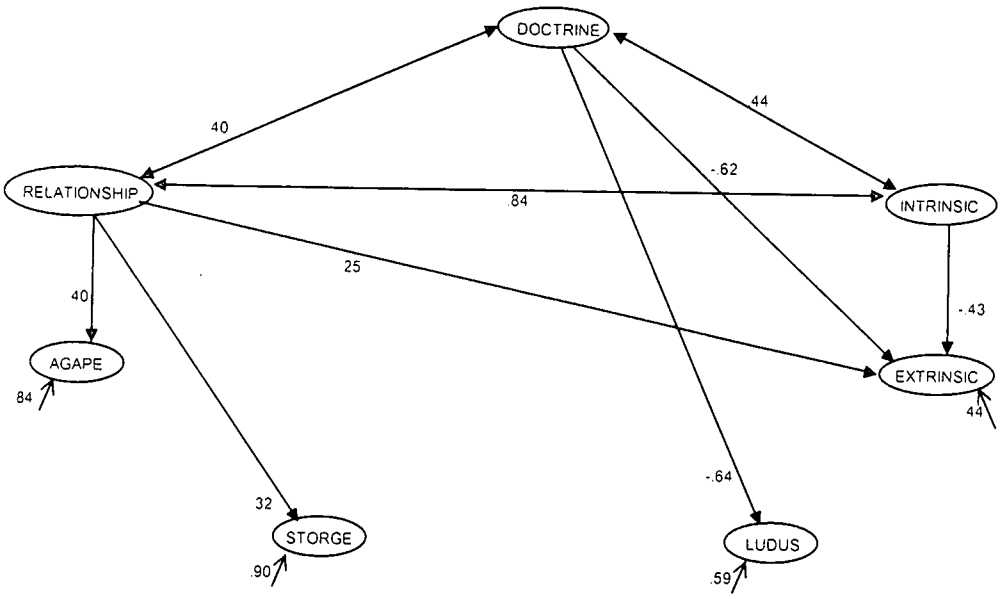


Figure 40 ***Standardised solution for Postulate 18 equivalent model: Extrinsic as endogenous***

When evaluating equivalent models, it has to be taken into account that not all the possible equivalent models are theoretically meaningful (MacCallum et al., 1993), and also that parameter estimates may vary widely across models which still give the same reproduced covariance matrices (Williams, Bozdogan & Aiman-Smith, 1996). As for the first of these considerations, MacCallum et al. recommend that all equivalent models be evaluated in terms of substantive meaningfulness, and that only those models which are theoretically defensible be retained and compared to the model chosen by the researcher. Given that, if pressed, a number of these models might be given theoretical justification a posteriori (whether appropriately so or not), a different means of selecting between the models would probably be preferred.

The different parameter loadings discussed by Williams et al. (1996) were thus taken into consideration. A comparison was made between the model chosen for postulate 18 and the various equivalent models in terms of the relevant parameters between the LVs and their *t*-values. This comparison is shown in Table 39. The first three columns of loadings shown the loadings and their associated *t*-values for postulate 18. All of these are intercorrelations, and are thus drawn from LISREL's *phi* matrix (relationships between exogenous variables). The next four columns of loadings are the relevant causal loadings for the model in which the variable specified in the row header is the endogenous variable, as taken from LISREL's *gamma* matrix (relationships between exogenous and endogenous variables). All the intercorrelations between the remaining exogenous variables remained the same as in postulate 18 (as was noted by Williams, Bozdogan & Aiman-Smith, 1996), and are thus not shown. Bearing in mind the critical value of 2.59, it can be seen that all the parameter loadings for postulate 18 are significant. However, each of

the equivalent models has at least one non-significant *t*-value. Furthermore, when these loadings are insignificant, their sign is, on occasion, also in the opposite direction to what is theoretically expected (e.g., Relationship/Extrinsic in the two models where Relationship and Extrinsic are the respective endogenous variables; Doctrine/Intrinsic in the two models where Doctrine and Intrinsic are the respective endogenous variables). Furthermore, when they are in the correct direction, the parameter values are occasionally substantially weaker than in postulate 18 (e.g., Intrinsic/Extrinsic in the model where Intrinsic is the endogenous variable; Doctrine/Relationship in the model where Doctrine is the endogenous variable). On these grounds the model proposed by postulate 18 may be preferred above any of the equivalent models specified.

Table 39 ***Parameter Loadings and t-values for Postulate 18 and Equivalent Models***

	Postulate 18			**Equivalent models**			
	Relationship	**Doctrine**	**Intrinsic**	**Relationship**	**Doctrine**	**Intrinsic**	**Extrinsic**
Relationship					.14 *1.48*	.86 *8.64*	.16 *1.62*
Doctrine	.40 *6.68*			.22 *1.45*		-.07 *-.43*	-.66 *-7.77*
Intrinsic	.84 *21.21*	.44 *8.14*		.76 *8.95*	-.04 *-.44*		-.25 *-2.75*
Extrinsic	-.35 *-5.45*	-.71 *-18.56*	-.49 *-8.87*	.25 *1.55*	-.62 *-8.25*	-.43 *-2.61*	

Note: Parameter values shown in first row in normal print, *t*-values shown in second row in italics.

6.3.4.2 Postulate 19

When considering postulate 19, it can again be noted that there are no parameters between any of the endogenous variables, and thus no equivalent models can be generated by modifying the (non-existent) relationships between them. The exogenous variables again form a saturated block, and since there are only two variables, two additional equivalent models may be constructed, one with Extrinsic as an endogenous variable with a causal path from Intrinsic to it (Figure 41), and one with Intrinsic as an endogenous variable, with a causal path from Extrinsic to it (Figure 42). The option of replacing the Intrinsic-Extrinsic correlation with correlated disturbances will again be discounted on theoretical grounds.

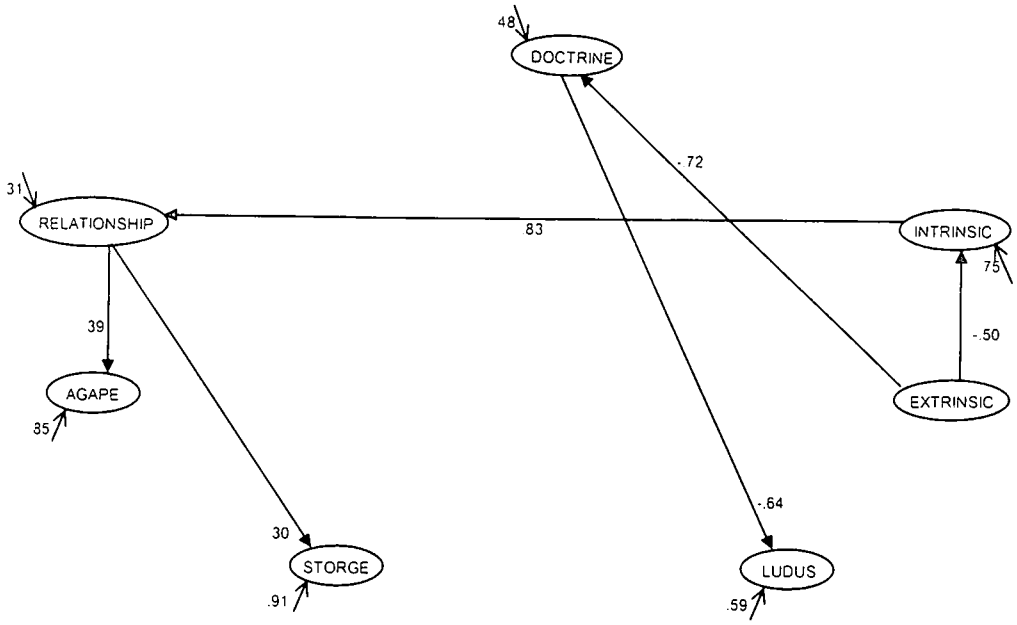


Figure 41 *Standardised solution for Postulate 19 equivalent model: Intrinsic as endogenous*

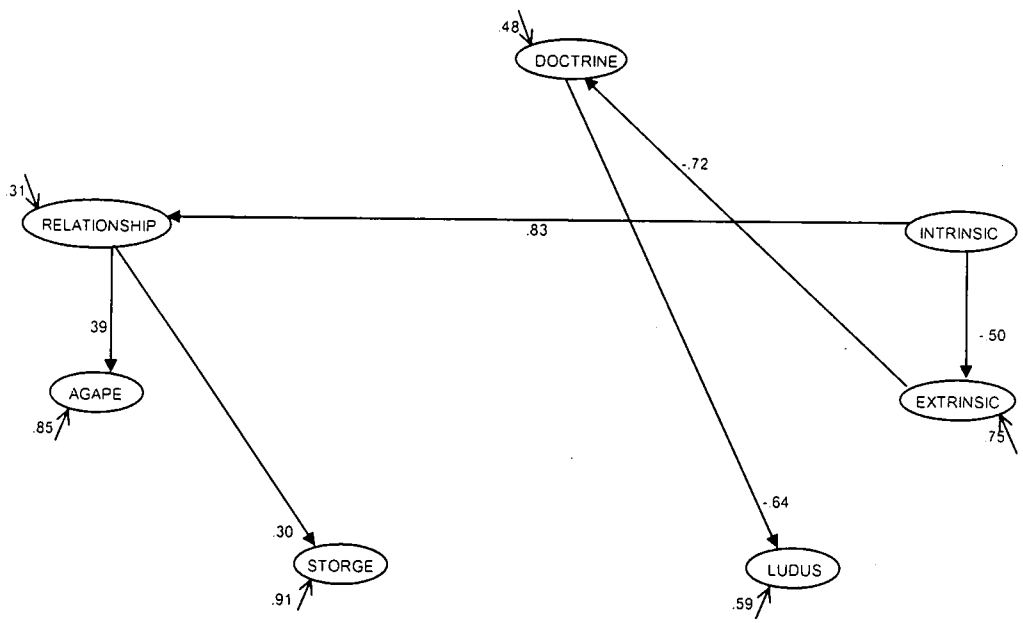


Figure 42 *Standardised solution for Postulate 19 equivalent model: Extrinsic as endogenous*

The parameter loadings for postulate 19 and its two equivalent models are shown in Table 40. Since the alternative specifications changed the nature of the variables from exogenous to endogenous, and thus their relationships with other variables, the LISREL matrices from which they are drawn are specified, so as to allow the reader to better comprehend the nature of the relationships. The relationships between the two endogenous variables Doctrine and Relationship, and their causal dependents (Ludus for Doctrine, and Agape and Storge for Relationship) are not shown, as these were unchanged. In the left three

columns of Table 40, the one intercorrelation (Φ) and two causal paths (Γ) for postulate 19 are shown. In the first row of the last four columns, the two causal paths are shown for the equivalent model in which Intrinsic is the endogenous variable, one from Intrinsic to Relationship (B) and one from Extrinsic to Intrinsic (Γ). The reverse is true for the second row. In each case, the one parameter specified in the first three columns, but not specified in the relevant row of the fourth and fifth columns, has remained unchanged (i.e., Extrinsic→Doctrine for the model where Intrinsic is endogenous, and Intrinsic→Relationship for the model where Intrinsic is exogenous). It can be seen that both equivalent models have the same parameter values as postulate 19. Their *t*-values are slightly lower in each case, but still significant. Since they are equivalent models, they can also not be distinguished in terms of fit. It thus has to be recognised that, from a statistical point of view, either of these equivalent models are equally as plausible as postulate 19. The only reason that could possibly be advanced for favouring postulate 19 is that it would be hard to distinguish between either of the equivalent models themselves. Which variable should be endogenous, and why? Does the intrinsic religious orientation cause a decrease in extrinsic views of religion, or does the extrinsic religious orientation cause a decrease in intrinsic views of religion? This chicken-and-egg dilemma may be solved by noting Allport's findings about the two religious orientations: They do not lie on a continuum, but are two correlated, yet different attitudes towards religion. Positing one of the religious orientations as a cause of the other flies in the face of the history and usage of religious orientation, and that without sufficient grounds to do so.

Table 40 *Parameter Loadings and t-values for Postulate 19 and Equivalent Models*

	Postulate 19			**Equivalent models**			
	Relationship	**Doctrine**	**Intrinsic**	**Relationship**	**Doctrine**	**Intrinsic**	**Extrinsic**
Intrinsic	**Γ** .83 *9.39*			**B** .83 *7.82*			**Γ** -.50 *-7.12*
Extrinsic		**Γ** -.72 *-9.36*	**Φ** -.50 *-9.82*		**B** -.72 *-8.02*	**Γ** -.50 *-7.28*	

Note: Parameter values shown in first row in normal print, *t*-values shown in second row in italics.

Γ – LISREL *Gamma* Matrix – Relationship between exogenous and endogenous variable

Φ – LISREL *Phi* Matrix – Relationship between two exogenous variables

B – LISREL *Beta* Matrix – Relationship between two endogenous variables

Chapter 7
Discussion

The findings of this study centre around two aspects: Investigations into the measurement models of the various scales used, and the testing of a number of theoretical models proposing various ways in which latent variables measured by these scales might be related.

7.1 Evaluation of the measurement models

Three scales were used in this study. The measurement components of all the unaltered scales were not satisfactory, as indicated by the revisions required in terms of the reliability analyses on the one hand, and convergent and discriminant validity analyses on the other. The findings regarding the respective scales varied from very positive to less positive.

7.1.1 Love Attitudes Scale

The examination of the reliability and factor structure of the LAS showed that the scale as originally developed was problematic. Initial criticisms against the LAS by some authors (cf. 3.3.2, p. 59) may not have been unfounded. However, in an attempt at "constructive criticism," an effort was made to improve the LAS by maximising its reliability and convergent and discriminant validity.

7.1.1.1 The trimmed LAS

The LAS subscales generally proved to be quite reliable. Four of the six subscales had alpha coefficients which could not be improved by removing any items. Of the remaining two, only Storge required the removal of four items before being at its most reliable. Overall one might have preferred the final reliability coefficients to be higher, but the values, all above .61 (Table 6, p. 106), were adequate for substantive research in the social sciences, where such reliabilities are not out of the ordinary (Bedeian, Day & Kelloway, 1997, p. 785), and they still compare favourably with reliabilities found in other studies on the LAS.

The LAS was also trimmed through a repetitive process of comprehensive exploratory factor analyses (Tateneni, Mels, Cudeck & Browne, 2001). Eventually a trimmed version was arrived at which still had

acceptable reliability, and also satisfactory convergent and discriminant validity (6.2.2.1, p. 104). What was encouraging about this trimmed version of the scale was its close agreement to two trimmed versions developed by Hendrick et al. (1998). Only two items (Eros2 and Ludus2) selected by Hendrick et al. for their 18-item version of the LAS were not selected in the present study. A further two items (Storge6 and Mania5) which they selected for their 24-item version were omitted here. Four items (Pragma1-Pragma3, Agape5) were thus included here which were not used by Hendrick et al. The findings of the present study thus confirm the findings of Hendrick et al. (1998) that a short version of the LAS, possibly the 18-item version, would actually be preferable to the full version. Some additional research may, however, be required to finally confirm which of the items not common to all the various short forms would be best to include in such a shortened scale.

The trimmed version used in this study was also evaluated in terms of its cross-validity. The results showed that the structure of the trimmed version, as used in this study, did replicate well from the current to the 1997 data set. This gives even more confidence in using this trimmed version of the LAS.

7.1.1.2 Models of the LAS

Apart from developing a trimmed version of the LAS which would be more reliable and valid, several models were tested in an attempt to answer some of the outstanding questions about the nature of the love styles as measured by the scale.

Several things should be noted about this study in comparison to those discussed in 3.3.2 (p. 59). Firstly, some of the confusion in the studies in the literature may have arisen from measurement inaccuracies caused by the use of the "wrong" LAS items. Thompson and Borrello (1987) chose the 18 items with the highest principal component loadings from the Hendrick and Hendrick (1986) study. However, only 12 of the items they selected corresponded to the 18-item version developed by Hendrick et al. (1998).

Furthermore, several factors point to the selection of the CFA model, almost by default, in this study. For example, that the CFA model was preferred in this study may point to the obvious fact that it was the most saturated of the models tested. In addition, the trimmed version developed and used in this study was developed using CEFA, the closest methodological counterpart of which, in LISREL terms, is a standard CFA model – all the factors (LVs) covary without restrictions. Thus the development methodology also favoured the CFA model. However, there can be no real justification for using any other more restricted method of trimming an instrument such as the LAS, as the CEFA process presents the researcher with more information and less restrictions than any other process, and allows the most informed choice to be made. Attempting to trim the LAS in accordance with any of the other postulated models would have biased the resultant product in favour of that postulate far more than what the CEFA process has biased the LAS in favour of the standard CFA model. This argument may be raised with

each of the following scales (ROS and RSS) as well, but the answer will remain the same in those situations too.

Having said that, the measurement models and their alternatives tested in this study, which represent various theoretical viewpoints, may be evaluated. Firstly, are the love styles measured by the LAS orthogonal or are they oblique? The vast difference between the fits (Table 13, p. 112) of the models representing postulate 1 (orthogonal) and postulate 2 (oblique) shows clearly that the love styles are indeed oblique. In fact, some of the confusion around the LAS may be as a result of the use of principal components analyses with varimax rotations in their development. These two models (orthogonal vs. oblique) were also tested by Rotzien et al. (1994), and although they also preferred the oblique model, they found that it too did not fit the data adequately. However, they used all 42 items of the original LAS, and this may have had an adverse effect on the fit of their model. For example, a CFA of all 42 items in this study yielded an RMSEA value of .058, compared to the value of .038 for the trimmed version, with the other fit indices showing similar improvements, where the unreliable and invalid items had been removed.

Thompson and Borrello (1987) also speculated that the Mania and Agape items could belong to a single factor. They later helped clarify the issue by finding that a better distinction could be made between the two by adding one additional item to each (Borrello & Thompson, 1990b). The poor fit of the corresponding model (postulate 3) in this study, both in terms of fit indices and item loadings (Table 13), also confirmed that Mania and Agape are two distinct factors, and should not be combined. This finding is in accordance with that of Rotzien et al. (1994), who also rejected a model combining Mania and Agape into a single factor.

The testing of the remaining premises centred around the testing of higher-order models and a LVM, for which a proper measurement model was essential. Thus the remaining models were tested using only the trimmed version of the LAS. On the basis of their findings, Borrello and Thompson (1990a) proposed that the LAS might consist of six first-order factors, which combined in pairs to form three second-order factors (this was not the original hypothesis of their study, but the conclusion they derived from it). This proposition was tested in postulate 4, and its logical extension, postulate 5 (which combined the second-order factors into a single third-order factor). Sadly, the model proposed by postulate 5 failed to converge, and could thus not be evaluated. The model proposed by postulate 4 did converge, albeit with a little assistance. Probably the estimation of these models proved to be more difficult in the present study than in Borrello and Thompson's because the latter researchers used SECONDOR (Thompson, 1990), which uses as its basis principal components, and not common factors. Furthermore, the higher-order model tested in this study is only near-equivalent to the Schmid-Leiman model used by Borrello and Thompson (Yung, Thissen & McLeod, 1999). Other possible reasons for this may be discrepancies

in the current data set, or possibly the larger sample size (N=487) which Borrello and Thompson used. Nevertheless, the poor fit of postulate 4 showed that the higher-order model of the LAS is not tenable.

Two further models were tested. Postulate 6 represented the model first tested by Thompson and Borrello (1992b). Here each of the love styles represented a first-order factor loading on a single second-order factor. This model was not supported by the data, although it did fit better than postulate 4. Also, if the second-order factor was truly underlying all the love styles, all of the second-order factor loadings would have to have been significant. This was not the case, and this casts serious doubt on the tenability of this model.

The last model (postulate 7) represented this researcher's conceptualisation (as an alternative model to the CFA model) of Lee's original intent with the love styles, viz., that three of the love styles (Eros, Ludus and Storge) were "primary" love styles, and three (Pragma, Mania and Agape) were "secondary" – compounded of various pairs of primary love styles. This model also fit the data reasonably well, but still significantly worse than the CFA model. Furthermore, two of the three "secondary" love styles failed to have significant causal paths to one of their respective "primary" love styles. Thus this model did not fit the data well enough to be favoured above the CFA model. It must also be remembered that the finding that the model representing Lee's original conceptualisation of the love styles did not improve on a standard version of the love styles as correlated but independent factors, does not necessarily negate Lee's conceptualisation of the love styles. The LAS is, as it were, twice removed from Lee's theory, firstly in that it was compiled by other researchers than Lee himself, and secondly (and simply) because it might lack construct validity in terms of Lee's original conceptualisation.

The final conclusion about the LAS is that it might not necessarily represent the constructs Lee defined, but measurements of those constructs as understood by the Laswells and the Hendricks. On the basis of this study, one might deduce that, at the most, the Hendricks' conceptualisation of Lee's theory does not correspond to a model (postulate 7) constructed to express that theory. However, Lee's use of a colour analogy to show how the different love styles combine to form secondary and tertiary styles has itself come under fire (Shaver & Hazan, 1988), and it may just be that the Hendricks actually saved Lee's love styles theory from its worst flaw by developing a scale which sees the different love styles as being on an equal footing, with a right to existence in and of themselves.

Having noted that one readily observable difference between the LAS and Lee's love styles theory, it must also be stated categorically that the relationship between the LAS and Lee six love styles of eros, ludus, storge, pragma, mania and agape, is one which can only be judged by a subjective evaluation of how well the aforementioned researchers understood Lee's theory. In this regard, it may be noted that thus far, none of the researchers who have acquainted themselves with Lee's theory (even if they have

objections to the theory itself), have found any reason to reject the LAS as not measuring that theory, and those six love styles in particular. This researcher can also not raise any such objections.

Finally, the most important recommendation of this study is that in future research, the LAS is probably best measured as a scale consisting of six oblique factors, and using a short form of the scale similar to that developed by Hendrick et al. (1998).

7.1.2 Religious Orientation Scale

The ROS was the scale used in this study with the most extensive history. Although the measurement aspect of the scale has been disputed, it is nonetheless widely accepted.

7.1.2.1 The trimmed ROS

The ROS was also trimmed so as to provide two subscales that were quite reliable ($\alpha > .74$) and showed adequate convergent and discriminant validity. In a stepwise process, six items were removed between the reliability analyses and the CEFAs. The trimmed version used in this study consisted of the following items: Intrinsic: 1-3, 5, 7-9; Extrinsic: 4, 6-11. There were thus seven items for each subscale. Since there was no prior shortened version with which to compare this trimmed ROS, it is uncertain whether the trimming process was entirely accurate. Although the trimmed version was applicable to this data set, its generalisability is a question which can only be answered with further testing on new samples.

One indication as to its generalisability has been provided by its cross-validation results. The cross-validation performed on the ROS showed that it while it did cross-validate to a degree, it still did not possess adequate configural invariance. Thus the structure of the measurement model did not replicate very well from the sample used in this study to the sample obtained three years earlier. Further study is thus needed to determine the generalisability of the present results to other populations.

7.1.2.2 Models of the ROS

Three alternative models were specified to test the ROS. The first was a standard CFA model of the scale. The second and third models were based on Allport's original (Allport & Ross, 1967) notion of Intrinsic and Extrinsic as being opposite poles of the same dimension of Religious Orientation. The second model had all the items loading on a single factor, with the hypothesis being that all the item loadings should be significant, but with differences in signs for the two sets of subscale items. The third model proposed a second-order factor underlying the two constructs, this time with the second-order loadings differing in sign.

These models were tested on the trimmed version of the scale. The order of the models in terms of their goodness-of-fit was first, third, second, with the second model fitting the data very poorly. That the items tap two constructs that are not simply opposites of the same dimension has been well established in the literature (Kahoe, 1976; Thompson, 1974), and also confirmed by the present study. Thus it was decided to maintain the CFA model of the ROS (which implies that the scale measures two negatively related constructs) for further use in this study.

7.1.3 Shepherd Scale

The Shepherd Scale is a scale that has seen very little work to date. It was not adequately tested in its development, and only one study had attempted to test it psychometrically – that of Pecnik and Epperson (1985). This study attempted to revise the Shepherd Scale. This revision was conducted in two steps. First, the items were re-worded to form a less ambiguous version of the scale. The product, the Revised Shepherd Scale, was designed to be as faithful to the original as possible, while maximising its resilience against common measurement problems such as ambiguity, acquiescence and social desirability. The second phase was a psychometric testing and revision of the scale.

7.1.3.1 The trimmed RSS

The SS obviously needed more revision than just rewording, but determining how to revise it without a history comparable to that of the LAS and ROS was difficult. For example, the authors (Bassett et al., 1981) and Pecnik and Epperson had both recommended a two-factor structure. However, the structure recommended by Bassett et al. was merely a conceptual division, with no psychometric confirmation. The structure recommended by Pecnik and Epperson had failed to replicate in a testing conducted prior to this study, so it could also not be used. That there were two or more factors seemed to be evident, since a one-factor model fared worst of all the models. However, it was uncertain, firstly, how many factors there really were, and it was also uncertain which items should load onto which factors.

Since this could not be established a priori, the scale was first trimmed so as to maximise its total reliability (and not the reliability of its different components, or sub-scales). Here the scale fared reasonably poorly as well. Even though it had a very high initial reliability of .867, a full ten items (just more than one quarter of its total) were removed before its reliability peaked at .877. This reliable scale was then first subjected to a conventional common factor analysis to determine the appropriate number of factors. A scree test revealed that the ideal number of factors would be two. This was confirmed by the CEFAs in which analyses containing more than two factors always contained trivial factors.

Next a process of stepwise CEFAs were conducted to remove those items which did not load properly on these two factors. A further 12 items (almost one third of the total) were removed, again indicating the inadequacy of the original scale.

The final product was so different from the original that the two new factors had to be re-examined and renamed. The first factor, called "Doctrinal beliefs and applications (Doctrine)" consisted of the 12 items: 6, 9, 13, 14, 16, 20, 23, 33-36 and 38. The second factor, called the "Relational aspects of faith (Relationship)" consisted of the four items: 26, 28, 30 and 32.

However, this trimmed version of the scale did not cross-validated well with the 1997 data set at all. This would seem to indicate that the RSS provides an inconsistent measurement of the constructs it is intended to measure, which may take on sample-specific values, and it replicates poorly across various studies. It could also be that the reason for the poor cross-validation of this scales lies in the fact that two different "versions" of the scale were used – the original and the revised version. However, the revision process was carried out in such a way as to maximise the congruence between the two scales, while improving its psychometric properties. The degree to which the process was a success in both of these aspects is hard to establish, but it should be noted that neither the original, nor the revised versions have the characteristics one would desire for such a scale. In that sense, at least, the revision may not considered to be a success, although it probably still is an improvement. This researcher's previous experience, on two occasions, with the SS, however, make it doubtful that the unrevised version of the SS would have fared any better in this study. The mediational effect that the two RSS factors played in the LVM could also be sample-specific, and again show that the measurement may not be valid. In the light of this, the best recommendation that might be made about the scale would be to discourage all further use of the scale.

7.1.3.2 Models of the RSS

Four models were proposed a priori to test the RSS. These models had to be adapted slightly after the extensive changes made to the scale, so much so that the fourth model testing Pecnik and Epperson's recommended version of the scale became redundant. This model was thus not tested. Suffice it to say that the fact that the revisions led to a different version than that recommended by Pecnik and Epperson is in itself a disconfirmation of their recommendation. However, it was interesting to note some definite similarities between the trimmed scale developed in this study, and that recommended by Pecnik and Epperson. There may be some portion of the scale that may be stable across studies, but it would probably be a very small portion, and would require more research to determine precisely which items are stable. This may not be worth the effort. The findings of this study cannot support the conclusion of Butman (1990, p. 22) that "the Shepherd Scale is one of the most psychometrically respectable

instruments that has been developed to date." The intentions underlying the SS are indeed noble, but the product did not deliver "psychometrically respectable" results in this study.

The remaining three models that were tested were firstly a standard CFA model with two factors, and two further models testing the idea of a general factor underlying the scale, either with the RSS as a single-factor scale, or as a two-factor scale with a single second-order factor. Neither of the latter two models fit very well, and the notion of a single factor was rejected. Thus, amongst all the different models, it was eventually the standard CFA model which fit the best, and which was retained for further use in this study.

7.2 Evaluation of the theoretical models

This study started out with three a priori models about the relationship between the Christian faith variables and three of the love styles variables. In testing them, definite problems came to light.

7.2.1 Model selection

The model (postulate 15) proposing that Agape and Storge were caused by both Doctrine and Intrinsic, and that Ludus was caused by Extrinsic, did not fit well at all. Although it's fit indices surpassed those of the other a priori models, it contained a Heywood case, and the signs of some of the parameters were opposite to what would have been expected (both theoretically, and on the basis of the intercorrelations derived from the CFA model). This model could not be accepted.

Postulate 16, a second, more restricted model (essentially the same as postulate 15, barring that Extrinsic was now posited as the sole cause of Ludus) succeeded in eliminating the Heywood case, but could not reverse the negative signs of parameters which, on the basis of the relevant theoretical considerations and previous correlations in the literature, should have been positive. It too did not account for the relationships between the variables that was in congruence with current theory, or even with the data, for that matter. It too was not acceptable.

The results from these two models did, however, highlight something very important. The love styles were not linear results of the Christian faith variables. The love styles could not simply be accounted for by positing them as dependent variables to all the measures of Christian faith. There was an unknown mechanism at work in the way in which the Christian faith variables related to each other which determined how they related to the love styles.

This was again evident in the testing of the third a priori model (postulate 17). Here Doctrine was posited as the sole exogenous variable, with causal paths leading from it to Agape and Storge, as well as to all of

the other three measures of Christian faith. Relationship and Intrinsic were posited as further causes of Agape and Storge, and Extrinsic as the sole cause of Ludus. Although this model had resolved the remaining problem in that all the parameters now had the signs which were expected, this model did not fit the data that well, and fully one half of the structural parameters were non-significant. While this model did confirm that an as yet unknown mechanism was at work in the interrelations between the Christian faith variables, it had not succeeded in discovering what that mechanism was, and was also not acceptable.

7.2.2 Model generation

Thus this researcher also had come to the situation which Jöreskog (1993) describes as being all too common: None of the a priori models have fit very well, and the research question remains relatively unanswered. New models had to be generated which could answer the research questions and properly account for the data.

Recognising that discovering the underlying relationship between the Christian faith variables was crucial to a correct understanding (and thus formulation) of the complete model, this researcher opted to examine the probable causes of this relationship in isolation. It was evident from the three models tested that Intrinsic and Relationship were interfering with each other in their relationships to both Agape and Storge. For example, removing the correlation between Relationship and Intrinsic (postulate 16 to postulate 17) allowed the negative parameters between Intrinsic and both Agape and Storge to become positive, as they were posited to be. It was also evident that Doctrine did not really play a role where these two love styles were concerned – its effect on them was small and negligible.

However, it was also evident that Doctrine played a very big role in determining Ludus. It was also evident that this role interfered with Extrinsic's influence on Ludus. When the parameter from Doctrine to Ludus was estimated (postulate 15), Extrinsic had a very small effect on Ludus. When the parameter from Doctrine to Ludus was fixed at zero (postulates 16 and 17), the influence of Extrinsic and Ludus shot up. Doctrine and Extrinsic were also very strongly related, while Intrinsic and Relationship were very strongly related. In contrast to this, the models of these postulates showed the relationships between Intrinsic and Extrinsic, and between Doctrine and Relationship as being relatively weak, and that while they were, in terms of mere correlations, actually quite strong.

Each of these two sets of variables (Intrinsic, Relationship, Agape and Storge, on the one hand, and Doctrine, Extrinsic and Ludus on the other) were thus examined in isolation. It was determined that the effect of Intrinsic on both Agape and Storge was mediated almost entirely by its association with Relationship. Thus the influence of Intrinsic on Agape and Storge should best be modelled as an indirect one, via Relationship.

It was anticipated that Relationship would influence the love styles variables directly, and that there would be a positive relationship between it and Intrinsic. However, the strong influence of Intrinsic on Relationship, and thereby also its strong indirect influence on Agape and Storge was not expected. This relationship, however, is not at all incongruent with the nature of Intrinsic (cf. 2.3.2.1, p. 28). Intrinsic is the approach to Christian faith defined by maturity and a turning away from selfish motives. Thus it can be expected to influence the ways in which Christians relate to others, especially in the expression of that most basic Christian virtue of all: Love.

More or less the same was found for Doctrine and Extrinsic as for Relationship, Intrinsic, Agape and Storge. The relationship between Extrinsic and Ludus was accounted for nearly exclusively by the relationship between Doctrine and Extrinsic. Extrinsic's effect on Ludus could be modelled solely indirectly, through Doctrine.

Discovering the relationship between Doctrine, Extrinsic and Ludus was a serendipitous discovery not expected by this researcher. It was expected that Christians' doctrine would influence their love styles, and that specifically it would keep them from the "un-Christian" love style of Ludus. It was also expected that the extrinsic religious orientation would exert an influence on Ludus, since the motives underlying both of these constructs have so much in common. What was not expected was that the effect of Extrinsic would be mediated through Doctrine. If this effect were true in the population, it would mean that Extrinsic has an effect on the Christian's (response to) doctrine. This effect then allows the person to indulge in the ludic love style. Thus what a person's motives are influences what that person believes, which in turn influences how that person behaves. Thus this discovery was surprising, but not startling, and it is one which is very defensible from a theoretical point of view.

Using this information, two new models were proposed and tested. The first (postulate 18) was a more simple version, with the influence of Extrinsic and Intrinsic on Doctrine and Relationship being accounted for merely by allowing all the measures of Christian faith to intercorrelate. The love styles were posited to be caused by the RSS variables only, with Doctrine accounting for Ludus only, and Relationship for both Agape and Storge. This model fit the data quite well – its fit indices compared very favourably with those of postulate 15. However, what set it above the model representing postulate 15 was that it had comparable fit despite being more restricted, that there were no Heywood cases, and the signs of all the variables were in agreement with the underlying theory.

The problem with this model, however, was that it did not allow Intrinsic to play any direct role in the interrelations of the various variables, and, more importantly, it did not isolate the unique effects of Extrinsic on Doctrine, and Intrinsic on Relationship. Thus an additional model (postulate 19) was tested, in which the relationships between the love styles and the RSS variables were as with postulate 18, except that Intrinsic was posited as the sole cause of Relationship, and Extrinsic as the sole cause of

Doctrine. Postulate 19 fit the data nearly as well as postulate 18, and a chi-square difference test showed that the two models were not distinguishable in terms of fit. Postulate 19, being more parsimonious and substantively meaningful, may be the more preferable model.

Nevertheless, it should be noted that chi-square difference tests between both of these models and the CFA model were significant. They could thus not improve statistically on the CFA model. Possibly even better theoretical models might exist which can improve statistically on the CFA model. This study should thus be seen as only an initial foray into the field of enquiry, and has definitely not provided the final answer as to the relationship between the RSS, ROS and LAS.

Future studies might benefit by focussing more exclusively on the ROS and the LAS, perhaps with the inclusion of another measurement of Christian faith other than the RSS or the SS.

7.2.3 The relationship between the love styles and measures of Christian faith

The models tested were based on theoretical concerns as discussed in the opening chapters of this dissertation. Even the changes made in the process of model modification were constrained by theoretical considerations. These models thus need to be interpreted in terms of the theory underlying them.

7.2.3.1 Postulates 18 and 19

Since postulate 18 posits no special relationships between the measures of Christian faith, and since its proposed relationships between the love styles and these measures of Christian faith are the same as for postulate 19, a discussion of it's implications (specifically, how the love styles relate to Christian faith) is subsumed in a discussion of postulate 19.

What does this model (postulate 19) "mean?" If it were to hold in the general population, this model would imply the following: The extrinsic religious orientation has a strong negative influence on a person's doctrine. This relationship, of course, is as old as the Bible itself (Tit 1:9-2:1; 1 Tim 6:3-5; 2 Tim 3:1-9, 4:3-4; 2 Pet 2:1-3, 10-19). It would mean that people who are immature in their faith, or who pursue their faith insincerely, motivated rather by selfish concerns than a desire to please God, will slight doctrine. These people will easily "neglect" doctrines that do not suit them, or adapt doctrines so that they might suit themselves, even if the intent of the doctrine is changed. This approach is exactly what Allport had in mind with the extrinsic religious orientation, as evidenced by his extensive study on the relationship between religious orientation and both helping behaviour and prejudice (Allport & Ross, 1967). An obvious test for this is to ask whether the converse is also true. Can it be seen that people who

disregard the importance of sound doctrine also exhibit a self-serving religious attitude? Sadly, this is very evident in the teaching of many Churches, especially in what is known as the "health and wealth" gospel, or the prosperity movement. Entire books have been written on (both for and against) this false teaching, which distorts Biblical doctrine so as to allow its proponents to focus on selfish material gain. The link between the poor doctrine and self-interest of this teaching is evident from works such as those of McConnell (1995, esp. pp. 185-189).

Doctrine, in its turn, has a strong influence on keeping the believer from selfishness, and specifically the immoral kind of love described so well by Ludus (Prov 6:20-24; 1 Cor 5:9; 1 Tim 4:16; 1 Thess 4:1-8; Heb 13:4). Thus, in keeping with the Biblical command to do so, this model would propose that a strong understanding of Biblical doctrine will cause the believer to actively flee immoral forms of love (1 Cor 6:18). It is interesting, however, that Doctrine seems not to have such a strong influence on the positive aspects of love. These will be discussed shortly. Doctrine, then, seems to direct the believer away from negative influences. A Christian with poor doctrine will, as noted in the references given, easily be caught up in immorality (Rev 2:14-15).

Ludus, is a totally self-serving type of love, and Extrinsic is a self-serving attitude towards religion. That the two are correlated has been confirmed in several studies (Hendrick & Hendrick, 1987a; Leak, 1993; Raubenheimer, 1994; 1997). What was interesting about this study is the mediating effect of the RSS on the ROS that was discovered. This highlights one of the advantages of SEM – the effects of multiple variables may be estimated simultaneously. Had one only examined the correlation matrix between the variables (Table 24, p. 123) as with previous studies, the simple conclusion would have been that Extrinsic and Ludus are strongly, and positively, correlated. While this is not an incorrect assumption at all, it does not reveal all there is to know about the relationship between these two variables. With SEM, the effect of other variables, not only on these two variables, but on the relationship between them, may be examined. That is then also what was found in this study. While Extrinsic is definitely correlated with Ludus, this relationship is mediated by Doctrine. Extrinsic has an effect on Doctrine, and Doctrine has an effect on Ludus. Thus the relationships between variables may be much more colourful and detailed than at first supposed. The importance of this mediating effect has already been discussed.

But there seems to be another dynamic at work in the life of a believer. If the intrinsic religious orientation represents mature, selfless faith, then it represents, without a doubt, that faith which is brought about in the life of the believer by the Holy Spirit (Gal 5:22-23). It is a force which pulls the believer towards what is good (Rom 8:1-10; Eph 2:1-9), and specifically also towards love (Rom 5:5; 1 Cor 13:4-8). It is this work that so powerfully works in the believer (1 Thess 2:13) to restore relationships (Joh 13:34-35; 1 Joh 3:14-18). It is this working, more than just the acquisition of knowledge in the form of doctrine (Rev 2:1-7), which compels the believer to love as God loves, to love with *agapē* love. In this way, then, Intrinsic influences, not just our love, but our whole view of human

relationships, and this, in turn, is how we learn to love in a way which the world does not teach us. If Intrinsic truly affects a Christian's relationships, and specifically the love relationships of Christians, then it can most certainly be expected to influence, even more specifically, the romantic love relationships of Christians.

It should be remembered that Storge, as defined and measured by the LAS, is in reality the Biblical *philia*. It is the word used for love second only to *agapē* in terms of frequency of Biblical usage – 26 times as against 259 for *agapē* (Goodrick & Kohlenberger, 1990). It is fitting, then, that this aspect of love also be found to relate strongly to Christian faith. Christians are commanded to love, not only their friends, but even their enemies (Matt 5:44; Luk 6:27, 34). However, this does not mean that friendship is immaterial to Christian love. Rather, Christian love should be such that it can make friends out of the worst enemies. Yes, love your enemies, but be friends with those you love. This is the message of the Bible (Luk 10:25-37). And if Christians are commanded to love, and even befriend, their enemies, how much more should Christians also show the love of friendship to those whom they already love, and especially those whom they love most intimately – their romantic love partners.

Having noted that the LAS' Storge is in actual fact *philia*, it would be interesting to speculate what the findings would be were the LAS extended to measure that aspect of love (familial love) which is actually known as *storgē*. Since the LAS' love style names have become so entrenched in the terminology of the psychology of love, one would not dare attempt correcting the names now, as too much confusion would result. So a new name would have to be found for *storgē*. Nevertheless, this "missing" love is a serious shortcoming in the LAS, as it has been shown that *storgē* is an essential component of romantic love as well (Lewis, 1960; Wheat & Perkins, 1980).

That agape, storge and ludus are related to Christian faith has also now been established in a number of studies (Hendrick & Hendrick, 1987a; Raubenheimer, 1994; 1997). It was again interesting to note the mediating role of Relationship on the effect of Intrinsic on these two variables. Nevertheless, they may be owned as integral components of what love is to the Christian. Lee himself (1977, p. 175) noted that agape is "the official lovestyle of the Christian Church." That agape and storge are the two love styles which relate positively to the measures of Christian faith is a comforting finding. Some researchers (Davis, Kirkpatrick, Levy & O'Hearn, 1994; Mathes, 1980; Yancey & Berglass, 1991) have speculated that Agape is an unrealistic conception of love which does not exist. Yancey and Berglass went as far as proposing that it was merely a response set of social desirability. That the strong link between agape and Christian faith has now been confirmed in a number of studies, including the humble contribution of this study, can be seen as a definite indication that it does exist, and that it may be found in the one place where it should be found, the one place, also, where Lee thought it would be found: The Christian Church.

7.3 *Shortcomings of this study and recommendations for future research*

Whenever it is mentioned that, for example, Doctrine "causes" Ludus, it should always be remembered that this is subject to several caveats. Firstly, it is only in the context of this model. There may be any number of other variables which also have causal influences on Ludus, and to think that Ludus, in its entirety, is "caused" by Doctrine is short-sighted. Secondly, this relationship is one which has been proposed, and which has withstood attempts at disconfirmation, in this study. It has, however, not been proved. It would only have been proved if, in addition to the evidence for the relationship between them, it could be shown that there is no spurious outside variable which causes both the variables mentioned, and if time precedence could be established (Judd et al., 1986, p. 184; Kenny, 1979, pp. 2-4). As already mentioned, the relationships investigated here have not even attempted to exhaust the range of possible outside variables which also have a role to play in these most complex of human states and emotions. It may be considered an impossible task to accomplish. This study also makes no pretence about the lack of time precedence. All the variables were measured concurrently. That we may test a model in which the measures of Christian faith are assumed to cause certain love styles, and that we may even defend such propositions theoretically, does not prove that it is in fact so.

This problem of proof is also reflected in the ever-present reality of equivalent models. This researcher attempted to deal with this issue by considering a number of equivalent models in this study. On both statistical and theoretical grounds, the models selected in this study are believed to be the best of the set. But it must be remembered that the replacing rule of Lee and Hershberger (1990) does not exhaust the possible set of alternative models (MacCallum et al., 1993, p. 188). Possibly, more equivalent models exist that could equally well account for the data. Proof of the suitability of the models derived in this study depends on their being tested, and found adequate, on new samples, and also in comparison to these and other possible equivalent models.

The findings of this study can also, unfortunately, not be generalised at will to the population at large. Firstly, the scales used in this study were trimmed using exploratory methods. This trimming process may have capitalised on chance characteristics of the data set, and may not generalise well to other situations. This also means that the later analyses – the testing of the LVMs – may be influence by this chance capitalisation. There is thus a dire need for the results of this study to be confirmed using new data sets. Both the trimming of the measurement scales, and the LVMs need to be re-tested individually on new samples.

The scales that were trimmed cross-validated with varying degrees of success. The LAS cross-validated well, the ROS only average, and the RSS not well at all. That the LAS cross-validated so well, and compared well with previous attempts at refining the scale show that the analyses for this scale can be trusted. Future study should focus on settling the one or two items about which absolute certainty does not yet exist. The LAS is a good scale, showing much promise in the psychology of love. Using a refined instrument can only increase its worth to research.

The ROS is a well-established scale, probably the most widely-used scale in the psychology of religion (Donahue, 1985a, p. 400; Hall et al., 1994, p. 396; Kirkpatrick & Hood, 1990, p. 442; Leak, 1993, p. 315). The fit of the ROS was also not as good as desired, although it was not so bad as to be unacceptable. Future research may focus on why this is so, and on possible ways of correcting this, so that two stable, reliable and valid measures of Intrinsic and Extrinsic may be had.

The ROS is also one of the few scales to have been correlated with the LAS in previous research. If one were to ignore the mediating effect of the RSS variables (which is justifiable, given the uncertainty about the validity of the RSSs measurement model), the ROS would probably be the scale which holds the most promise for future research on the relationship between Christian faith and the love styles. Its use in all such studies should be considered mandatory. However, the way in which it relates to other measures of Christian faith should also always be brought into consideration. Whether the mediating effect of the RSS is an effect unique to this study will have to be clarified through future research. But just as the ROS should be an obligatory scale in the study of Christian faith and love, so also it is imperative that it never be used alone. Faith is such a complex phenomenon that the interplay between various measures of faith forms an essential part of understanding how it influences the world of the believer.

The SS has proved to be a problematic scale (Raubenheimer, 1997). This study confirmed that even after an extensive and well-reasoned revision, the scale still provided many problems. At least several more studies will be required to ascertain with a degree of certainty whether there are any stable factors underlying parts of the scale, and how these should be used in research. Whether the effort will be justified is debatable. Despite an appealing basis, the scale has not delivered what it has promised to do. It should, at the very least, never be used as the sole measure of Christian faith. It may even be so that its use should be discouraged entirely, and were it not for the interesting indirect effect which the ROS had on the love styles through the two RSS variables, this researcher would have recommended that the scale be discarded completely. However, its redemption may lie in the fact that it does seem to suggest that it mediates the effect of other measures of Christian faith. Why and how it does this will still have to be determined in future studies, and it would have to be proved to be a consistent effect, not specific to any single sample, before its role as a mediational variable may even be considered to be justified. It would make an interesting companion to the ROS in future studies about the relationship between Christian faith and love, provided that researchers using it remain aware of its considerable shortcomings.

A possible recommendation in the use of the SS may lie in its original intention as designed by Bassett et al. (1981). The SS was designed as a means of tentatively separating "the sheep from the goats." As was mentioned previously (2.3.1.2, p. 26), perhaps it can be used to indicate which members of a sample are Christians and which are not. It can then function in a dichotomous way, separating a sample into two groups, which can then be tested separately with other scales. However, to do that properly, a cut-off score will need to be determined, and this will only be possible after extensive testing. Whether the effort is justified is, as was mentioned, debatable.

It might also be argued that, in the context of SEM, revision of the SS may not have been totally necessary, as, to a limited extent, various techniques can be used to counter for such things as social desirability in the modelling process itself (Watson, 1992).

This researcher has assumed that significant differences would exist between White South Africans and South Africans of other races in terms of the relationship between faith and love (and in terms of these variables individually), and thus other races were excluded from this study. Even though very little work has been done in South Africa on either faith or love, most of it has centred on Whites. As far as lōve in South Africa is concerned, the work of Philbrick and Stones (Philbrick & Stones, 1988a; 1989a; Stones & Philbrick, 1989b) seems to be the only studies of love amongst other cultural groups. Even internationally, however, work on love amongst other races is minimal (Braithwaite, 1998, p. 750). This is a situation which desperately needs to be addressed.

As was painstakingly pointed out in the literature review, the work of this study should not be generalised to all religious faiths either. Gorsuch (1988, p. 202), speaking of the unfounded tendency of researchers to generalise from one study of religion to all religions, noted that "psychology always hopes that the principles found operating in one population will generalise to other populations, but this is not necessarily so." It should be remembered in this study too, that this is an exploratory investigation (using confirmatory methods) into the relationship between Christian faith and the love styles amongst White, unmarried, South African Evangelical Christians. This study needs to be replicated on the same sample, and it needs to be repeated on different samples before any means of true knowledge in the field can rightly be had.

Further sample restrictions related to the respondents' young age and love status. The study needs to be repeated on older samples, and also samples including married couples. The results of the present study cannot be generalised to these groups.

An interesting aspect which was not examined in this study relates to gender differences. It was mentioned in the literature review (p. 37) that the existence of gender differences concerning love is still being hotly debated. What has not yet even come properly under the spotlight is gender differences in the relationship between love and other variables. Although methods have long existed to examine the

differences in such correlations statistically (e.g., Fisher's r to z transformation), SEM allows even more complex comparisons, as entire models can be examined for group differences. Whether, and under what conditions, gender differences exist in the relationship between religion and love must surely become the focus of some subsequent studies. This will, of course, necessitate repetitions for each subdivision of each religious faith under study.

A last shortcoming of this study lies in the data gathering. Possibly, better measurements may have been obtained by using more extensive categories for the Likert scales (e.g., an 8-point scale instead of a 4-point scale), as this does seem to affect the analysis of the data (Bernstein & Teng, 1989; Bollen, 1989, p. 435; Dolan, 1994; Gorsuch, 1997a, p. 538-539; Rigdon & Ferguson, 1991, p. 496). Another possible alternative would be to use something like a feeling thermometer (Alwin, 1997) to obtain a more continuous measurement. Although the ordinal-type nature of data such as was used in this study can be accommodated in SEM, it must be admitted that the technique lends itself better to continuous data. However, this will always be a problem in social-psychological research (and many other research fields) which is so dependent on self-report measures. That other researchers may have to contend with the same problems in attempting similar studies should not discourage them from attempting work in such an exciting field of discovery.

7.4 Significance of this study

Structural equation modelling has come to take its place in the array of methodologies open to psychology researchers (Bentler, 1986; Coovert, Penner & MacCallum, 1990; Fassinger, 1987; Goldberger & Duncan, 1973). It has found wide appeal and wide application. This study is also not the first SEM study in the fields of either love or religion, and it will hopefully, and probably, not be the last. However, the daunting nature of the complex methodology underlying SEM has discouraged many researchers from employing it, even while the wave of new and user-friendly computer programmes has encouraged its misuse (Steiger, 2001). Nevertheless, it is unfortunate that only a handful of studies have used SEM in the study of love. In the 26 years which have passed since the first such studies that could be located (3.3, p. 58), very few others have appeared. It is equally unfortunate that even fewer studies have used SEM in the study of religion (2.4, p. 33). These are fields which, by the very nature of their immense complexity, require level-headed research using sophisticated methodologies such as SEM. Both in the psychology of love and the psychology of religion, calls have been made for just such a methodological sophistication. Dion and Dion (1993, p. 463) pleaded that "a multidimensional perspective is needed to understand heterosexual love." This is indicative of using scales such as the LAS, and using techniques such as SEM. One of the most prolific and influential researchers in the psychology of religion, Hood (1989, p. 336), has called for methodological sophistication to be

combined with theoretical recognition of God's active ontological role in theology. It is hoped that this study would meet with his approval. It is also hoped that this study will pave the way for more SEM studies, both in the respective fields of religion and love, and in the combination of these two fields. The surface has only been scratched, but without techniques such as SEM, which require researchers to carefully consider and explicitly state their theoretical expectations, research will never delve more than skin-deep.

Another area in which more sophistication is needed in the psychology of religion is in reckoning with the differences caused by theological heritage (Donahue, 1989). This is also a problem that has rendered most previous research correlating love and religion null and void. This study has attempted to carefully define and delimit the theological background to which it refers. More such studies are desperately needed.

It is also surprising that so little work has been done on the relationship between Christian faith and love (whether romantic love or any other kind of love), especially since love is so central to the Christian faith (Joh 13:34-35; 1 Cor 13:13; 1 John 4:7-12, 16 4:3). Some interesting work has already done which could open the door even further for the combined study of these two factors. Waller and Shaver (1994) showed that the love styles are formed almost entirely through environmental factors (and not genetic factors). Thus factors such as religious faith should be expected to play an important role in the formation of love. It is also essential for Christian researchers to show the difference that Christian faith can make in the life of a believer, that love to a Christian means different things than to the rest of the world. As noted previously, Wheat (in Wheat and Perkins, 1980, p. 67) pointed out that "in our culture, sex and love are often confused even though they are not interchangeable terms." That the Christian Church has a different view on love in general, and romantic love in particular, needs to be shown, also in the world of academic research, through careful and consistent studies, such as it is hoped this study would be.

Gorsuch (1988, p. 205) also noted that "psychological analysis is incomplete unless it includes information on the religiousness of the people being studied and how that affects the focal behaviour." This is especially true of the study of love. It is a strange anomaly that researchers have often examined the relationship between religion and sexual behaviour (cf. Bassett et al., 1999; Gorsuch, 1988, p. 208; Haerich, 1992; Hendrick & Hendrick, 1987a; Leak, 1993; Reed & Meyers, 1991; Wann, 1993), and researchers have also often examined the relationship between the love styles and sexual behaviour (e.g., Cimbalo & Novell, 1993; 1988; Hendrick & Hendrick, 1987a; 1987b; Hensley, 1996; Raciti & Hendrick, 1992; Sarwer, Kalichman & Johnson, 1993), but researchers have seldom turned their attention to the relationship between religion and love (Hendrick & Hendrick, 1987a; Leak, 1993). This area requires much further investigation, and it needs to do it within very clearly defined boundaries (such as the clear and specific definition of the sample used in this study – cf. 2.2, p. 14) if it is to make a

sensible contribution to knowledge of the ways in which religion and love are related. It is hard to understand why, when love and religion are so closely associated (Drakeford, 1964, p. 106), there has been so little research investigating this relationship. It is hoped that this study will inspire more researchers to tackle the combination of these two fields, and to do so in ways which are fitting to the demands for refined research made by these multifaceted constructs.

It is believed that this study has clinical significance as well. That psychologists need to take recognition of theology and spiritual values in the therapeutic process is something which need not even be debated any longer (Clay, 1996a; 1996b; Ellison, 1972; Goldsmith, 1989; Hunter, 1989; Jones, 1994; Malony, 1972; Paloutzian, 1989; Sexton, 1986; Sloan et al., 2000; Spilka & Bridges, 1989; Theodore, 1984). Hall, Tisdale and Brokaw (1994, p. 395) discussed "the inclusion of religion as a human difference within the Ethical Principles of Psychologists and Code of Conduct," and came to the conclusion that "this inclusion makes it incumbent upon all practitioners in the field of psychology to have an awareness of issues related to religiosity as well as an ability to effectively address clients' religious concerns in treatment."

Psychologists dealing with Christian clients need to have an understanding of the different religious orientations, and how these can be expected to influence the outlook of their client on all areas of life. This is clearly seen in the way in which Christian faith relates to romantic love. For example, Hahn and Blass (Hahn & Blass, 1997) found that respondents preferred potential partners who were similar to them in terms of their love styles. If it is so that Christians do display certain characteristic ways of loving, it can be expected that they would want love partners with similar ways of loving. Counsellors need to know this.

Both religion (or at the very least, belief in some form, even if belief in agnosticism) and love are things which form part of the daily life of almost all living people. That these two vital components of human existence are related should not be surprising. What is surprising is psychologists' inability or refusal to deal with them as related issues. Certainly many psychologist deal with relationship issues, to the point that dealing with love may form part of their daily work. Hendrick and Hendrick (1987a, p. 397) rightly state that "philosophers and theologians have long been aware of the links between religious feeling and love." Psychologists, it would seem, have not.

And yet, knowledge of how religion and love interact is vital for any counsellor (Pavelsky, 1973). And this knowledge must be precise as well. As Leak (1993, p. 315) (speaking of religion and sexuality) emphasises: "Global statements (e.g., religious individuals are sexually conservative) need to take into account a particular individual's religious orientation as well as the nature of the sexual dimension being considered." Therapists need to be aware that Christian clients will be more storgic, more agapic, possibly less manic, and definitely much less ludic than other clients. Proper therapeutic intervention

cannot take place without basic knowledge such as this. As an example, Davis and Latty-Mann (1987) explained the intuitive appeal of Lee's love styles theory, and the important role that the love styles play in relationship quality. Specifically, they found that if partners in a romantic relationship have very different love styles (especially on Agape) they do not have a high quality relationship. Thus, while it would seem as if Christians tend to have strong Agape scores (although comparisons between various religious groupings are still lacking), therapists would need to take this into account in dealing with their romantic relationships. Psychologists need to admit that faith can very well influence other areas of life, such as love.

Lastly, Gorsuch's (1990b, p. 90) admonition in this regard should also be mentioned: "We need to continually remind ourselves and our fellow psychologists that descriptive studies are solely descriptive, and not prescriptive, and that theology and philosophy are the basis of prescriptive oughts." This study has found evidence for the possibility of certain love styles characteristics which may be found amongst Christians. At the very best, it indicates that Christians may be expected to be like this. It does not in the least indicate that they *should* be like this. That is the sole prerogative of the Word of God.

Summary

English

This study was designed to investigate the relationship between Evangelical Christian faith and romantic love. The investigation was done through the analysis, by means of structural equation modelling, of a priori models proposing various ways in which these variables could possibly be related.

The literature review of this study revealed the necessity of delimiting studies in the field of religion to specific and narrowly-defined religious groupings, and also provided a working and measurable definition of Evangelical Christian faith. Furthermore, psychological research into love, focusing on that emanating from the work of Lee (1977), was reviewed. A clarification of the terms used by Lee and their original meanings, and how these terms relate to a Christian definition of love was provided.

Three scales were used in this study. Data were collected from a sample of 369 young, unmarried, White South African Evangelical Christians. Prior to the analysis of the latent variable models, the psychometric suitability of the scales to be used was examined by means of reliability analyses and Comprehensive Exploratory Factor Analyses (Tateneni, Mels, Cudeck & Browne, 2001). The Shepherd Scale (Bassett et al., 1981) proved to be psychometrically inadequate, even after trimming the 38 items down to 16. This study could not replicate factor structures found in the literature for this scale, and it is doubtful whether the scale is a useful research tool. The Religious Orientation Scale (Allport & Ross, 1967) was trimmed so as to maximise its reliability and its convergent and discriminant validity, yielding a shortened scale of seven items each for Intrinsic and Extrinsic. The Love Attitudes Scale (Hendrick & Hendrick, 1986) was also trimmed (from 42 to 24 items), and the shortened version agreed almost completely with a shortened version developed by Hendrick et al. (1998). The trimmed versions of all three scales were cross-validated on a previous data set, with the Love Attitudes Scale performing best, and the Shepherd Scale not validating well at all.

The a priori models tested did not deliver acceptable fit with the data. It was discovered that the Shepherd Scale played a mediational role on the influence of Intrinsic and Extrinsic on the love styles of Agape and Storge, and Ludus, respectively. These influences were incorporated into two further models, with the best model being that in which Intrinsic was posited as a cause of Relationship, which in turn functioned as a cause of both Agape and Storge. Extrinsic (correlated with Intrinsic) was also posited as a cause of Doctrine, which functioned as a cause of Ludus.

Numerous equivalent models were considered, although the two models posited a posteriori were favoured. In view of the poor structure of the Shepherd Scale, and because of the manner in which the mediational effect of the Shepherd Scale variables was uncovered, these two models must be seen as tentative, as their statistical selection may have been due to a capitalisation on chance.

It is recommended that the study be repeated, testing the two a posteriori models on new (but similar) samples, and also on different cultural groupings, various very specifically defined and delimited religious groupings, age groupings, and love status groupings. It is also recommended that clinicians and counsellors take cognisance of the relationship between faith and love amongst their Christian clients.

Afrikaans

Hierdie ondersoek is ontwerp om die verhouding tussen die Evangeliese Christelike geloof en romantiese liefde te ondersoek. Die ondersoek is gedoen deur die toetsing, met behulp van strukturele vergelykingsmodellering, van voorafopgestelde wyses waarop die veranderlikes moontlik met mekaar kan verband hou.

'n Oorsig van die literatuur het beklemtoon dat ondersoeke in die veld van godsdiens tot baie spesifieke en eng-gedefinieerde godsdienstige groeperinge beperk moet word, en het ook 'n werkbare en meetbare definisie van die Evangeliese Christelike geloof opgelewer. 'n Oorsig is ook gegee oor sielkundige ondersoeke van liefde, met die klem op dié wat spruit uit die werk van Lee (1977). 'n Verduideliking is ook gegee van die terme soos gebruik deur Lee, asook hul oorspronklike betekenisse, en hoe hierdie terme verband hou tot 'n Christelike definisie van liefde.

Drie meetinstrumente is gebruik in hierdie ondersoek. Data is ingesamel van 'n steekproef van 369 jong, ongetroude, Wit Suid-Afrikaanse Evangeliese Christene. Voor die ontleding van die latente-veranderlike-modelle is die psigometriese aanvaarbaarheid van hierdie skale ondersoek deur middel van betroubaarheidsontledings en omvattende eksploratiewe faktor ontledings (Tateneni, Mels, Cudeck & Browne, 2001). Die Shepherd Scale (Bassett et al., 1981) is as psigometries onaanvaarbaar bevind, selfs na die verwydering van 22 van dié skaal se items. Hierdie ondersoek kon nie faktorstrukture van hierdie skaal in die literatuur repliseer nie en dit is twyfelagtig of die skaal 'n nuttige navorsingsinstrument is. Die Religious Orientation Scale (Allport & Ross, 1967) is verkort om sodoende die betroubaarheid en die konvergente en diskriminante geldigheid daarvan optimaal te verhoog, en het 'n skaal van sewe items elk vir die intrinsieke en ekstrinsieke godsdienstige oriënterings tot gevolg gehad. Die Love Attitudes Scale (Hendrick & Hendrick, 1986) is ook verkort (van 42 na 24 items) en die verkorte weergawe het grotendeels ooreengestem met 'n vorkorte weergawe soos ontwikkel deur Hendrick et al. (1998). Die verkorte weergawes van al drie skale is gekruisvalideer op 'n vorige datastel. Die Love Attitudes Scale het die beste resultate opgelewer en die Shepherd Scale het glad nie goed gekruisvalideer nie.

Die voorafopgestelde modelle het nie 'n goeie passing met die data opgelewer nie. Daar is vasgestel dat die Shepherd Scale 'n bemiddelende rol gespeel het op die invloed van Intrinsiek en Ekstrinsiek op die liefdestyle van onderskeidelik Agape en Storge aan die een kant en Ludus aan die ander kant. Hierdie bemiddelende invloede is ingesluit in twee verdere modelle. Die beste van hierdie twee modelle is een waarin Intrinsiek as die oorsaak van Christelike verhoudings gestel is, wat om die beurt as die oorsaak

van sowel Agape as Storge gefunksioneer het. Ekstrinsiek (wat korreleer met Intrinsiek) is ook as die oorsaak van Doktriene gepostuleer, wat weer as 'n oorsaak van Ludus gestel is.

Verskeie ekwivalente modelle is oorweeg, maar die twee modelle wat a posteriori opgestel is, het voorkeur geniet. In die lig van sowel die swak struktuur van die Shepherd Scale as die manier waarop die bemiddelende effek van die Shepherd Scale veranderlikes aan die lig gekom het, moet hierdie twee modelle as tentatiewe modelle gesien word, aangesien hul statistiese seleksie deur kansfaktore beinvloed kon gewees het.

Daar word aanbeveel dat hierdie ondersoek gerepliseer word, en dat die twee a posteriori modelle op nuwe soortgelyke steekproewe getoets word, asook dat die ondersoek gerepliseer word op ander kulturele-, ouderdoms-, liefdestatus-, en ook goed gedefinieerde en afgebakende godsdienstige groeperinge. Daar word ook aanbeveel dat kliniesesielkundiges en beraders kennis neem van die verhouding tussen geloof en liefde onder hul Christelike kliente.

Key terms

Love, Love Styles, Love Attitudes Scale, Christian faith, Intrinsic Religious Orientation, Extrinsic Religious Orientation, Shepherd Scale, Religious Orientation Scale, Structural Equation Modelling, LISREL.

Appendix A

The Revised Shepherd Scale

The original SS items (cf. Bassett et al., 1981, pp. 349-350) are shown first in italics (with the Bible references on which Bassett et al. based them in parentheses), after which the revised items are shown in plain type (unaltered items thus do not have a revised form).

1. *I believe that God will bring about certain circumstances which will result in the judgement and destruction of evil. (Rev 3:10)*
2. *I believe that I can have the personal presence of God in my life. (Jhn 14:16)*
   I do not believe that it is possible to have the personal presence of God in my life.
3. *I believe that there are certain required duties to maintaining a strong Christian lifestyle (i.e., prayer, doing good deeds, and helping others). (Lk 9:23, 17:10; Rom 12:1; 1 Cor 6:15; 1 Thes 4:4, 5:18; Tit 3:8)*
   The fact that I am a Christian does not necessarily mean that I have the responsibility of maintaining a lifestyle which is in keeping with my faith (e.g., through prayer, doing good deeds, and helping others).
4. *I believe that it is possible to have a personal relationship with God through Christ. (Rom 14:22; Eph 2:14-17; Col 1:19-20)*
5. *I believe that by following the teachings of Jesus Christ and incorporating them into my daily life, I receive such things as peace, confidence and hope. (Jhn 14:27; Rom 5:1-2; Gal 3:11; Phil 4:7; 1 Jhn 2:28, 3:20-22)*
   Even if I were to follow the teachings of Jesus Christ, incorporating them into my life, that would not be a guarantee that I would be filled with peace, confidence and hope.
6. *I believe that God raised Jesus from the dead. (Jhn 20:24-29; 1 Cor 15:3-8)*
   God did not raise Jesus from the dead.
7. *I believe that God will judge me for all my actions and behaviours. (Jhn 3:18; Rom 1:18-32)*
   God will not judge the world for all their actions and behaviours.
8. *I believe that by submitting myself to Christ, He frees me to obey Him in a way I never could before. (Rom 6:15-19)*
9. *I believe in miracles as a result of my confidence in God to perform such things. (Acts 3:16; Phil 3:9)*
   My confidence in God allows me to believe that He can perform miracles.

10. *Because of God's favour to us, through Jesus Christ, we are no longer condemned by God's laws. (Rom 6:14; Gal 2:21)*

    I am no longer condemned by God's laws, because through Jesus Christ God has shown favour to me.

11. *Because of my personal commitment to Jesus Christ, I have eternal life. (Jhn 3:13-15, 31-35; Rom 5:17-21)*

    Because of my personal commitment to Jesus Christ, I know that I have eternal life.

12. *The only means by which I may know God is through my personal commitment to Jesus Christ. (Jhn 14:6-7; 2 Cor 4:5-6)*

    I can come to God through any religion, and therefore do not need a personal commitment to Jesus Christ in order to know God.

13. *I believe that everyone's life has been twisted by sin and that the only adequate remedy to this problem is Jesus Christ. (Jhn 3:19; Rom 1:18, 3:20)*

    I believe that everyone's life has been twisted by sin, and that Jesus Christ is the only one who can save them from this.

14. *I am concerned that my behaviour and speech reflect the teachings of Christ. (Matt 5:13-14; Col 4:6)*

    It is not essential that my behaviour and speech reflect the teachings of Christ.

15. *I respond positively (with patience, kindness, self-control) to those people who hold negative feelings toward me. (Matt 5:38-48; Rom 12:14-21)*

16. *I do kind things regardless of who's watching me. (Matt 6:1-6, 25:31-46; Eph 6:5-9)*

    I do not do good deeds if I know that I will not get any recognition for them.

17. *Status and material possessions are not of primary importance to me. (Matt 6:16-21, 25-33; Lk 12:13-21; 1 Cor 1:26-31; Phil 4:10-13)*

    Status and material possessions are important to me.

18. *I do not accept what I hear in regard to religious beliefs without first questioning the validity of it. (Matt 7:15-16; Col 2:8-19; 1 Jhn 4:1-7)*

19. *I strive to have good relationships with people even though their beliefs and values may be different than mine. (Rom 14:1-12)*

    I do not maintain good relationships with people whose beliefs and values are different from mine.

20. *It is important to me to conform to Christian standards of behaviour. (Matt 5:27-32, 19:1-12; Mk 10:1-12; Lk 16:18; Rom 8:6; Eph 5:18; 1 Jhn 2:15)*

    It is not so important to conform to Christian standards of behaviour.

21. *I am most influenced by people whose beliefs and values are consistent with the teachings of Christ. (Gal 2:11-16; Phil 2:19-24; 2 Tim 1:3-7)*

I am most influenced by those people whose beliefs and values are consistent with the teachings of Christ.

22. *I respect and obey the rules and regulations of the civil authorities which govern me. (Mk 12:3-17; 1 Cor 6:1-8; 1 Pet 2:13-17)*

    It is not necessary to respect and obey the rules and regulations of the civil authorities which govern me.

23. *I show respect towards Christians. (Rom 12:9-13; 1 Pet 3:8)*

    I find it important that Christians show love and respect to one another.

24. *I share things that I own with Christians. (Acts 4:31-37; Gal 6:10; Phil 4:14-20)*

    I do not share my possessions with other Christians.

25. *I share the same feelings Christians do whether it be happiness or sorrow. (Jhn 11:33-44; Rom 12:15)*

    I can easily share in the feelings of other Christians, whether it be happiness or sorrow.

26. *I'm concerned about how my behaviour affects Christians. (Rom 14:13-21; Gal 2:11-14)*

    I am concerned about how my behaviour will affect the faith of other people.

27. *I speak the truth with love to Christians. (Eph 4:15; Phil 2:1-11; Col 3:9)*

    I speak the truth with love to other Christians.

28. *I work for Christians without expecting recognition or acknowledgements. (Jhn 13:15-16; Rom 12:16; Gal 5:13; Eph 4:5)*

    I work for the Church without expecting recognition or acknowledgement.

29. *I am concerned about unity among Christians. (Jhn 17:20-23; 1 Cor 122-26; Phil 2:1-4; 1 Pet 3:8)*

    I am concerned about unity amongst Christians.

30. *I enjoy spending time with Christians. (Acts 2:42-47; 1 Jhn 1:7)*

    I devote much time to Christian activities and fellowship.

31. *My belief, trust, and loyalty to God can be seen by other people through my actions and behaviour. (Jhn 15:8; Gal 5:22-23; Phil 1:11; Col 3:12)*

    It is not necessary that others see my belief, trust and loyalty to God in my actions and behaviour.

32. *I can see daily growth in the areas of knowledge of Jesus Christ, self-control, patience and virtue. (2 Pet 1:5-7)*

33. *Because of my love for God, I obey His commandments. (Matt 22:37; Jhn 14:15; Rom 8:28)*

    Despite the fact that I love God, I do not have to obey all His commandments.

34. *I attribute my accomplishments to God's presence in my life. (Jhn 15:5, 7)*

    My accomplishments are the result of my own hard work, and not the presence of God in my life.

35: *I realise a need to admit my wrongs to God. (Matt 4:17; Rev 3:19)*

It is not necessary to admit my faults to God.

36. *I have told others that I serve Jesus Christ. (Acts 4:18-20; Phil 1:27-30)*

It is not necessary to tell others that I serve Jesus Christ.

37. *I have turned from my sin and believed in Jesus Christ. (Jhn 1:12; Acts 2:37-39; Rom 10:5-11)*

I have turned from my sin and believed in Jesus Christ for salvation.

38. *I daily use and apply what I have learned by following Jesus Christ. (Jhn 15:1-6; Eph 4:17-24; Col 2:6-7)*

Everything I learn by following Jesus Christ does not necessarily have to be used and applied in my daily life.

Appendix B

The reconstructed Shepherd Scale

The numbers in parentheses show the original numbering of the item in the Shepherd Scale.

Factor I – Doctrinal beliefs and applications

1. (6.) God did not raise Jesus from the dead.
2. (9.) My confidence in God allows me to believe that He can perform miracles.
3. (13.) I believe that everyone's life has been twisted by sin, and that Jesus Christ is the only one who can save them from this.
4. (14.) It is not essential that my behaviour and speech reflect the teachings of Christ.
5. (16.) I do not do good deeds if I know that I will not get any recognition for them.
6. (20.) It is not so important to conform to Christian standards of behaviour.
7. (23.) I find it important that Christians show love and respect to one another.
8. (33.) Despite the fact that I love God, I do not have to obey all His commandments.
9. (34.) My accomplishments are the result of my own hard work, and not the presence of God in my life.
10. (35.) It is not necessary to admit my faults to God.
11. (36.) It is not necessary to tell others that I serve Jesus Christ.
12. (38.) Everything I learn by following Jesus Christ does not necessarily have to be used and applied in my daily life.

Factor II – Relational aspects of faith

1. (26.) I am concerned about how my behaviour will affect the faith of other people.
2. (28.) I work for the Church without expecting recognition or acknowledgement.
3. (30.) I devote much time to Christian activities and fellowship.
4. (32.) I can see daily growth in the areas of knowledge of Jesus Christ, self-control, patience and virtue.

Appendix C

Questionnaires completed

Table 41 *Questionnaires Obtained From Various Sources*

Source	Name	English	Afrikaans	*Total*	Rejected	*Total entered*
Bible study	D.K.	2	8	*10*		*10*
Bible study	P.A.	4		*4*		*4*
Bible study	T.H.	2		*2*		*2*
Church	A.G.S. Fichardt Park		2	*2*		*2*
Church	A.G.S. Sentraal		6	*6*		*6*
Church	A.G.S. Universitas		4	*4*		*4*
Church	Afrikaanse Baptiste Kerk		6	*6*	1	*5*
Church	G.K. Bloemfontein-Noord		15	*15*	2	*13*
Church	G.K. Bloemfontein-Suid		10	*10*		*10*
Church	G.K. Bloemfontein-Wes		8	*8*		*8*
Church	G.K. Bloempark		16	*16*		*16*
Church	H.K. Bloemfontein-Wes		8	*8*		*8*
Church	N.G. Berg-en-Dal		15	*15*	2	*13*
Church	N.G. Brandwag		4	*4*		*4*
Church	N.G. Estoire		13	*13*		*13*
Church	N.G. Fichardtpark		1	*1*		*1*
Church	N.G. Gardeniapark		3	*3*		*3*
Church	N.G. Heuwelkruin		9	*9*	1	*8*
Church	N.G. Heuwelsig		25	*25*	2	*23*
Church	N.G. Hospitaalpark	1	10	*11*		*11*
Church	N.G. Onze Rust		2	*2*		*2*
Church	N.G. Pellisier		16	*16*	3	*13*
Church	N.G. Tweetoring		28	*28*	9	*19*
Church	N.G. Universitas		7	*7*	2	*5*
Church	N.G. Universitas-Rif		7	*7*		*7*
Church	N.G. Wilgehof		19	*19*		*19*
Church	Trinity Methodist Church		4	*4*		*4*
Church	V.E.K. Dan Pienaar		17	*17*	10	*7*
Hostel (UFS)	Abraham Fischer	1	3	*4*		*4*
Hostel (UFS)	Karee	1	8	*9*	2	*7*
Hostel (UFS)	Roosmaryn	10	53	*63*	16	*47*
Hostel (UFS)	Soetdoring	8	78	*86*	18	*68*
Hostel (UFS)	Vergeet-My-Nie	15	8	*23*	3	*20*
Hostel (UFS)	Verwoerd		19	*19*	8	*11*
Hostel (UFS)	Wag-'n-Bietjie	32	69	*101*	9	*92*
Hostel (FST)	Welgemoed	6	10	*16*		*16*
	Totals:	**82**	**511**	***593***	**88**	***505***

Table 42 *Number of Questionnaires Collected per Language and Source Type*

Source	Language		Questionnaires			%	
	English	Afrikaans	Gathered	Rejected	Data entered	Initial	Final
Bible studies	8	8	16	0	16	3.2	3.0
Churches	1	255	256	32	224	44.4	38.0
Student hostels	73	248	321	56	265	52.5	59.0
Totals:	*82*	*511*	*593*	*88*	*505*	*100.1*	*100.0*

Table 43 *Number of Questionnaires Collected per Language and Source Type for Final Sample*

		Source			
		Bible studies	Churches	Student hostels	*Row totals:*
Questionnaire language	Afrikaans	6 (1.6%)	144 (39.0%)	170 (46.1%)	*320 (86.7%)*
	English	8 (2.2%)	1 (0.3%)	40 (10.8%)	*49 (13.3%)*
	Column totals:	*14 (3.8%)*	*145 (39.3%)*	*210 (56.9%)*	*369 (100.0%)*

Note: Cell percentages show N of cell as a percentage of the entire final sample.

Table 44 *Culling of the Sample*

Category	Criteria	N
Relationship status	Engaged; Married; Divorced; Widowed	16
Race	Greek; South Sotho; Tswana; Xhosa; Zulu	9
Religion	Non-Christian	4
Age	< 18 / 30 <	90
Doctrinal background	Interdenominational; Roman Catholic; Unknown	10
incomplete after imputation	Missing data not imputed successfully	20

Note: Although the total of these categories sums to 149, only 136 questionnaires were excluded because of overlap between the categories.

Appendix D

Sample characteristics

Gender

Table 45 *Frequencies and Percentages for Sample Gender*

Gender	N	%
Male	87	23.6
Female	282	76.4

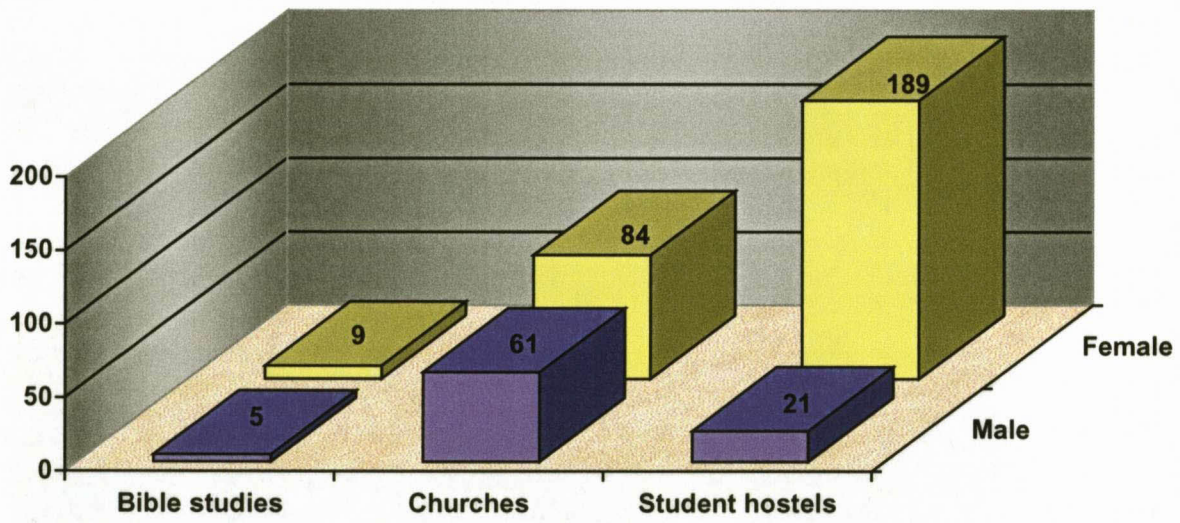


Figure 43 *Gender according to questionnaire source*

Age

Table 46 *Frequencies and Percentages for Sample Age*

Age	N	%	Cumulative %
19	114	30.9	30.9
20	95	25.7	56.6
21	64	17.3	74.0
22	33	8.9	82.9
23	16	4.3	87.3
24	18	4.9	92.1
25	7	1.9	94.0
26	8	2.2	96.2
27	5	1.4	97.6
28	4	1.1	98.6
29	5	1.4	100.0
Totals:	*369*	*100.0*	
Mean:	*20.897*		
SD:	*2.220*		

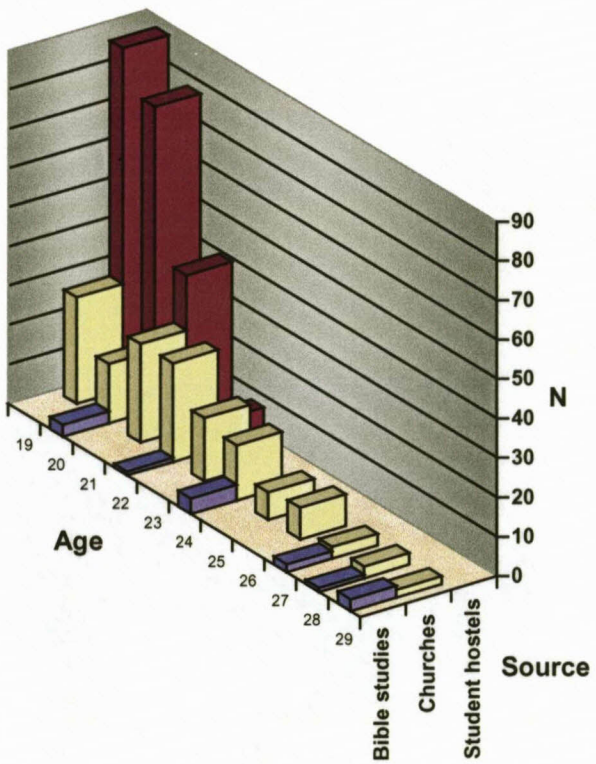


Figure 44 *Age distribution for source category*

Language

Table 47 *Frequencies and Percentages for Sample Language*

Home Language	N	%
Afrikaans	342	92.7
English	24	6.5
Bilingual	3	0.8
Totals:	*369*	*100.0*

Table 48 *Home Language Compared to Questionnaire Language*

		Home language			
		Afrikaans	**English**	**Bilingual**	***Row totals:***
Questionnaire language	**Afrikaans**	308 (83.5%)	9 (2.4%)	3 (0.8%)	*320 (86.7%)*
	English	37 (9.2%)	15 (4.1%)	0 (0.0%)	*49 (13.3%)*
	Column totals:	*342 (92.7%)*	*24 (6.5%)*	*3 (0.8%)*	*369 (100.0%)*

Note: Cell percentages show N of cell as a percentage of the entire sample.

Denomination

Table 49 *Denominational Affiliation*

Denomination *(Afrikaans names given in second line)*	**N**	**%**
Dutch Reformed Church [a] *Nederduits Gereformeerd Kerk (N.G.)*	245	66.4
Reformed Church *Gereformeerde Kerk*	45	12.2
Dutch Reformed Church [a] *Nederduitsch Hervormde Kerk*	16	4.3
Independent Charismatic Churches (various[b]) *Verskeie onafhanklike Charismatiese Kerke*	13	3.5
Apostolic Faith Mission (AFM) *Apostoliese Geloofsending (AGS)*	11	3.0
Baptist Church *Baptiste Kerk*	10	2.7
Methodist Church *Metodiste Kerk*	8	2.2
Anglican Church *Anglikaanse Kerk*	5	1.4
Full Gospel Church *Volle Evangelie Kerk*	5	1.4
Afrikaans Protestant Church (APK) *Afrikaanse Protestantse Kerk (APK)*	4	1.1
Church of England in South Africa (CESA) *Kerk van Engeland in Suid-Afrika*	3	0.8
Free Christian Reformed Church *Vrye Christelike Gereformeerde Kerk*	1	0.3
New Covenant Church *Nuwe Verbond Kerk*	1	0.3
Protestant Church *Protestantse Kerk*	1	0.3
United Congregational Church *Verenigde Denominasionele Kerk*	1	0.3
Totals:	*369*	*100.2*

a: Due to a linguistic occurrence ("Hervormd" is an Afrikaans term, and "Gereformeerd" stems from Dutch, but both are translated in English as "Reformed"), the English names of these two different denominations are the same, but they are not the same denomination. However, having said that, even though these are two totally different denominations, it should be noted that the first three Churches in this list share a common heritage, and are doctrinally very similar. They are still know in South Africa as the "three sister Churches."

b: The biographical item requesting denominational membership included most of the larger denominations as well as the option to specify the precise denomination if it was not on the list. One of the denominations on the list was "Charismatic" as most Charismatic churches in South Africa belong to the International Fellowship of Christian Churches (IFCC), a group whose members refer to themselves as "Charismatic." Nonetheless, four respondents opted rather to report that they belonged to one of the following denominations: Lighthouse (Jesus ministry); United Apostolic Faith Church; His People; Vineyard. Since these are all known to be Charismatic churches, these respondents were grouped along with the other Charismatics. The Apostolic Faith Mission was not grouped with the other Charismatic Churches, since in practice they are very similar to the Charismatic Churches, but historically they come from a more Pentecostal heritage.

Religious devotion

Table 50 *Church Attendance*

Frequency of church attendance	N	%	Cumulative N	Cumulative %
More than once a week	111	30.1	111	30.1
Once a week	205	55.6	316	85.6
Twice a month	33	8.9	349	94.6
Once a month	13	3.5	367	98.1
Never	7	1.9	369	100.0
Totals:	*369*	*100.0*		

Table 51 *Prayer Behaviour*

Frequency of prayer	N	%	Cumulative N	Cumulative %
Daily	306	82.9	306	82.9
Twice a week	29	7.9	335	90.8
Weekly	18	4.9	353	95.7
Monthly	7	1.9	360	97.6
Never	7	1.9	367	99.5
Unknown	2	0.5	369	100.0
Totals:	*369*	*100.0*		

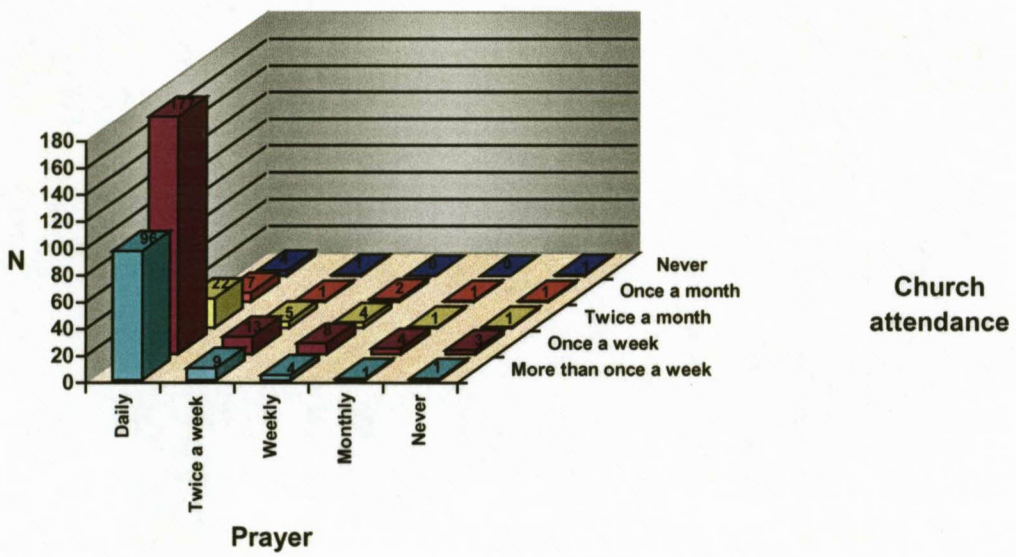


Figure 45 *Prayer frequency compared to frequency of church attendance (N=367)*

Relationship characteristics

Table 52 *Relationship Status*

Love status[a]	N	%
Yes	157	42.5
No	173	46.9
Never	39	10.6
Totals:	*369*	*100*

a: i.e., current involvement in a romantic love relationship.

Table 53 *Descriptive Statistics (in Months) for Relationship Status*

	Current relationship length	Time since last relationship ended	Length of previous relationship
N	157	175	169
Minimum	1	1	1
Maximum	84	84	100
Mode	1	1	3
Median	14	10	5
Mean	18.497	15.486	13.000
SE	1.368	1.217	1.256
SD	17.146	16.102	16.322

Appendix E

Imputation of missing data

Number of imputations per respondent

No. of imputations	No. of Respondents
0	303
1	55
2	10
3	9
4	6
5	1
6	1
7	2
8	1
9	0
10	1

Imputations per scale

Scale	Matched on	Item	Incomplete	Imputed	Unsuccessful
RSS		SS1	23	23	0
		SS2	2	2	0
		SS3	**5**	**4**	**1**
		SS4	1	1	0
		SS5	4	4	0
		SS7	**4**	**3**	**1**
	SS6	SS8	1	1	0
	SS9	SS10	2	2	0
	SS13	SS11	2	2	0
	SS14	SS12	2	2	0
	SS17	SS15	1	1	0
	SS19	SS16	5	5	0
	SS23	SS18	8	8	0
	SS24	**SS20**	**3**	**2**	**1**
	SS27	SS21	3	3	0
	SS30	**SS22**	**2**	**1**	**1**
	SS31	SS25	2	2	0
	SS32	SS26	3	3	0
	SS35	SS28	1	1	0
		SS29	1	1	0
		SS33	4	4	0
		SS34	1	1	0
		SS36	2	2	0
		SS37	2	2	0
		SS38	1	1	0

Scale	Matched on	Item	Incomplete	Imputed	Unsuccessful
LAS	Eros5 Eros7 Ludus1 Ludus2 Ludus3 Ludus4 Storge1 Pragma2 Pragma3 Pragma6 Mania3 Mania4 Mania5 Mania6 Agape1 Agape2 Agape4 Agape5 Agape6 Agape7	Eros1	5	5	0
		Eros2	3	3	0
		Eros3	8	8	0
		Eros4	1	1	0
		Eros6	1	1	0
		Ludus5	2	2	0
		Ludus6	1	1	0
		Ludus7	1	1	0
		Storge2	1	1	0
		Storge3	2	2	0
		Storge4	2	2	0
		Storge5	2	2	0
		Storge6	3	3	0
		Storge7	2	2	0
		Pragma1	1	1	0
		Pragma4	3	3	0
		Pragma5	3	3	0
		Pragma7	3	3	0
		Mania1	1	1	0
		Mania2	2	2	0
		Mania7	2	2	0
		Agape3	1	1	0
ROS	Intrinsic7 Extrinsic1 Extrinsic6 Extrinsic7 Extrinsic10	**Intrinsic1**	**4**	**2**	**2**
		Intrinsic2	1	1	0
		Intrinsic3	1	1	0
		Intrinsic4	1	1	0
		Intrinsic5	**2**	**1**	**1**
		Intrinsic6	**9**	**2**	**7**
		Intrinsic8	**1**	**0**	**1**
		Intrinsic9	1	1	0
		Extrinsic2	**4**	**1**	**3**
		Extrinsic3	**2**	**1**	**1**
		Extrinsic4	**1**	**0**	**1**
		Extrinsic5	**3**	**1**	**2**
		Extrinsic8	2	2	0
		Extrinsic9	1	1	0
		Extrinsic11	1	1	0

Appendix F

Distribution of scale scores

Table 54 *Distribution of Scale Scores*

(Sub)Scale	Minimum		Maximum		SD	SE	Mean	Mode	Median	Skewness	Kurtosis
	Possible[a]	Obtained	Possible	Obtained							
Belief	13	25	52	52	4.889	0.255	46.585	52	48	-1.449	2.701
Christian Walk	25	50	100	98	8.632	0.449	84.176	88	86	-1.045	1.329
RSS Total	*38*	*81*	*152*	*150*	*12.403*	*0.646*	*130.762*	*137*	*133*	*-1.328*	2.280
Intrinsic	9	12	36	36	4.166	0.219	29.752	31	30	-0.501	0.049
Extrinsic	11	11	44	39	5.477	0.287	22.482	25	22	0.345	-0.167
Eros	7	9	28	28	3.783	0.197	22.022	25	22	-0.540	-0.026
Ludus	7	7	28	28	4.124	0.215	12.780	12	12	0.859	0.385
Storge	7	7	28	28	3.461	0.180	22.401	24	23	-0.553	0.105
Pragma	7	7	28	28	4.216	0.219	18.794	18	19	-0.319	-0.199
Mania	7	8	28	28	3.772	0.196	17.949	18	18	0.091	-0.171
Agape	7	13	28	28	3.387	0.176	23.417	25	24	-0.631	-0.167

a: Since the minimum score in each instance is 1, this column also indicated the number of items per (sub)scale.

Appendix G

Data Covariance Matrix

The mean for an item is given only for the first occurrence of that item in a table row.

For printing purposes, the entire matrix is broken up into separate tables, from which the entire matrix may be reconstituted.

Table 55 RSS1-19 x RSS1-19 Variance/Covariance Matrix

	Mean	RSS1	RSS2	RSS3	RSS4	RSS5	RSS6	RSS7	RSS8	RSS9	RSS10	RSS11	RSS12	RSS13	RSS14	RSS15	RSS16	RSS17	RSS18	RSS19
RSS1	*3.515*	.707																		
RSS2	*3.631*	.006	.679																	
RSS3	*3.404*	-.073	.201	.861																
RSS4	*3.802*	.012	.041	.050	.393															
RSS5	*3.087*	.061	.152	.307	-.040	1.128														
RSS6	*3.805*	-.005	.124	.174	.073	.104	.489													
RSS7	*3.382*	.050	.138	.296	.059	.255	.175	1.220												
RSS8	*3.669*	.067	.090	.128	.057	.026	.063	.135	.466											
RSS9	*3.816*	.060	.119	.129	.088	.098	.113	.168	.170	.276										
RSS10	*3.114*	-.002	.004	.160	.126	.107	.126	.128	.114	.078	1.438									
RSS11	*3.759*	.051	.093	.095	.088	.108	.143	.166	.075	.078	.182	.395								
RSS12	*3.751*	.001	.101	.109	.029	.060	.103	.101	.053	.057	.115	.108	.465							
RSS13	*3.851*	.099	.056	.077	.060	.084	.101	.141	.100	.108	.088	.094	.107	.290						
RSS14	*3.612*	.089	.123	.271	.092	.148	.204	.225	.105	.146	.145	.132	.188	.181	.667					
RSS15	*2.810*	.073	.049	.014	-.008	.068	.001	.051	.000	.022	.003	.036	-.026	.012	.043	.529				
RSS16	*3.298*	.012	.135	.175	.046	.159	.197	.114	.099	.142	.096	.078	.129	.080	.197	.108	.742			
RSS17	*2.816*	.019	.122	.075	.007	.165	.111	.098	.080	.091	.130	.042	.071	.062	.195	.147	.264	.749		
RSS18	*2.886*	.094	.031	.109	.026	.053	-.011	.120	.104	.066	.097	.040	.056	.021	.054	.038	.061	.047	.889	
RSS19	*2.802*	.010	.098	-.023	-.042	.020	.043	.016	.011	.023	.028	-.059	-.001	-.040	.007	.060	.127	.140	.043	.762

Table 56 *RSS20-38 x RSS1-19 Covariance Matrix*

	Mean	RSS1	RSS2	RSS3	RSS4	RSS5	RSS6	RSS7	RSS8	RSS9	RSS10	RSS11	RSS12	RSS13	RSS14	RSS15	RSS16	RSS17	RSS18	RSS19
RSS20	*3.518*	.024	.104	.203	.043	.186	.134	.117	.060	.085	.036	.084	.086	.075	.231	.055	.182	.136	-.014	.013
RSS21	*3.423*	-.001	.096	.098	.076	.020	.085	.058	.042	.056	.126	.119	.138	.077	.145	.045	.069	.043	.116	-.047
RSS22	*3.417*	.059	.043	.086	.004	.140	.082	.063	.038	.069	.064	.112	.132	.087	.162	.030	.093	.009	-.012	.028
RSS23	*3.900*	.016	.072	.076	.073	.022	.100	.074	.051	.060	.058	.063	.051	.077	.121	.027	.098	.039	.013	.010
RSS24	*3.301*	.008	.103	.098	.060	.074	.089	.080	.064	.085	.004	.046	.105	.053	.111	.079	.206	.208	.004	.117
RSS25	*3.447*	.082	.078	.085	.056	.045	.082	.084	.086	.104	.120	.086	.074	.072	.092	.096	.135	.088	.097	.004
RSS26	*3.360*	.094	.030	.118	.058	.162	.027	.028	.071	.099	.097	.087	.096	.067	.132	.066	.063	.113	.066	-.105
RSS27	*3.417*	.070	.119	.163	.037	.108	.109	.123	.079	.077	.056	.076	.058	.062	.111	.120	.144	.091	.039	-.029
RSS28	*3.304*	.129	.115	.133	.025	.112	.049	.011	.082	.062	.147	.120	.087	.040	.153	.147	.184	.189	.084	-.005
RSS29	*3.564*	.051	.094	.128	.055	.087	.064	.083	.056	.063	.118	.115	.089	.084	.151	.088	.092	.110	.026	-.032
RSS30	*2.821*	.022	.067	.140	.011	.122	-.016	.044	.106	.032	.175	.065	.072	.025	.134	.110	.029	.152	.069	-.014
RSS31	*3.201*	.144	.033	.191	.015	.214	.140	.146	.080	.072	.099	.127	.172	.120	.233	.006	.081	.056	.045	-.053
RSS32	*3.176*	.075	.109	.062	.002	.083	.024	.049	.031	.057	.102	.102	.033	.048	.068	.118	.094	.120	.034	-.025
RSS33	*3.743*	.089	.149	.131	.036	.093	.153	.123	.061	.107	.054	.090	.107	.103	.207	.033	.191	.134	-.019	.063
RSS34	*3.762*	.069	.143	.091	.048	.132	.184	.124	.076	.105	.103	.086	.090	.103	.163	.020	.185	.149	.014	.061
RSS35	*3.848*	.048	.145	.102	.043	.119	.169	.118	.034	.086	.091	.086	.068	.081	.158	.023	.127	.092	-.009	.024
RSS36	*3.591*	.016	.188	.149	.066	.131	.181	.102	.101	.085	.126	.151	.104	.053	.173	.023	.133	.120	.038	.074
RSS37	*3.575*	.059	.128	.137	.035	.108	.129	.147	.082	.082	.225	.153	.116	.089	.131	.063	.095	.128	.095	-.038
RSS38	*3.585*	.054	.129	.190	.051	.161	.180	.143	.137	.127	.172	.074	.138	.115	.274	.027	.208	.165	.056	.056

Table 57 *RSS20-38 x RSS20-38 Variance/Covariance Matrix*

	RSS20	RSS21	RSS22	RSS23	RSS24	RSS25	RSS26	RSS27	RSS28	RSS29	RSS30	RSS31	RSS32	RSS33	RSS34	RSS35	RSS36	RSS37	RSS38
RSS20	.669																		
RSS21	.150	.582																	
RSS22	.123	.065	.787																
RSS23	.098	.116	.083	.161															
RSS24	.175	.093	.097	.082	.689														
RSS25	.075	.112	.098	.097	.107	.525													
RSS26	.136	.119	.045	.039	.057	.110	.557												
RSS27	.096	.122	.092	.080	.097	.155	.134	.396											
RSS28	.120	.127	.107	.052	.110	.089	.173	.166	.647										
RSS29	.107	.076	.030	.054	.045	.120	.171	.112	.182	.415									
RSS30	.098	.100	.012	.017	.070	.050	.225	.113	.261	.139	.626								
RSS31	.149	.127	.117	.096	.130	.133	.104	.079	.094	.123	.025	1.112							
RSS32	.044	.110	-.003	.010	-.026	.125	.162	.117	.175	.088	.203	.008	.575						
RSS33	.164	.082	.105	.083	.116	.105	.047	.105	.114	.102	.027	.207	.018	.463					
RSS34	.126	.098	.105	.082	.113	.093	.067	.083	.089	.102	-.002	.168	.031	.213	.399				
RSS35	.125	.075	.099	.077	.133	.095	.060	.077	.076	.075	.016	.117	.059	.181	.178	.314			
RSS36	.191	.114	.076	.087	.094	.121	.096	.101	.146	.071	.141	.158	.102	.120	.163	.174	.650		
RSS37	.033	.140	.102	.050	.052	.166	.148	.140	.151	.096	.095	.200	.110	.143	.113	.090	.124	.620	
RSS38	.207	.132	.068	.105	.131	.102	.123	.122	.167	.142	.081	.284	.060	.205	.219	.160	.199	.157	.613

Table 58 *LAS1-21 x RSS1-19 Covariance Matrix*

	Mean	RSS1	RSS2	RSS3	RSS4	RSS5	RSS6	RSS7	RSS8	RSS9	RSS10	RSS11	RSS12	RSS13	RSS14	RSS15	RSS16	RSS17	RSS18	RSS19
Eros1	*2.897*	.094	-.014	-.037	-.012	-.016	-.115	.067	.009	-.030	-.024	-.030	-.050	-.015	-.021	.013	-.059	-.014	.034	-.067
Eros2	*3.358*	.052	-.009	.007	.033	.034	-.006	.015	-.006	-.007	.043	-.011	.019	.018	.003	.003	.070	-.005	.117	-.011
Eros3	*2.892*	.053	-.032	.014	.046	.058	-.076	-.141	-.001	.013	-.009	-.081	-.065	.003	-.039	-.002	.043	-.020	.134	-.073
Eros4	*3.312*	.016	.015	.167	.065	.065	.020	.041	.073	.063	.187	.013	-.017	.022	.078	.051	.021	.039	.060	-.028
Eros5	*2.962*	.052	-.022	.053	.044	.025	-.013	.004	.053	.012	.045	-.028	-.058	-.014	-.020	.015	.014	-.023	.009	-.048
Eros6	*3.366*	.007	.040	.126	.040	.058	.047	.083	.026	.005	.148	.040	-.034	.022	.069	.102	.035	.030	.039	-.039
Eros7	*3.236*	-.005	.084	.043	.063	.007	-.014	-.012	.040	.011	-.068	.003	-.042	-.003	.016	.001	.076	-.003	.040	-.021
Ludus1	*2.041*	.012	-.099	-.106	-.038	-.071	-.052	-.092	-.008	-.001	-.179	-.118	-.058	-.065	-.115	-.055	-.037	-.041	-.101	-.016
Ludus2	*2.081*	.072	-.076	-.112	-.014	-.219	-.074	-.167	.002	-.023	-.197	-.016	.007	.020	-.096	-.055	-.084	-.124	-.051	-.025
Ludus3	*1.306*	-.039	-.102	-.151	-.045	-.100	-.128	-.106	-.037	-.066	-.122	-.105	-.122	-.085	-.145	-.037	-.146	-.115	-.003	.004
Ludus4	*1.978*	.060	-.035	-.056	-.015	.064	-.105	-.076	-.064	-.050	-.114	-.057	-.076	-.041	-.087	-.001	-.034	-.091	.014	-.031
Ludus5	*1.818*	.091	-.116	-.307	-.012	-.085	-.147	-.104	-.047	-.044	-.112	-.093	-.151	-.049	-.187	-.035	-.201	-.202	-.032	-.041
Ludus6	*2.295*	.054	-.065	-.128	-.058	-.088	-.035	-.018	.019	-.002	-.115	.006	.036	.050	-.010	-.031	-.007	-.057	-.042	.029
Ludus7	*1.260*	-.031	-.078	-.146	-.052	-.110	-.101	-.178	-.050	-.093	-.103	-.059	-.060	-.081	-.143	-.016	-.138	-.107	-.003	-.046
Storge1	*2.472*	.039	-.024	-.131	-.029	-.133	.030	-.088	-.004	-.013	-.124	.041	-.056	-.014	-.015	.041	-.046	-.084	-.079	-.002
Storge2	*3.715*	.090	.004	.036	.050	.036	.053	.038	.071	.081	.068	.032	.010	.082	.099	.027	.036	.064	.057	-.032
Storge3	*3.650*	.080	.026	.063	.086	.047	.057	.101	.093	.047	.119	.070	.057	.067	.111	.059	.104	.060	.093	-.018
Storge4	*3.266*	.010	-.011	.031	.001	.029	.000	-.061	.034	.019	.027	.059	-.031	-.023	.073	.091	.076	.106	-.008	.107
Storge5	*2.970*	-.004	-.046	.007	.048	.065	-.052	-.105	.020	-.016	.077	.036	-.016	.015	.078	.051	-.018	.043	-.055	.040
Storge6	*3.176*	.099	.022	.046	.021	-.029	.013	-.106	.037	.052	.070	.007	-.010	.092	.096	.099	.007	.003	.093	-.041
Storge7	*3.152*	.055	.037	.028	-.003	.000	-.008	-.066	.091	.080	.048	.026	.005	.015	.035	.121	.063	.107	.047	.033

Table 59 *LAS22-42 x RSS1-19 Covariance Matrix*

	Mean	RSS1	RSS2	RSS3	RSS4	RSS5	RSS6	RSS7	RSS8	RSS9	RSS10	RSS11	RSS12	RSS13	RSS14	RSS15	RSS16	RSS17	RSS18	RSS19
Pragma1	*2.084*	-.052	-.042	-.080	-.021	-.116	-.111	-.010	-.075	-.055	-.178	-.053	-.044	-.012	-.101	-.057	-.145	-.177	-.037	-.103
Pragma2	*2.710*	.104	.004	-.081	-.006	-.067	-.035	-.066	-.072	-.040	-.108	.011	.028	.030	-.015	.045	-.011	.001	.029	-.009
Pragma3	*3.084*	.006	-.053	.069	.003	-.089	-.003	.060	-.040	-.017	.007	.007	.105	.048	.033	-.027	-.036	-.101	.080	-.068
Pragma4	*2.816*	.046	.008	-.010	.034	-.068	.002	-.038	-.009	-.007	-.009	.026	.054	.057	-.004	-.005	-.007	.018	.025	-.037
Pragma5	*3.331*	-.002	.027	-.014	.036	.001	-.011	-.083	.050	.026	.003	.017	.031	.014	.022	.049	.002	.064	.013	-.011
Pragma6	*2.835*	.061	-.058	-.172	.032	-.102	-.030	-.086	-.033	-.020	-.144	.014	-.039	.032	-.048	.047	-.054	-.058	-.095	-.098
Pragma7	*1.935*	.096	-.092	-.207	-.010	-.152	-.045	-.130	-.049	-.034	-.107	-.002	-.106	-.048	-.090	.031	-.106	-.064	-.013	-.046
Mania1	*3.173*	.068	.002	-.016	.018	-.034	.009	.042	.014	.029	.059	.064	.038	.072	.029	-.008	-.019	-.033	.052	-.061
Mania2	*1.591*	-.050	-.105	-.090	.022	-.141	-.102	-.104	-.057	-.057	-.027	-.080	-.102	-.091	-.186	-.034	-.139	-.111	.043	-.076
Mania3	*2.984*	.074	.046	-.026	.032	.056	-.079	.025	.030	-.011	-.028	.012	-.029	-.049	-.033	-.036	-.039	.011	-.056	-.079
Mania4	*2.696*	.034	-.036	-.065	.021	-.042	-.062	-.011	.041	-.015	-.050	.022	.025	.014	-.020	-.033	-.080	-.081	-.007	-.093
Mania5	*2.715*	-.032	-.045	-.059	.039	-.046	-.061	-.019	.039	-.023	-.054	.007	-.087	-.048	-.064	-.051	-.108	-.028	-.071	-.114
Mania6	*2.583*	.036	-.113	-.201	-.042	-.146	-.103	-.098	-.005	-.055	-.053	-.011	-.085	-.041	-.105	-.093	-.136	-.131	-.031	-.096
Mania7	*2.206*	-.033	-.117	-.157	-.038	-.091	-.085	-.136	-.032	-.054	-.045	-.064	-.117	-.075	-.184	-.086	-.203	-.136	-.047	-.038
Agape1	*3.862*	.003	.014	.048	.030	.034	.033	.028	.063	.032	.073	.032	.044	.023	.020	-.005	.044	.002	.033	.008
Agape2	*3.539*	.083	.006	.078	.047	.035	.067	.019	.059	.045	.091	.073	.007	.026	.036	.051	.067	.051	.135	-.042
Agape3	*3.217*	.057	.056	.032	.095	.016	.080	.023	.037	.067	.103	.033	-.022	.019	.060	.117	.044	.094	.033	-.071
Agape4	*3.163*	-.005	.098	.048	.065	.062	.032	.065	.057	.063	.087	.045	.013	.016	.069	.077	.082	.147	.062	-.047
Agape5	*3.003*	-.042	.055	.045	.071	-.011	.009	-.045	.069	.052	.092	.047	.017	.000	.074	.060	.018	.090	.125	-.046
Agape6	*3.523*	.026	.049	.076	.055	.080	.040	.115	.046	.064	.147	.075	.027	.029	.105	.070	.056	.108	.084	-.024
Agape7	*3.111*	.027	.068	-.002	.087	-.018	.019	-.007	.048	.026	.134	.046	.009	.011	.035	.086	.059	.072	.116	-.046

Table 60 *LAS1-21 x RSS20-38 Covariance Matrix*

	RSS20	RSS21	RSS22	RSS23	RSS24	RSS25	RSS26	RSS27	RSS28	RSS29	RSS30	RSS31	RSS32	RSS33	RSS34	RSS35	RSS36	RSS37	RSS38
Eros1	-.039	-.079	-.017	-.019	-.059	.038	-.036	-.055	-.018	-.018	-.002	-.053	-.020	-.078	-.038	-.070	-.012	-.096	-.124
Eros2	-.012	-.005	-.008	.025	.017	.052	.007	.021	.011	.037	-.058	.094	.016	.027	.037	.035	-.022	.030	.026
Eros3	-.069	-.006	-.020	.016	-.024	.013	.004	.034	.036	.012	-.093	.014	-.032	.007	.042	-.041	-.031	-.014	-.010
Eros4	.064	.058	.073	.031	-.015	.064	.072	.043	.063	.109	.064	.068	.029	.056	.099	.053	.052	.117	.113
Eros5	.039	-.014	.111	.004	-.040	.020	.014	.016	.031	.002	.015	-.017	.026	-.013	.043	.008	.017	-.076	-.078
Eros6	.057	.057	.037	.040	.017	.051	.015	.113	.076	.089	.079	.073	.050	.046	.049	.039	.082	.107	.062
Eros7	.019	.063	.026	.013	.035	.068	-.015	.002	.072	.079	-.020	.040	.002	.045	.054	.049	.048	.046	.027
Ludus1	-.081	-.050	-.134	-.007	-.037	-.037	-.009	-.033	-.083	-.045	-.066	-.033	-.081	-.060	-.064	-.075	-.146	-.135	-.084
Ludus2	-.088	-.037	-.099	-.030	.016	-.047	-.013	-.080	-.052	-.030	-.037	-.111	-.042	-.134	-.062	-.066	-.116	-.131	-.170
Ludus3	-.083	-.075	-.096	-.075	-.065	-.078	-.138	-.090	-.129	-.111	-.076	-.130	-.035	-.141	-.120	-.130	-.113	-.125	-.169
Ludus4	-.032	-.059	-.064	-.040	-.004	.004	-.038	.012	.036	-.072	-.023	-.167	.031	-.125	-.125	-.093	-.096	-.045	-.096
Ludus5	-.080	-.097	-.033	-.051	-.179	-.022	-.095	-.082	-.081	-.085	-.100	-.165	-.001	-.175	-.139	-.109	-.189	-.129	-.173
Ludus6	-.023	-.038	-.058	-.016	-.018	-.045	-.017	-.012	-.008	-.018	-.067	-.076	.043	-.076	-.087	-.034	-.028	-.116	-.078
Ludus7	-.089	-.056	-.093	-.074	-.095	-.041	-.061	-.060	-.068	-.049	-.038	-.112	-.030	-.169	-.142	-.132	-.119	-.090	-.202
Storge1	-.052	.012	.006	-.002	-.031	-.005	-.013	.028	-.016	-.046	.000	-.087	.036	-.085	-.058	-.045	.011	-.046	-.084
Storge2	.061	.031	.070	.058	.040	.062	.051	.051	.051	.041	.052	.122	.039	.071	.043	.063	.068	.020	.058
Storge3	.040	.135	.054	.071	.067	.127	.075	.065	.030	.067	.073	.087	.051	.051	.058	.064	.077	.085	.097
Storge4	.020	.042	.044	.043	.067	.044	.043	.036	.088	.084	.091	.063	.065	.052	-.021	.078	.038	-.009	.048
Storge5	.067	.051	.021	-.006	.031	.000	.130	.037	.104	.082	.177	-.035	.070	-.035	-.015	-.002	.107	.006	.064
Storge6	.055	.061	-.028	.053	.026	.095	.053	.062	.080	.042	.059	.008	.045	.059	-.001	.049	.018	.067	.019
Storge7	.139	.017	.004	.021	.115	.100	.100	.072	.106	.110	.128	.073	.030	.045	-.013	.004	.087	.013	.071

Table 61 *LAS22-42 x RSS20-38 Covariance Matrix*

	RSS20	RSS21	RSS22	RSS23	RSS24	RSS25	RSS26	RSS27	RSS28	RSS29	RSS30	RSS31	RSS32	RSS33	RSS34	RSS35	RSS36	RSS37	RSS38
Pragma1	-.095	-.041	-.049	-.046	-.104	-.024	-.039	-.035	-.180	-.113	-.088	.002	-.012	-.079	-.135	-.074	-.072	-.024	-.125
Pragma2	-.059	-.008	.004	.003	.014	-.028	.037	.018	.086	.020	-.022	-.026	.040	-.001	-.039	-.014	-.086	.009	-.017
Pragma3	-.006	.138	.000	.025	-.066	.019	.013	.063	-.017	.007	.010	.021	-.020	.030	-.004	-.001	.010	-.021	-.009
Pragma4	-.016	.089	.006	.036	.045	.055	.004	.058	.026	-.032	-.033	.023	.019	.020	-.014	-.012	.003	.114	-.001
Pragma5	.040	.080	.055	.025	.055	.020	.033	.033	.054	.033	.002	.034	.018	.031	.000	.010	-.025	.041	.012
Pragma6	-.042	-.063	.001	-.019	-.032	.033	.030	-.012	-.020	-.045	-.041	-.032	.067	.033	-.034	-.036	-.095	-.003	-.039
Pragma7	-.034	-.002	-.079	-.045	-.075	-.025	.018	-.024	-.005	-.066	-.004	-.150	-.035	-.060	-.051	-.045	-.008	-.009	-.076
Mania1	.016	.019	.131	.020	-.001	-.004	.060	.014	.056	-.008	.004	.049	.051	.056	.039	.089	.025	.003	.012
Mania2	-.059	-.041	-.109	-.055	-.053	-.020	-.061	-.046	-.123	-.087	-.079	-.113	-.074	-.136	-.076	-.098	-.078	-.145	-.192
Mania3	.003	.048	-.034	-.023	-.025	.045	.011	.031	.032	.047	.073	.112	.079	.020	.007	-.016	.031	-.002	-.023
Mania4	.008	.012	.092	.021	-.006	-.011	-.018	.002	-.038	-.040	-.014	.004	-.003	-.046	-.024	.003	-.043	-.004	-.017
Mania5	.031	.042	-.014	.007	-.036	.035	-.009	.010	-.041	.030	.044	.016	.031	-.035	-.027	-.019	.019	-.067	-.056
Mania6	-.042	-.079	.009	-.045	-.124	-.009	-.075	-.108	-.074	-.063	-.135	-.049	-.097	-.048	-.035	-.009	-.038	-.020	-.049
Mania7	-.104	-.112	-.026	-.066	-.122	-.117	-.110	-.143	-.155	-.089	-.110	-.139	-.055	-.134	-.095	-.080	-.021	-.086	-.156
Agape1	.007	.042	.023	.032	.020	.027	.006	.042	.045	.029	.011	.071	-.011	.035	.051	.041	.060	.080	.097
Agape2	.046	.059	.041	.032	.038	.076	.080	.065	.042	.067	.029	.057	.035	.074	.083	.066	.053	.051	.058
Agape3	.091	.071	.026	.022	.049	.093	.098	.105	.078	.106	.096	.011	.089	.072	.065	.106	.089	.084	.109
Agape4	.049	.072	.008	-.003	.092	.047	.083	.038	.056	.060	.105	-.006	.126	.045	.091	.095	.107	.056	.068
Agape5	.067	.086	-.026	.003	.092	.007	.051	.037	.070	.069	.096	-.030	.043	.028	.050	.057	.080	.023	.017
Agape6	.112	.058	.007	.053	.060	.064	.094	.061	.053	.052	.083	.061	.038	.075	.084	.080	.117	.052	.106
Agape7	.051	.100	.049	.017	-.034	.081	.079	.079	.102	.095	.161	-.044	.078	.015	.029	.003	.067	.039	.038

Table 62 *LAS1-21 x LAS1-21 Variance/Covariance Matrix*

	Eros1	Eros2	Eros3	Eros4	Eros5	Eros6	Eros7	Ludus1	Ludus2	Ludus3	Ludus4	Ludus5	Ludus6	Ludus7	Storge1	Storge2	Storge3	Storge4	Storge5	Storge6	Storge7
Eros1	1.180																				
Eros2	.170	.600																			
Eros3	.217	.389	.988																		
Eros4	.182	.214	.240	.900																	
Eros5	.314	.136	.273	.218	.939																
Eros6	.084	.151	.113	.426	.153	.619															
Eros7	.119	.095	.064	.263	.110	.221	.784														
Ludus1	.018	-.077	-.015	-.244	-.058	-.178	-.023	1.148													
Ludus2	.033	-.045	.014	-.153	-.049	-.155	-.055	.415	1.347												
Ludus3	.067	-.055	.020	-.147	.009	-.107	-.078	.145	.266	.583											
Ludus4	-.038	-.076	.038	-.200	-.093	-.003	.021	.216	.298	.200	1.108										
Ludus5	.139	-.003	.105	-.047	.096	-.080	-.025	.162	.335	.382	.227	1.171									
Ludus6	.060	-.071	-.115	-.277	-.089	-.130	-.189	.341	.378	.176	.232	.230	1.100								
Ludus7	.106	.015	.023	-.092	.032	-.055	-.032	.128	.210	.257	.150	.227	.100	.405							
Storge1	.000	-.082	-.128	-.136	-.161	-.037	-.136	.193	.165	.130	.081	.110	.358	.089	1.092						
Storge2	-.010	.021	.034	.032	.041	.009	.046	-.018	.010	-.032	-.014	-.016	.027	-.062	.029	.345					
Storge3	.005	.055	.044	.063	-.019	.033	.050	-.032	-.061	-.075	-.008	-.045	-.027	-.045	-.014	.099	.462				
Storge4	-.084	-.084	-.055	.007	-.104	.028	-.003	.033	-.038	-.024	-.032	.048	.060	-.061	.114	.078	.109	.804			
Storge5	-.169	-.076	-.011	.259	-.151	.174	.045	-.042	.011	-.007	.046	.049	-.013	-.044	.036	.016	.096	.378	1.127		
Storge6	-.142	-.050	.046	.108	.004	.047	-.004	-.124	-.003	-.011	.012	.005	-.017	-.068	.042	.159	.086	.238	.209	.955	
Storge7	-.131	-.019	.019	.113	-.073	.056	-.003	-.017	.056	-.082	.003	-.010	.028	-.053	.018	.073	.118	.424	.483	.332	.950

Table 63 *LAS22-42 x LAS1-21 Covariance Matrix*

	Eros1	Eros2	Eros3	Eros4	Eros5	Eros6	Eros7	Ludus1	Ludus2	Ludus3	Ludus4	Ludus5	Ludus6	Ludus7	Storge1	Storge2	Storge3	Storge4	Storge5	Storge6	Storge7
Pragma1	.006	-.046	-.018	-.135	-.035	-.110	-.020	.260	.178	.162	.119	.173	.193	.141	.031	.021	.054	.010	.005	.102	.088
Pragma2	-.038	.031	-.007	-.018	-.114	-.092	-.018	.194	.323	.078	.135	.143	.265	.100	.145	.050	.040	.137	.138	.135	.161
Pragma3	-.029	.027	.017	-.026	-.035	-.023	.024	.065	.153	-.015	.048	.013	.122	-.008	.015	.062	.076	.078	.000	.140	.050
Pragma4	-.041	-.059	.007	-.051	-.056	-.036	.025	.146	.159	.032	.086	.034	.177	.005	.041	.053	.098	.114	.117	.209	.123
Pragma5	-.017	-.026	.003	.060	.056	.015	.058	-.013	.000	-.001	-.055	.033	-.006	-.026	-.042	.089	.102	.113	.119	.202	.137
Pragma6	.054	-.020	-.040	-.095	.013	-.067	.110	.151	.250	.059	.130	.160	.144	.002	.075	.032	.002	.098	.082	.097	.131
Pragma7	.088	-.121	-.037	-.064	-.016	-.039	.043	.228	.138	.131	.197	.165	.275	.107	.137	.036	-.042	.020	.082	.066	.032
Mania1	.040	.125	.073	.060	.118	-.026	.038	-.127	-.006	-.067	-.148	.075	.027	-.072	.008	.134	.028	-.014	-.033	.111	-.024
Mania2	.151	.052	.157	.049	.169	-.007	.034	.115	.107	.101	-.142	.197	.026	.109	.003	-.030	-.010	-.040	.026	-.031	.035
Mania3	.096	.066	.069	.043	.059	.003	.151	-.062	-.042	-.011	-.120	.035	-.036	-.004	-.098	.025	.035	-.001	-.033	-.041	.027
Mania4	.213	.065	.008	.054	.097	-.035	.047	.012	.133	.017	-.142	.149	-.008	.006	-.014	.017	.046	-.003	-.077	.018	-.038
Mania5	.172	.059	.064	.026	.114	-.021	.016	.022	-.015	.079	-.137	.109	.014	.047	.088	.011	.004	.032	-.030	-.102	-.014
Mania6	.163	.049	.025	-.024	.057	-.110	.012	.066	.124	.066	-.042	.323	.053	.090	-.015	-.021	-.002	.013	-.010	-.019	-.013
Mania7	.203	.032	.066	.025	.114	-.081	-.008	.144	.114	.181	-.020	.266	.004	.123	.011	.010	-.045	-.028	-.016	-.039	-.015
Agape1	-.017	.022	.047	.057	.006	.029	.044	-.041	-.035	-.031	-.014	-.041	-.011	-.045	-.035	.034	.063	.007	.034	.014	.024
Agape2	-.048	.062	.097	.147	.067	.093	.071	-.106	-.090	-.141	-.086	-.070	-.130	-.097	-.073	.026	.078	.003	.051	.076	.084
Agape3	-.021	.023	.070	.174	.125	.122	.101	-.131	-.135	-.121	-.090	-.061	-.162	-.095	-.103	.048	.057	.035	.093	.054	.095
Agape4	-.010	.018	.029	.112	.080	.071	.081	-.164	-.076	-.121	-.102	-.076	-.181	-.094	-.099	.000	.052	.038	.108	.056	.119
Agape5	.027	.075	.068	.203	.152	.127	.143	-.169	-.060	-.069	-.027	-.059	-.240	-.017	-.162	.006	.015	.005	.084	.067	.111
Agape6	-.030	.065	.054	.203	.085	.159	.096	-.157	-.170	-.161	-.095	-.122	-.133	-.117	-.076	.070	.047	.016	.097	.087	.108
Agape7	-.027	.047	.080	.161	.029	.103	.093	-.132	-.053	-.105	-.044	-.015	-.199	-.070	-.088	.051	.055	.014	.145	.070	.162

Table 64 *LAS22-42 x LAS22-42 Variance/Covariance Matrix*

	Pragma1	Pragma2	Pragma3	Pragma4	Pragma5	Pragma6	Pragma7	Mania1	Mania2	Mania3	Mania4	Mania5	Mania6	Mania7	Agape1	Agape2	Agape3	Agape4	Agape5	Agape6	Agape7
Pragma1	1.061																				
Pragma2	.326	1.098																			
Pragma3	.227	.220	.898																		
Pragma4	.282	.378	.342	.933																	
Pragma5	.116	.164	.176	.281	.727																
Pragma6	.288	.319	.191	.328	.286	.997															
Pragma7	.332	.310	.125	.300	.163	.353	1.045														
Mania1	-.039	.037	.075	.024	.054	.072	.014	.758													
Mania2	.075	-.035	-.009	.039	.000	.054	.087	.101	.748												
Mania3	-.007	-.062	.007	.030	.014	-.008	-.004	.133	.186	.951											
Mania4	.023	.048	.034	.123	.098	.088	-.003	.240	.131	.202	.777										
Mania5	.024	-.037	.019	.029	.051	.037	.006	.060	.190	.354	.223	.764									
Mania6	.079	.044	-.044	.064	.087	.105	.220	.121	.215	.129	.305	.188	1.151								
Mania7	.132	.057	-.036	.016	.035	.012	.092	.089	.258	.077	.247	.148	.450	.979							
Agape1	-.040	.006	.025	.023	.049	-.009	-.042	.032	-.038	.028	.031	.015	-.012	-.007	.168						
Agape2	-.105	-.074	-.035	-.009	.022	-.036	-.074	.088	.004	.060	.069	.010	.006	-.005	.088	.461					
Agape3	-.116	-.070	-.040	-.031	.031	.001	-.040	.125	.007	.110	.088	.078	-.021	.010	.049	.220	.605				
Agape4	-.122	-.040	-.060	.014	.019	-.008	-.106	.083	.050	.141	.041	.079	.011	-.044	.023	.173	.334	.588			
Agape5	-.117	-.135	.024	-.013	.064	-.092	-.046	.070	.072	.101	.058	.052	.055	-.011	.022	.156	.252	.345	.867		
Agape6	-.104	-.082	-.006	-.042	.052	-.036	-.058	.137	.027	.079	.042	.035	-.012	-.048	.059	.190	.182	.165	.227	.473	
Agape7	-.145	-.090	-.037	-.031	.020	-.055	-.044	.057	.100	.173	.047	.135	.049	-.056	.029	.212	.242	.259	.329	.241	.719

Table 65 *ROS1-20 x RSS1-19 Covariance Matrix*

	Mean	RSS1	RSS2	RSS3	RSS4	RSS5	RSS6	RSS7	RSS8	RSS9	RSS10	RSS11	RSS12	RSS13	RSS14	RSS15	RSS16	RSS17	RSS18	RSS19
Intrinsic1	*3.612*	.075	.066	.070	.035	.102	-.008	.094	.059	.053	.055	.077	.063	.021	.075	.087	.004	.048	.059	-.061
Intrinsic2	*3.588*	.118	.092	.047	.051	.131	.053	.060	.065	.054	.071	.077	.044	.047	.046	.074	.052	.062	.056	.016
Intrinsic3	*3.583*	.109	.090	.093	.050	.107	.084	.119	.071	.072	.143	.114	.059	.068	.099	.111	.092	.105	.113	.020
Intrinsic4	*3.146*	.039	.081	.074	.053	.107	.004	.047	.095	.019	.087	.065	.012	.019	.019	.074	.021	.049	.044	.040
Intrinsic5	*3.512*	.064	.135	.149	.028	.205	.027	.097	.072	.076	.202	.121	.066	.063	.112	.070	.056	.125	.116	.009
Intrinsic6	*1.913*	.077	.020	-.038	.026	.067	-.041	.033	-.023	.003	-.080	-.024	.014	.009	-.091	.046	.012	.046	.077	.026
Intrinsic7	*3.675*	.138	.067	.058	.055	.085	.053	.133	.044	.065	.029	.076	.036	.066	.099	.052	.040	.089	.036	-.007
Intrinsic8	*2.713*	.078	.057	.192	-.027	.153	-.007	.042	.043	.012	.133	.099	.053	-.021	.013	.059	-.001	.031	.111	-.033
Intrinsic9	*3.073*	.027	.000	.123	.017	.170	-.005	.045	.043	.057	.149	.072	.035	.044	.066	.052	.046	.084	.079	-.010
Extrinsic1	*3.398*	.091	.025	.007	.055	.022	.045	.046	.059	.057	.047	.096	.013	.065	.041	.057	.033	.093	-.033	-.008
Extrinsic2	*2.276*	-.012	.037	-.055	.011	.017	-.082	-.019	-.052	-.030	-.056	.048	-.007	-.010	-.009	.009	-.134	.005	-.017	-.141
Extrinsic3	*2.648*	.049	.003	-.118	.023	.028	-.044	-.080	-.052	-.005	-.183	-.015	-.094	-.012	-.017	.077	-.058	.063	-.179	-.127
Extrinsic4	*1.371*	-.088	-.110	-.126	-.049	-.078	-.137	-.213	-.102	-.111	-.181	-.119	-.163	-.151	-.209	-.041	-.187	-.103	-.083	.030
Extrinsic5	*1.829*	-.045	-.104	-.200	-.009	-.162	-.112	-.076	-.067	-.078	-.179	-.063	-.102	-.050	-.156	-.065	-.177	-.113	-.087	-.042
Extrinsic6	*1.900*	-.011	-.067	-.171	-.020	-.127	-.058	-.116	-.077	-.040	-.127	-.024	-.069	-.077	-.082	-.022	-.139	.017	-.107	-.014
Extrinsic7	*1.512*	-.129	-.126	-.120	-.040	-.110	-.123	-.150	-.020	-.096	-.067	-.077	-.130	-.076	-.198	-.052	-.186	-.098	-.039	-.051
Extrinsic8	*1.669*	-.093	-.136	-.209	-.101	-.064	-.190	-.180	-.120	-.115	-.095	-.115	-.096	-.074	-.188	-.082	-.227	-.110	-.027	-.047
Extrinsic9	*1.507*	-.080	-.128	-.192	-.038	-.126	-.145	-.118	-.060	-.075	-.066	-.073	-.118	-.060	-.148	-.061	-.151	-.067	-.043	-.063
Extrinsic10	*1.767*	-.094	-.127	-.156	-.044	-.107	-.105	-.150	-.102	-.089	-.117	-.078	-.115	-.029	-.153	-.080	-.183	-.138	-.040	-.044
Extrinsic11	*2.724*	.020	-.132	-.176	-.014	-.022	-.043	-.109	-.094	-.059	-.197	-.040	-.121	-.044	-.175	-.006	-.116	-.062	-.108	-.096

Table 66 *ROS1-20 x RSS20-38 Covariance Matrix*

	RSS20	RSS21	RSS22	RSS23	RSS24	RSS25	RSS26	RSS27	RSS28	RSS29	RSS30	RSS31	RSS32	RSS33	RSS34	RSS35	RSS36	RSS37	RSS38
Intrinsic1	.073	.088	.048	.024	.035	.106	.148	.143	.104	.070	.159	.102	.145	.011	.000	.033	.086	.096	.059
Intrinsic2	.053	.069	.031	.040	.067	.109	.122	.113	.131	.067	.116	.164	.105	.097	.048	.095	.116	.096	.144
Intrinsic3	.073	.120	.031	.050	.088	.130	.145	.153	.149	.111	.162	.144	.161	.085	.107	.078	.147	.124	.150
Intrinsic4	.071	.090	.004	-.007	.037	.032	.118	.094	.094	.015	.173	.041	.113	.000	.019	-.002	.106	.130	.042
Intrinsic5	.101	.136	.049	.043	.000	.088	.193	.123	.230	.132	.211	.101	.132	.097	.120	.045	.131	.183	.134
Intrinsic6	-.075	-.050	-.062	-.014	.059	.050	.042	.004	.005	.027	.003	-.023	.023	.013	.001	.003	-.019	.042	-.082
Intrinsic7	.074	.059	.008	.041	.109	.097	.082	.093	.066	.078	.102	.112	.090	.093	.096	.089	.108	.079	.096
Intrinsic8	.068	.084	.036	-.032	.032	.039	.164	.120	.164	.097	.280	.142	.159	-.014	.026	.008	.127	.117	.079
Intrinsic9	.125	.094	.075	.026	.081	.098	.215	.105	.141	.103	.206	.124	.153	.032	.056	.055	.131	.061	.098
Extrinsic1	.008	.043	.026	.037	.048	.107	.060	.081	.058	.082	.033	.099	.057	.059	.087	.061	.096	.094	.087
Extrinsic2	-.021	.030	-.072	-.018	-.005	.012	.085	.028	.033	.053	.055	-.031	.016	-.010	.025	.007	.029	.096	-.021
Extrinsic3	.017	-.022	.001	.027	.027	.071	.019	.041	.015	.042	.035	-.057	-.017	.069	-.008	.017	-.014	.007	-.049
Extrinsic4	-.095	-.147	-.117	-.101	-.047	-.137	-.058	-.101	-.127	-.085	-.023	-.205	-.063	-.211	-.161	-.115	-.147	-.151	-.215
Extrinsic5	-.278	-.159	-.119	-.085	-.155	-.078	-.131	-.124	-.122	-.015	-.126	-.229	-.024	-.172	-.125	-.121	-.225	-.089	-.256
Extrinsic6	-.127	-.164	-.064	-.059	-.065	-.064	.015	-.040	-.016	.027	-.034	-.151	.020	-.061	-.076	-.051	-.095	.001	-.088
Extrinsic7	-.176	-.152	-.119	-.087	-.100	-.151	-.123	-.119	-.099	-.067	-.112	-.195	-.069	-.194	-.141	-.142	-.127	-.143	-.214
Extrinsic8	-.097	-.129	-.112	-.128	-.118	-.088	-.082	-.128	-.209	-.074	-.100	-.276	-.029	-.202	-.174	-.148	-.179	-.155	-.287
Extrinsic9	-.089	-.082	-.049	-.074	-.039	-.072	-.074	-.103	-.097	-.072	-.072	-.246	-.032	-.171	-.142	-.121	-.145	-.113	-.159
Extrinsic10	-.137	-.135	-.060	-.094	-.106	-.107	-.147	-.166	-.160	-.097	-.159	-.138	-.062	-.144	-.175	-.095	-.147	-.156	-.211
Extrinsic11	-.071	-.087	-.045	-.044	-.023	-.031	-.055	-.045	-.098	-.034	-.175	-.159	.024	-.118	-.033	.001	-.051	-.042	-.088

Table 67 *ROS1-20 x LAS1-21 Covariance Matrix*

	Eros1	Eros2	Eros3	Eros4	Eros5	Eros6	Eros7	Ludus1	Ludus2	Ludus3	Ludus4	Ludus5	Ludus6	Ludus7	Storge1	Storge2	Storge3	Storge4	Storge5	Storge6	Storge7
Intrinsic1	-.016	.000	-.029	.026	.029	.047	-.006	-.060	-.020	-.047	.065	-.073	.041	-.032	.001	.047	.033	.033	.059	.003	.097
Intrinsic2	-.086	.039	-.004	.009	-.027	.007	.000	-.040	-.070	-.069	.037	-.078	.013	-.069	.002	.048	.089	.047	.018	.027	.071
Intrinsic3	-.010	.025	.039	.073	.014	.074	-.013	-.078	-.012	-.081	.002	-.079	-.020	-.070	-.001	.041	.049	.011	.061	.019	.072
Intrinsic4	-.050	-.031	.008	.009	.003	.050	.044	-.060	-.091	-.026	.030	-.025	-.041	-.046	.031	-.018	.043	-.039	.026	-.010	-.039
Intrinsic5	-.001	.031	.012	.079	.006	.051	.020	-.062	-.077	-.084	-.040	-.070	-.038	-.052	-.028	.051	.033	.018	.075	.070	.063
Intrinsic6	.032	.058	.056	.019	-.003	-.009	-.026	.006	.067	-.014	.012	-.008	.009	.023	-.073	.051	.008	-.029	.016	.021	-.017
Intrinsic7	-.031	.011	-.027	.017	-.004	.065	.036	-.041	-.009	-.060	-.045	-.040	-.004	-.073	-.034	.068	.082	.030	.058	.047	.006
Intrinsic8	.003	-.060	-.067	.016	.043	.043	-.044	-.070	-.096	-.099	.051	-.107	-.045	-.036	-.054	-.006	.019	.041	.111	-.001	.101
Intrinsic9	-.017	.017	-.019	.026	.000	.079	.007	.027	-.066	-.112	.029	-.082	-.046	-.063	-.054	.032	.028	.084	.086	.020	.133
Extrinsic1	.047	.026	.019	.063	.034	.074	.107	.092	.087	-.022	.020	.007	.004	-.028	-.009	.046	.058	.062	.115	.057	.116
Extrinsic2	.135	-.086	-.013	.044	-.019	.062	.117	.046	.143	.027	.088	.105	.040	-.023	-.079	.008	-.001	-.019	.144	.101	.001
Extrinsic3	.048	-.088	-.025	.080	.003	.108	.127	.186	.146	.051	.074	.091	.015	-.028	.033	.046	.007	.029	.139	.125	.086
Extrinsic4	.036	-.041	.000	-.078	.009	-.066	-.014	.075	.127	.133	.106	.141	-.018	.140	.045	-.071	-.076	-.017	.068	-.047	.011
Extrinsic5	.083	-.064	.000	-.042	.015	-.032	.016	.132	.153	.129	.154	.162	.037	.159	-.001	-.049	-.022	-.017	-.070	-.024	-.053
Extrinsic6	.011	-.040	.022	-.072	-.058	-.020	.013	.058	.101	.066	.115	.055	.019	.070	.047	-.026	-.089	.103	.122	.026	.078
Extrinsic7	.031	-.059	-.048	-.060	-.005	-.047	.001	.039	.083	.139	.003	.110	-.024	.127	.019	-.030	-.060	-.009	.034	-.020	-.048
Extrinsic8	.118	-.061	-.006	-.030	.009	-.009	-.006	.076	.163	.167	.126	.157	.106	.160	.059	-.070	-.094	-.015	.053	.009	.001
Extrinsic9	.052	-.079	-.010	-.022	-.019	-.001	-.003	.088	.168	.154	.150	.144	.054	.112	.103	-.035	-.053	.050	.099	.000	.053
Extrinsic10	.030	-.079	-.053	-.153	-.058	-.113	-.089	.096	.125	.191	.098	.172	.132	.115	.061	-.053	-.076	-.036	-.007	-.032	-.013
Extrinsic11	.012	-.048	-.027	-.063	.055	.020	.057	.087	.131	.090	.114	.129	-.024	.069	-.013	-.027	-.064	.071	.076	.062	.031

Table 68 *ROS1-20 x LAS22-42 Covariance Matrix*

	Pragma1	Pragma2	Pragma3	Pragma4	Pragma5	Pragma6	Pragma7	Mania1	Mania2	Mania3	Mania4	Mania5	Mania6	Mania7	Agape1	Agape2	Agape3	Agape4	Agape5	Agape6	Agape7
Intrinsic1	.008	.018	.063	.078	.047	.023	.007	.046	-.045	.075	.012	.039	-.056	-.113	.050	.030	.076	.071	.085	.067	.070
Intrinsic2	-.009	.068	.013	.041	-.005	.027	-.005	.047	-.068	.034	.000	.002	-.053	-.054	.060	.057	.090	.018	.017	.061	.059
Intrinsic3	-.055	.036	.022	.067	.038	.023	.046	.064	-.027	.048	-.010	.009	-.044	-.077	.048	.098	.134	.095	.066	.107	.109
Intrinsic4	-.023	-.126	-.012	-.054	.033	-.060	.121	-.053	-.087	.078	-.029	.009	-.023	-.079	.001	.032	.052	.041	.078	.035	.035
Intrinsic5	-.030	.002	.049	.019	.029	-.037	-.032	.036	-.102	.046	-.045	-.022	-.066	-.051	.044	.093	.068	.066	.015	.106	.133
Intrinsic6	-.025	.122	-.023	.022	-.039	-.023	-.022	.064	.054	.028	.042	-.019	-.025	.031	.018	.009	.027	.055	.049	.040	-.028
Intrinsic7	-.054	-.016	.027	.032	.043	.066	-.008	.073	-.044	.041	.018	-.003	-.014	-.074	.020	.056	.071	.048	.020	.092	.044
Intrinsic8	-.036	-.037	.002	-.094	.025	-.083	.014	.017	-.025	.082	-.009	.019	-.090	-.058	.034	.066	.062	.028	.061	.094	.092
Intrinsic9	-.033	-.068	-.036	-.025	-.035	-.048	-.022	.012	-.027	.020	-.038	-.023	-.037	-.061	.005	.096	.071	.075	.098	.057	.073
Extrinsic1	.021	.051	.108	.128	.096	.142	.086	.064	.014	.061	.029	.062	.006	-.020	.052	.021	.095	.049	.075	.041	.040
Extrinsic2	.142	.053	.161	.157	.126	.195	.222	.014	.065	.081	.122	.046	.110	.030	-.005	-.033	.054	.055	.040	.018	-.012
Extrinsic3	.098	.061	.046	.071	.117	.183	.284	-.034	.005	.054	.086	.024	.070	-.011	-.008	-.024	.085	-.032	.012	.027	.031
Extrinsic4	.069	-.012	-.031	-.075	-.052	.021	.089	-.086	.166	.014	.029	.060	.036	.114	-.082	-.070	-.067	-.025	.051	-.072	.013
Extrinsic5	.099	.043	-.064	-.040	.038	.078	.089	-.027	.050	-.044	.027	.060	.043	.068	-.045	-.060	-.066	-.046	.033	-.106	.014
Extrinsic6	.066	.096	-.013	.077	.069	.106	.159	-.026	.040	-.013	.065	.028	.184	.129	-.041	-.068	.008	.027	-.038	-.062	-.005
Extrinsic7	.074	.008	-.059	-.052	-.004	-.018	.009	.001	.167	.074	.061	.054	.092	.161	-.038	-.073	-.095	-.029	.042	-.062	-.035
Extrinsic8	.194	.116	.055	.058	.020	.095	.139	-.043	.171	.079	.068	.047	.087	.245	-.062	-.085	-.118	-.006	.006	-.096	-.026
Extrinsic9	.107	.079	-.002	.050	.044	.100	.093	-.058	.099	-.005	.056	.082	.131	.143	-.038	-.084	-.067	.002	.004	-.070	-.005
Extrinsic10	.259	.087	-.002	.022	-.007	.067	.123	-.041	.111	-.031	.035	.075	.117	.198	-.065	-.108	-.129	-.049	-.040	-.136	-.053
Extrinsic11	.097	.080	-.039	.060	.097	.172	.164	.062	.088	-.034	.049	.016	.094	.179	.013	-.027	.022	-.066	.012	-.015	.001

Table 69 *ROS1-20 x ROS1-20 Variance/Covariance Matrix*

	Intrinsic1	Intrinsic2	Intrinsic3	Intrinsic4	Intrinsic5	Intrinsic6	Intrinsic7	Intrinsic8	Intrinsic9	Extrinsic1	Extrinsic2	Extrinsic3	Extrinsic4	Extrinsic5	Extrinsic6	Extrinsic7	Extrinsic8	Extrinsic9	Extrinsic10	Extrinsic11
Intrinsic1	.374																			
Intrinsic2	.144	.379																		
Intrinsic3	.172	.186	.423																	
Intrinsic4	.057	.082	.154	.821																
Intrinsic5	.158	.122	.182	.156	.555															
Intrinsic6	.032	.021	.018	-.039	-.072	1.014														
Intrinsic7	.088	.113	.122	.072	.096	.023	.334													
Intrinsic8	.147	.123	.198	.192	.248	-.033	.094	.934												
Intrinsic9	.172	.153	.172	.147	.204	-.045	.065	.377	.834											
Extrinsic1	.084	.083	.112	.067	.064	.018	.154	.074	.077	.577										
Extrinsic2	.026	.011	.023	.133	.027	.103	.063	.052	.080	.227	1.179									
Extrinsic3	.032	.042	.043	.068	.012	.029	.073	.024	.072	.277	.524	1.202								
Extrinsic4	-.081	-.091	-.141	.027	-.150	.051	-.080	-.021	.000	-.031	.114	.131	.587							
Extrinsic5	-.110	-.119	-.164	-.048	-.170	.080	-.102	-.112	-.156	.011	.026	.057	.202	.952						
Extrinsic6	-.047	-.022	-.066	.004	-.090	.192	.000	-.064	-.047	.100	.332	.261	.225	.257	1.009					
Extrinsic7	-.097	-.098	-.128	-.037	-.171	.083	-.097	-.092	-.097	-.063	.040	.037	.282	.373	.149	.696				
Extrinsic8	-.061	-.142	-.136	-.036	-.151	.058	-.119	-.084	-.144	-.107	.149	.068	.275	.226	.233	.270	.841			
Extrinsic9	-.075	-.117	-.073	-.042	-.157	.120	-.071	-.066	-.070	-.034	.177	.160	.216	.201	.325	.248	.358	.653		
Extrinsic10	-.110	-.064	-.141	-.039	-.160	.050	-.122	-.146	-.160	-.081	.016	.002	.204	.273	.186	.239	.336	.287	.723	
Extrinsic11	-.004	.005	.009	-.046	-.124	.096	.013	-.009	-.001	.184	.234	.473	.190	.167	.331	.131	.215	.279	.166	1.124

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