

PATHWAYS TO FLOURISHING OF PHARMACY STUDENTS

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“Out beyond ideas of wrongdoing and right doing,
there is a field. I'll meet you there.

When the soul lies down in that grass,
the world is too full to talk about.

Ideas, language, even the phrase "each other" doesn't make any sense.”

mevlana jelaluddin rumi - 13th century

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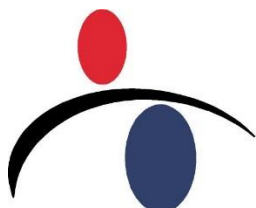
PREFACE AND DECLARATIONS

The current study was done in article format. The research was done by the researcher, Mariëtta Basson. The researcher also wrote the three manuscripts that form part of this thesis. Prof. Ian Rothmann acted as the promoter of this study. The three manuscripts will be/were submitted to accredited journals for publication:

- Manuscript one, Pathways to the flourishing of pharmacy students: The role of study demands and lecturer support was submitted to the Journal of Psychology.
- Manuscript two, Antecedents of Basic Psychological Need Satisfaction of Health Sciences Students: The Role of Peers, Family and Lecturers was submitted to the journal, Advances in Health Sciences Education and is under review; and
- Manuscript three, Pathways to flourishing: Internal strategies of pharmacy students was submitted to the journal Applied Psychology: Health and Well-being.

I declare that the thesis “Pathways to Flourishing of Pharmacy Students” is my own work and that I acknowledged all the sources that I used or quoted by means of complete references.

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SUMMARY

Topic: Pathways to flourishing of pharmacy students

Keywords: Flourishing, well-being, demands, resources, basic psychological needs, contextual factors, family, lecturers, peers, workload, broaden-and-build, positive emotion regulation, savouring, dampening, students

Spending your time ‘nurturing what is right’ enables people to grow and negotiate the problems of life which is more than only fixing what is wrong. The World Health Organisation also defined well-being as more than not ill-being. Flourishing is an optimal state of well-being. The question is, ‘what is it that flourishers do different from non-flourishers?’

Pharmacy students prepare themselves for a profession which is being bombarded with change; they are the pharmacists of tomorrow. Among them some students flourish and the others do not. This study aimed to look at possible pathways to flourishing that flourishers utilise. In this way the study addressed several gaps in the knowledge regarding flourishing: 1) The prevalence of flourishing among pharmacy students, 2) The role of demands and resources in flourishing of students, 3) The role of antecedent factors of basic psychological need satisfaction on the basic psychological need satisfaction of students and therefore in their flourishing, and 4) The use of positive affect regulation (an internal strategy) as a pathway to flourishing.

A cross-sectional design was utilised. The study population was all the enrolled pharmacy students at the North West University during 2014. A convenience sample of 779 students participated. The measuring battery consisted of the *Mental Health Continuum-Short Form* (MHC-SF; Keyes, 2009), the *Emotional Regulation Profile-Revised* (ERP-R; Nelis, Quoidbach, Hansenne, & Mikolajczak, 2011), the *Balanced Measure of Psychological Needs*

(BMPN; Sheldon & Hilpert, 2012), statements about the antecedents of basic psychological need satisfaction and statements about demands and resources, developed for the purpose of this study, and a demographic questionnaire. Structural equation modelling, invariance testing and latent class analysis were some of the statistical techniques used to analyse the cross-sectional data.

Manuscript one addressed the prevalence of flourishing among pharmacy students as well as possible differences between the year groups. The manuscript also investigated the role of workload as a study demand and the lecturer as a study resource and the possible interaction between them in the flourishing of students. Year group as a possible moderator in the respective relationships between demands, resources, the interaction between them on the one hand and flourishing on the other, were also assessed. 40% of the group flourished whilst 57% was moderately healthy and 3% languished. The different year groups negotiated the demands and resources in their study environment differently in their path to flourishing. The possible pathways to flourishing in this context were identified as the use of lecturer support (a resource), especially when the workload (a demand) is high and the successful negotiation of workload over their four years of study.

Manuscript two dealt with the impact of antecedent factors of basic psychological need satisfaction of pharmacy students on their basic psychological need satisfaction and therefore ultimately the influence of these contextual factors on their flourishing. The researcher wanted to determine whether there is a difference in the role(s) that family, peers, lecturers and workload play in the satisfaction of the students' basic psychological needs (relatedness, competence and autonomy). Year group as a moderator in these respective relationships was also investigated. Family and peers played the most important role in need satisfaction of students. However, lecturers can actively engage in supporting the need satisfaction of

students, which would increase their levels of autonomous motivation and thereby their levels of flourishing.

In manuscript three the use of internal strategies as pathways to flourishing were explored. Positive emotion regulation strategies have a positive relationship with well-being. However, a person can dampen or savour his or her positive emotions. The students were clustered into distinctive groups by means of a latent class analysis. Three distinctive groups were posterior identified based on the characteristics of group members, namely flourishers, languishers and moderately healthy students. Regression analyses of the three groups revealed that flourishers are the only group that most likely will utilise savouring positive emotion regulation strategies and refrain from utilising dampening positive emotion regulation strategies. Pathways to flourishing that flourishing pharmacy students utilise are therefore the use of savouring positive emotion regulation strategies and the non-use of dampening positive emotion regulation strategies.

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CHAPTER 1: BACKGROUND AND MOTIVATION

This thesis deals with the flourishing of pharmacy students. More specifically, possible intrinsic and extrinsic pathways to flourishing that flourishers utilise. The focus is on what flourishers do differently from moderately healthy and languishing students.

The problem statement is discussed in this chapter. The general and specific research objectives are set out, the research method explained and a division of chapters outlined.

1.1 BACKGROUND AND MOTIVATION FOR THE RESEARCH

The interest in human well-being dates back as far as 350 BC when Aristotle wrote that the highest of all good achieved by human action was ‘eudaimonia’. Keyes operationalised human well-being on a continuum from flourishing to languishing that includes hedonic as well as eudaimonic perspectives. In order to flourish, a person needs to be well emotionally, psychologically and socially (Keyes, 2002). The benefits of flourishing to a person, a society and the workplace have been researched, especially in the United States. Flourishing and moderately mental healthy individuals are associated with superior profiles of psychological functioning. Flourishing adults report the fewest days absent from work, fewest health limitations in daily living activities and the healthiest psychosocial functioning, which is low helplessness, clear life goals, high resilience and high intimacy (Keyes, 2005, 2007). In South Africa, it has also been found that flourishing individuals function better psychosocially than individuals who are languishing or are moderately healthy (Keyes et al., 2008).

The pharmacy sector in South Africa is constantly being bombarded with change, not only from a legislative perspective (Department of Health, 2003; Rabali, 2009), but also from a global change regarding pharmacy services (World Health Organisation, 2011), as well as changing national expectations (Hall, 2007; Rothmann & Malan, 2007) and a stressful South African Pharmacist work environment (Basson, 2002; Rothmann & Malan, 2011). Currently,

South Africa has one of the worst pharmacist-patient ratios in the world (Gray, 1998); there is a shortage of pharmacists and the distribution of pharmacists between the public and private sector is lopsided (Hall, 2007).

Traditionally, pharmacists manufactured and supplied medicines. Owing to the increasing health demands, pharmacists were forced to develop their role into a more patient-centred approach, known as pharmaceutical care. The World Health Organisation (WHO) and the International Pharmaceutical Federation (FIP) established the new role of the pharmacist through a seven-star concept, one in which the pharmacist is being described as a caregiver, communicator, decision-maker, teacher, lifelong learner, leader and manager (World Health Organisation, 2011).

McCann, Hughes, Adair, and Cardwell (2009) concluded in their research regarding the job stress of pharmacists in Northern Ireland during changes in practice that any developments in the professional practice of pharmacists need to be considered in the context of the well-being of the health professionals who implement and are affected by the changes. If not, patients and pharmacists may be at risk, for pharmacists' ability to practise safely and effectively is influenced. Studies done under pharmacists report on their well-being in terms of burnout (Calgan, Aslan, & Yegenoglu, 2011), work engagement (Rothmann & Malan, 2011), work stress (Gaither et al., 2008; Rothmann & Malan, 2007; Yeh, Lin, Lin, & Wan, 2010). The model of Gaither et al. (2008) indicates how job stress affects psychological and work outcomes. Unchanged physical and psychological stressors may lead to elevated burnout levels of staff, increased absenteeism, employee turnover and consequently reduced service levels and work output. The interpersonal aspects of the work environment are one of the strongest predictors of both job satisfaction and organisational commitment and therefore focusing on the interpersonal aspects could be a powerful tool to improve the work life of pharmacists (Gaither et al., 2008).

Globally, there is a shortage of pharmacists. In the USA, this shortage started in 1998 and resulted in a higher degree of role ambiguity, role conflict, role overload, job stress and work-home conflict and a concomitant decrease in job satisfaction (Knapp, 2004). South Africa has a pharmacist-patient ratio of 1:3897 compared to a norm for industrialised countries of 1:2300 (Gray, 1998). The strategy of the Department of Health to mitigate the impact of HIV/Aids needs additional pharmacists to assist with the roll-out of free antiretroviral therapy (Hall, 2007). South African pharmacists have had to deal with a lot of change since 1994. In 2003, they lost their sole right to ownership of pharmacies (Department of Health, 2003). Regulations followed and although the Department of Health envisaged that these regulations would lower the price of medicines for consumers, retail pharmacy groups claimed that the prescribed dispensing fee and regulations were not enough to ensure the viability of pharmaceutical structures (Rabali, 2009).

Even though the demand for pharmaceutical skills is greater in the public health care sector and in rural areas, pharmacists in South Africa prefer to work in the private health care sector and in the metropolitan areas (Hall, 2007). According to Hall (2007), the shortage of pharmaceutical skills in South Africa is due to the inequitable distribution of pharmacy personnel and the outflow of pharmacists to other countries. A new mid-level worker, the pharmacist technician, is currently being introduced into the health care system. Currently a new health system for South Africa is being propagated, but the role envisioned for the pharmacist in this system is not known. Even in the eighties it was already argued that it was time to move beyond categorising the satisfied pharmacist to exploring mechanisms by which we can facilitate their satisfaction and productivity (Desselle & Tipton, 2001). The profession has to look internally at the foundations that would enable individuals to lead change and achieve excellence (Traynor, Janke, & Sorenson, 2010). According to Seligman, Steen, Park

and Peterson (2005), it would be logical to study what was right about people to add to what was known to be wrong.

Mental illness has become the second largest burden regarding disease in the world. Languishing persons have a greater chance to develop a mental illness than flourishing persons with a history of mental illness. Historically, psychologists have worked from the disease model, in other words. They described what was wrong and why. If they work from the positive side, in other words, studying what is right and why, they can compose the whole picture. The benefits to society, the individual and employer of flourishing persons have been widely researched and affirmed. Owing to the low presence of flourishing individuals (about 20% in the adult population) (Keyes, 2007; Keyes et al., 2008) and the researched benefits associated with them, it makes sense to investigate flourishing among pharmacy students. Therefore, instead of defining the wrongs, establish what the inherent attributes of flourishing pharmacy students are and use these to optimise the performance of the pharmacy profession.

Today's youth holds the key to the future. The students that currently study pharmacy will determine what will happen in the pharmacy profession during the next few decades. In this cohort there are students that cope better than their peers with regard to their studies. On the one hand, there are those students with excellent academic results who participate in various activities both on and off campus while, on the other hand, there are students who struggle to just obtain their minimum qualifications within the prescribed time. Traditionally, the focus would have been on the struggling students to determine all the intrinsic and extrinsic factors that hinder their progress. Studying what is right means the focus will be on the students that excel, finding the intrinsic and extrinsic factors that facilitate their progress. A holistic picture of the future of the pharmacy profession can then be composed, knowing which intrinsic and extrinsic factors hinder progress as well as knowing what is right; in other words, which intrinsic and which extrinsic factors actually facilitate progress.

In terms of pharmacy students, flourishing individuals are expected to perform well continually, to be actively involved in society and to be adept at handling the pressures of academic and social life. In South Africa and especially in the changing pharmacy milieu, the country needs pharmacists who can continue to function optimally even in changing circumstances. Pharmacists should be able to negotiate and resolve life's stressors and challenges; they should be able to grow in spite of these stressors and challenges (Keyes & Haidt, 2003). Currently, little information is available regarding the flourishing profiles of qualified pharmacists or of pharmacy students. The distribution of flourishing (or languishing) among pharmacists is not known, neither are the pathways that flourishing individuals (pharmacists) utilise. It is thus necessary to study flourishing pharmacy students in order to add to the body of knowledge regarding flourishing in general, but also specifically to pharmacy in the South African context.

1.2 PROBLEM STATEMENT

Given that all the students have to face similar conditions in the university environment, the question that comes to mind is why some of them flourish and others do not. Not all the pathways, extrinsic and intrinsic, to flourishing are clear. In this regard, the mechanism of basic psychological need satisfaction (PNS) embedded in self-determination theory (SDT) could be explored. According to SDT, personal well-being and social development are optimised when a person's needs for competence, belongingness and autonomy are met. The satisfaction of these basic psychological needs energises and directs behaviour (Van den Broeck, Vansteenkiste, & De Witte, 2008). Antecedents to PNS in the students' environment could influence a student's levels of PNS and ultimately his or her level of flourishing. For example, in an autonomy supportive environment students would have opportunities to influence decision making, would receive the rationale for tasks and their feelings and perspectives would be acknowledged.

Each student engages in a personal way with his or her studies. The way they handle the demands and resources in their study environment differ. Do flourishers, for example, utilise resources to buffer the effect of demands (Hakanen, Schaufeli, & Ahola, 2008) or are their specific demands and resources in the study environment that impact on pharmacy students' flourishing? Another possible intrinsic pathway to flourishing for students may be the way in which students regulate their emotional experiences. Small, consequential differences in a person's daily pleasant experiences may fuel flourishing (Catalino & Frederickson, 2011). Affect regulation strategies have the potential to address a person's basic psychological needs through the broaden-and-build theory (Fredrickson, 2006), which describes the effect of capitalising on emotional experiences, and may thus be a pathway to flourishing.

1.2.1 Flourishing

Moving away from the disease model of work life (or life), that is, to look at what is wrong and why, the focus can instead be on the positive that there is, on what we can learn from what is right. In this regard, positive psychology is a science of positive subjective experiences, positive individual traits and positive institutions. It has the promise to improve quality of life and prevent the pathologies that arise when life is barren and meaningless (Seligman & Csikszentmihalyi, 2000).

In 2004, the WHO described mental health as a "positive state" that enables an individual to cope with normal stresses, to contribute to work life and community life and to realise his or her own abilities. Mental health has for long been considered the absence of mental illness. Currently, mental health and mental illness are considered separate correlated unipolar dimensions (Keyes, 2005). Persons without mental illnesses are not necessarily mentally healthy and, similarly, mentally healthy persons are not necessarily without mental

illnesses. A person with a complete state of mental health is therefore mentally healthy and without a mental illness.

According to Keyes (2002), flourishing is the presence of mental health and languishing is the absence of mental health. Flourishing encompasses a complete state model of the presence of positive states of human capacities as well as the absence of disease or infirmity (Keyes, 2007). The mental health continuum diagnoses states of mental health as “something positive”, and not merely as the absence of psychopathology. Also, it moves from flourishing through moderately mentally healthy to languishing. Depending on the position of an individual on the mental health continuum, his or her level of functioning can be determined. This mental health continuum can be applied to persons without a mental illness as well as to persons with a mental illness (Keyes & Annas, 2009).

Well-being has been described from two perspectives: hedonic and eudaimonic. Hedonic well-being deals with happiness or subjective well-being and is about affect and life quality, whereas eudaimonic well-being concerns human potential or psychological well-being and is about growth and purpose (Keyes, Shmotkin, & Ryff, 2002). Feeling good and functioning well are related but distinct concepts (Keyes & Annas, 2009). High levels of both hedonic and eudaimonic well-being are characteristic of a flourishing person (Keyes & Annas, 2009).

Existing research regarding hedonic or emotional well-being focused on the experience of positive emotions, namely happiness, life satisfaction and positive-negative affect balance. To feel good and to function well (eudaimonia), on the other hand, has been researched as psychological well-being (PWB) and social well-being (SWB). PWB represents how the individual sees him/herself functioning as the “I” or “me” and SWB as the “we” or “us” (Keyes et al., 2008). The Ryff model of PWB includes purpose in life, environmental

mastery, positive relationships, personal growth, autonomy and self-acceptance (Ryff & Singer, 2008). Both PWB and SWB are considered measuring symptoms of mental health because mental health in itself is unobservable.

Keyes operationalised mental health as emotional, psychological and social well-being (see Table 1) that lies on a continuum from languishing through moderately healthy to flourishing.

Table 1

Components of Mental Health (Keyes, 2002)

Mental health structures	Components
Emotional well-being	<ul style="list-style-type: none"> • Presence of positive affect • Absence of negative affect • Perceived satisfaction with life
Psychological well-being	<ul style="list-style-type: none"> • Self-acceptance • Positive relations with others • Personal growth • Purpose in life • Environmental mastery • Autonomy
Social well-being	<ul style="list-style-type: none"> • Social coherence • Social actualisation • Social integration • Social acceptance • Social contribution

Some changes in mental well-being cannot be explained by demographic variables, physical ailments, mental illnesses or chronic conditions (Snowden, Dhingra, Keyes, & Anderson, 2010). Persons that are not flourishing are associated with greater levels of dysfunction in terms of work reductions, health limitations and psychosocial functioning. Languishing individuals can even experience more dysfunctions than persons with purely mental illness. A

longitudinal study showed that gains in mental health predict declines in mental illness and losses in mental health predict gains in mental illness (Keyes, Satvinder, Dhingra, & Simoes, 2010).

Owing to the low presence of flourishing individuals (about 20% in the adult population) (Keyes, 2007; Keyes et al., 2008) and the researched benefits associated with them, it makes sense to investigate flourishing among pharmacy students. It seems that mental health also plays a role in academic performance (Van Zyl & Rothmann, 2012). Therefore, instead of defining the wrongs, what are the inherent positive attributes of flourishing future pharmacists that can be used to optimise the performance of the pharmacy profession?

1.2.2 Demands and resources

The interaction between demands and resources is key to flourishing (Bakker & Sanz-Vergel, 2013). The Job Demands-Resources (JD-R) model (Demerouti & Bakker, 2011) can be used to predict well-being and performance (Demerouti & Bakker, 2011). The JD-R model defines demands as physical, psychological, social or organisational aspects that require sustained physical and/or psychological effort or skills and are associated with physiological or psychological costs. Resources are defined as physical, psychological, social or organisational aspects that are associated with either/or the achieving of work goals, that reduce demands and the associated costs, or stimulate personal growth, learning and development. For pharmacy students, demands may be the high workload or irregular working hours needed for studying. Resources on the other hand may be autonomy, feedback and support from their lecturers and peers and the significance of their studies. Analogue to the JD-R model, we used the Study Demands-Resources (SD-R) model (Mokgele & Rothmann, 2014) in this study.

Inherent in this model is a health impairment process and a motivational process (Demerouti & Bakker, 2011). In the first energetic process, work overload may exhaust a student's energy whilst resources like lecturer support may have a motivational value and results in increased well-being. It seems that it is the interaction effect between demands and resources that is important (Hakanen, Schaufeli, & Ahola, 2008), in the sense that study environment resources may buffer the effect of study environment demands.

Hobfoll (2002) defines a resource as an entity that is valued for itself or that acts as a means to obtain a valued end. According to the Conservation of Resources (COR) theory (Hobfoll, 1988), a student would try to obtain, retain or protect his/her resources and if not able, would stress. Resource gain is more salient in the face of resource loss because both processes tend to act in cycles with increased strength and speed. Resources are created across one's lifespan and tend to exist in resource caravans; a resource does not exist in isolation, e.g. a student with a high self-esteem might also have a strong social support system and coping skills. Similarly, a lack of resources does also not exist in isolation.

Resources preserve well-being and health (Hobfoll, 2002). For students, the central elements in this process would be that 1) they strive to obtain, retain, protect and foster resources; 2) for students with resources, stressful circumstances are less likely to affect them psychologically negative; 3) students with resources are more capable of solving problems; 4) students with resources are less negatively affected by resource drains because they can substitute resources or absorb the loss by simply access their resource reserves; 5) resources are linked, therefore resources are enriched among those with a solid reservoir; 6) the influence of resources is long term and 7) resources are valued in their own right.

1.2.3 Motivation and psychological need satisfaction

Self-determination theory (SDT) is a motivational theory that underpins human behaviour. Self-determination Theory explains the “what”, the “why” and the “how” of behaviour. The “why” of behaviour evolves from interplay between intrinsic and extrinsic motivation; the “what” of behaviour is evident from the motivational influences, and both derive from the degree of need satisfaction (Van den Broeck, Vansteenkiste, & De Witte, 2008) that explains the “how” of behaviour. Contrary to other motivational theories, the motivational distinction is not external versus internal motivation, but is concerned with whether the behaviour was motivated autonomously or controlled. According to SDT, motivation for behaviour lies on a continuum between autonomous and controlled (See Table 2).

Table 2

The Behavioural Motivation Continuum (Van den Broeck et al., 2008)

Most autonomous	Autonomous+		Controlled			Most controlled
	Internal(intrinsic)		External(extrinsic)			
	Internal	Integrated regulation	Identified regulation	Introjections	External regulation	
	Goals stimulate actualisation of inherent potential	Activity fits individual's broader set of values and beliefs	Goal of behaviour is personally endorsed and considered important	Reason for behaviour is internally pressuring reasons	Reason for behaviour external to individual	

Behaviour cannot be fully understood if the process that energises and directs the behaviour is not scrutinised (Deci & Ryan, 2000). The degree to which an individual's basic psychological needs (see Table 3), namely autonomy, belongingness and competence are being satisfied explains the “why” and “what” of motivation.

Table 3

Basic Psychological Needs (Deci & Ryan, 2000)

Need	Definition
Autonomy	An inherent desire to act with a sense of volition and choice
Relatedness	An inherent propensity to feel connected to others
Competence	A desire to feel capable to master the environment and to bring about the desired outcomes

These innate psychological needs describe the fuel an individual needs for psychological growth, integrity and well-being. Contrary to other motivational theories, the strength of the need or the hierarchical value of the need is not important. The balance in the satisfaction of the needs is important. Between two persons with the same sum score for well-being, the one with the better balance between the three needs of autonomy, relatedness and competence, reports greater well-being (Sheldon & Niemiec, 2006). Under these circumstances persons are intrinsically motivated, able to fulfil their potentialities and able to seek greater challenges (Seligman & Csikszentmihalyi, 2000). The degree to which people are able to satisfy their fundamental needs is the most important predictor of optimal functioning (Deci & Ryan, 2000). From this, it seems that the students with the best balance in need satisfaction should be the flourishers.

Better learning, performance and well-being have been associated with intrinsic motivation by various studies. To maintain intrinsically motivated behaviours, the needs for autonomy and competence have to be nourished (Deci & Ryan, 2000). Autonomy support behaviours (relative to control behaviours) result in, inter alia, enhanced intrinsic motivation and well-being. Perceived competence is the basis for motivation, but perceived autonomy forms the basis for intrinsic motivated behaviours. Chirkov and Ryan (2001) found in two

different cultures, those of Russia and of the United States, that for high school students that perceive others as supporting their autonomy, well-being and self-motivation were facilitated.

From the above, it seems that the better performing pharmacy students are most probably intrinsically motivated. SDT recognises that individuals have an inherent tendency to grow and develop if conditions are favourable, but also that individuals can malfunction if they do not have sufficient inner resources or if environmental support is lacking. The antecedent factors to psychological need satisfaction in the environment of pharmacy students therefore play an important role.

The context wherein a psychological characteristic of a person is being displayed has an important influence on whether the outcome is positive or negative for that person (McNulty & Fincham, 2012). Contextual events also influence intrinsic motivation in the sense that a person's perceived locus of causality determines the degree to which persons feel they are autonomously engaged. When one defines the core of well-being as growth and human fulfilment, one cannot ignore the influence of context on a person's life (Ryff & Singer, 2008).

From the above, it follows that, for students, extrinsic factors like work volume and time constraints may have a connection with flourishing, which could be mediated by the degree to which their basic psychological needs are being satisfied.

1.2.4 Affect regulation

All the pathways to flourishing are not yet clear, for example, Catalino and Frederickson (2011) suggest that small, consequential differences in a person's daily pleasant experiences may fuel flourishing. They also found proof that a mechanism through which flourishing is being achieved is the broaden-and-build theory, whereby a person capitalises on positive potentiation processes. Savouring affect regulation strategies (Table 4) (Nelis, Quoidbach,

Hansenne, & Mikolajczak, 2011) have the potential for a person to capitalise on positive emotional experiences.

Affect regulation strategies can be grouped into categories of behaviour that savour positive affect or dampen positive affect, as depicted in Table 5 (Nelis, Quoidbach, Hansenne, & Mikolajczak, 2011). Irrespective of age or gender, affect regulation strategies explained 10% and 18% respectively of the variation in positive affect and life satisfaction (Quoidbach, Berry, Hansenne, & Mikolajczak, 2010).

One can speculate that a pharmacy student's basic psychological need for belongingness is addressed when he or she celebrates a positive event in his or her life with his or her friends, and so his or her emotional well-being and ultimately his or her flourishing are thus enhanced. Similarly, if the student attributes success in a pharmacological oral to an external factor such as luck, it may impact on his or her basic need for competence and influence his or her psychological well-being and ultimately his or her flourishing. More specifically, the way in which affect regulation relates to flourishing has not been fully explored, especially not in the South African context of pharmacy students.

Table 4

Savouring and Dampening Affect Regulation Strategies (Nelis et al., 2011)

Category	Strategy	Description
Savouring	Behavioural display	Expressing positive emotions with non-verbal behaviours
	Be present	Deliberately direct attention to present pleasant experience
	Capitalising	Communicate and celebrate positive events with others
	Positive mental time travel	Vividly remember or anticipate positive events
Dampening	Suppression	Repressing or hiding positive emotions
	Distraction	Engage in thoughts or activities unrelated to current positive event
	Fault finding	Look at the negative elements of otherwise positive situation
	Negative mental time travel	Negative reminiscence and negative anticipation of future consequences

1.2.5 Specific research problems

It is evident that the demands placed on a pharmacist are continually changing. From within the pharmacist community, there is a quest to look at the well-being of pharmacy students and ways to strengthen the profession. Studying flourishing pharmacy students will help the profession to start to complete a holistic picture of the profession in order to enable it to strengthen itself from within. Flourishing students are mentally healthy without a mental illness. They cope with the normal pressures of studying and living and contribute to student life specifically and to society in general. The strength of the pharmacy profession might depend on the flourishers. From this perspective, it makes sense to study flourishing

pharmacy students. What is it that flourishing pharmacy students in South Africa do differently from mentally healthy and languishing students?

More specifically, the literature in the pharmacy environment is not clear on pathways to flourishing. Basic psychological need satisfaction (as described in SDT) seems to be indicative of flourishing individuals. For pharmacy students, the extrinsic and intrinsic factors that influence their levels of need satisfaction have not been fully explored. Although students are all subject to similar conditions when it comes to their studies, some flourish and some do not. Are there specific demands and resources that impact on a student's level of flourishing? Which factors in their external environment would address their needs for autonomy, belongingness and relatedness as described in SDT and which therefore have a connection with flourishing? Intrinsic factors may also affect a student's level of basic psychological need satisfaction. The broaden-and-build theory illuminates how capitalising on positive experiences can relate to flourishing. Affect regulation strategies, especially savouring strategies, enable an individual to capitalise on positive daily experiences. Would there be a difference in the level of flourishing of students related to the affect regulation strategies that they used? As there is a dire need for context specific information regarding flourishing in the pharmacy world, the researcher aims to add to these gaps in the knowledge.

The gaps in the current knowledge are multiple: First, the researcher could not find any information (in international, African or national context) regarding the flourishing of pharmacy students. Information regarding the flourishing of pharmacists or flourishing within pharmacy as a profession was also not available. Furthermore, all the pathways to flourishing, extrinsic and intrinsic, of students are not clear. The relationship between a pharmacy student's level of flourishing and the demands and resources in his or her study environment is not known. Information regarding the antecedent factors of psychological need satisfaction (PNS) and their relationship to the PNS of pharmacy students is lacking. The possible

moderating role of year groups in this relationship is also not known. A fourth year pharmacy student at this higher educational institution is, for example, exposed to the “threat” of a pharmacology oral whilst a first year student has to deal with adaptation to the new environment. Affect regulation as a possible pathway to flourishing in the context of pharmacy students has not been investigated yet. It is also not known whether year groups act as a moderator in this relationship.

Lastly, it is the first time that some of the questionnaires used in this study, namely the Emotional Regulation Profile-Revised (ERP-R; Nelis, Quoidbach, Hansenne, & Mikolajczak, 2011) and the Balanced Measure of Psychological Needs (BMPN; Sheldon & Hilpert, 2012) were translated into Afrikaans.

From the above, the following research questions were formulated:

1. What is the prevalence of flourishing and non-flourishing among pharmacy students?
2. Can demands and/or resources act as pathways to flourishing?
3. Are there differences between the year groups in terms of the measures used?
4. What are the differences in the role of antecedent factors in the basic psychological need satisfaction of students and therefore in their flourishing?
5. Does year of study act as moderator in the respective relationships between demands, resources, antecedent factors of basic psychological need satisfaction, basic psychological need satisfaction and flourishing?
6. Could affect regulation strategies as intrinsic factors act as pathways to flourishing?

1.3 AIM

The aim of this study is to explore possible pathways to the flourishing of pharmacy students.

1.3.1 General objectives

The general objectives are to explore possible pathways to the flourishing of pharmacy students, namely demands, resources, contextual factors and their impact on PNS and affect regulation.

1.3.2 Specific objectives

The specific objectives were to:

1. Assess the prevalence of flourishing versus non-flourishing pharmacy students;
2. Determine the reliabilities of the *Mental Health Continuum-Short Form* (MHC-SF; Keyes, 2009) and the *Balanced Measure of Psychological Needs* (BMPN; Sheldon & Hilpert, 2012) for the study population;
3. Study whether demands and resources can act as pathways to the flourishing of pharmacy students;
4. Evaluate the role of the antecedent factors of basic psychological need satisfaction of students on their basic psychological need satisfaction;
5. Investigate whether year of study moderates the relationships between demands, resources and flourishing of pharmacy students;
6. Explore the moderation effect of lecturer support (a resource) on flourishing at different levels of workload (a demand);
7. Assess whether there is a difference between the year groups regarding the latent mean scores of the constructs (e.g. emotional well-being, psychological well-being, etc.);
8. Investigate whether year of study moderates the relationships between antecedents of basic psychological need satisfaction and psychological need satisfaction of pharmacy students; and
9. Study whether flourishers use specific affect regulation strategies as pathways to flourishing.

1.4 RESEARCH METHOD

The research will consist of a literature and an empirical study.

1.4.1 Literature study

A literature study conceptualised the following concepts and possible relationships: flourishing, SDT, study demands, study resources, antecedents to PNS, PNS and affect regulation. The literature study also aimed to describe the above concepts in the world of the pharmacy student.

1.4.2 Empirical study

1.4.2.1 *Research design and methodology*

This study was done from a quantitative research paradigm. Therefore, constructs were quantified, variables played a central role in the describing and analysing of the flourishing of pharmacy students and sources of error were controlled via statistical procedures (Babbie & Mouton, 1998). Data and their relationships were systematically and scientifically investigated. The objective was to employ mathematical models and theories regarding the flourishing of pharmacy students. The quantitative research design allowed for great accuracy of results and minimum personal bias of the researcher as well as for replication of the study.

The information from a cross-sectional survey was used. In the cross-sectional survey, a large number of cases were compared (Druckman, 2005), the “cause and effect” variables were determined at the same time and there was neither a control group nor randomisation (Ghauri & Grønhaug, 2002).

In this research a hypothesis-testing approach to the analysis of structural theory was used, in other words, *structural equation modelling* (SEM). Two aspects of the process are important: first, the causal processes are represented by a series of regression equations and secondly, they can be modelled pictorially (Byrne, 2012). The proposed models, each

consisting of a measurement model and a latent variable model, were tested statistically as a whole to determine whether the models and the data fit. When the goodness-of-fit was inadequate, the tenability of the proposed relations was rejected. The pattern of the intervariable relations were specified apriori, which meant the data could be analysed for inferential purposes. SEM also provided explicit estimates of error variance parameters. Both latent and observed variables were used in the models.

Exploratory factor analysis (EFA) and *confirmatory factor analysis* (CFA) were used to investigate the relations between all the variables, latent and observed. EFA was used to ascertain the contextual factors that underlie the covariance among the observed variables and to determine the extent to which item measurements were related to the latent constructs. CFA was used to determine the extent to which the observed variables are generated by the underlying latent constructs which were reflected in the factor loadings.

As a prerequisite to compare latent mean scores of constructs (e.g. overload, flourishing) in the different year groups, *measurement invariance* of the best-fitting model for students in the four year groups was determined (Wang & Wang, 2012). Three types of invariance, namely configural, metric and scalar invariance were determined (Cheung & Rensvold, 2002). Configural invariance indicated whether the students belonging to the four year groups conceptualised the constructs similarly. Metric invariance meant that all factor loading parameters are the same across the year groups. Scalar invariance indicated whether the measurement scales have the same operational definition for the four year groups of pharmacy students.

A *latent class analysis* (LCA) was used to identify ‘unobserved subgroups comprised of similar individuals’ (Wang & Wang, 2012:290). It is a person-centred, model-based approach that clustered the students into groups with distinctive characteristics based on their

responses to a set of observed variables. The classes were identified on posterior membership probabilities and the number of classes determined via statistical procedures.

1.4.2.2 Participants

All the undergraduate students enrolled for pharmacy ($N = 899$) at the North-West University were invited to participate in the study, 779 participated. Therefore the first, second, third and fourth year pharmacy students of 2014 were engaged for the quantitative investigation.

1.4.2.3 Data gathering

Demographic and quantitative data was gathered by means of an electronic questionnaire.

The measuring battery will now be discussed:

The measuring battery consisted of the *Mental Health Continuum-Short Form* (MHC-SF; Keyes, 2009), the *Emotional Regulation Profile-Revised* (ERP-R; Nelis, Quoidbach, Hansenne, & Mikolajczak, 2011), the *Balanced Measure of Psychological Needs* (BMPN; Sheldon & Hilpert, 2012), statements about the antecedents of basic psychological need satisfaction and statements about demands and resources, developed for the purpose of this study, and a demographic questionnaire.

The *Mental Health Continuum-Short Form* (MHC-SF; Keyes, 2009) consists of 14 items which assess positive mental health in terms of emotional, social and psychological dimensions. The three factor structure of mental health was confirmed (Lamers, Westerhof, Bohlmeijer, Ten Klooster & Keyes, 2011). The first dimension, Emotional well-being (EWB) consists of three items, the second dimension is Social well-being (SWB), consisting of five items, and the third dimension is Psychological well-being (PWB) consisting of six items. The MHC-SF was also shown to be internally reliable with $\alpha = 0.89$ for the total MHC-SF, and $\alpha = 0.83$ for the subscale emotional well-being and $\alpha = 0.74$ for the subscale social well-being. Lamers et al. (2011) also demonstrated the convergent validity of the MHC-SF in a

Dutch population where various corresponding measures of well-being were used. Examples are the satisfaction with life scale for EWB, positive affect for PWB and social engagement for SWB. An evaluation carried out in South Africa also confirmed the MHC-SF as reliable and valid (Keyes et al., 2008). The internal consistencies of the three subscales EWB, SWB and PWB were 0.74, 0.59 and 0.67 respectively. In a study among employees in South Africa the internal consistencies were found to be 0.87, 0.86 and 0.82 for EWB, PWB and SWB respectively (Diedericks & Rothmann, 2013).

The *Emotional Regulation Profile-Revised* (ERP-R; Nelis, Quoidbach, Hansenne, & Mikolajczak, 2011) consists of vignettes (in French) that describe specific emotions. Each scenario is followed by four adaptive (according to empirical evidence) and four maladaptive (according to empirical evidence) reactions. A respondent chooses as many responses as he or she wants, as long as it gives an accurate reflection of his/her behaviour (persons typically use more than one response in a situation). The ERP-R indicates how a person regulates emotions, as well as which specific strategies are being used. The global ERP-R was reliable with $\alpha = 0.84$. The two factors “down regulation of negative emotions and up-regulation of positive emotions” were internally consistent with Cronbach $\alpha = 0.83$ and 0.79 . See Nelis et al. (2011) for a complete discussion of convergent validities.

The *Balanced Measure of Psychological Needs* (BMPN; Sheldon & Hilpert, 2012) was used to assess need satisfaction of autonomy, competence and relatedness of the future pharmacists in their daily living. Sheldon and Hilpert (2012) demonstrated the convergent and discriminant validity of the BMPN scale and the reliabilities of PMPN autonomy, competence and relatedness were 0.78, 0.79 and 0.78 respectively. Each construct is measured by six statements that the candidate has to rate on a scale from 1 to 5 where 1 represents no agreement, 3 represents some agreement and 5 represents much agreement.

Study demands and resources were investigated through statements which were developed for the purpose of this study. Three items pertained to study demands: “The workload in some of the subjects is too much”, “My studies take up so much time that I do not have time to relax”, and “During the semester I feel physically drained at the end of the day”. The support of lecturers was investigated by means of four statements: “My lecturers provide accurate, performance-related feedback”, “My lecturers involve me in skills development and/or problem solving”, “My lecturers regard failure as part of the learning process”, and “My lecturers emphasise the fact that students are responsible for their own results”. The candidates had to rate each statement on a scale from 1 (*no agreement*) to 5 (*much agreement*).

Antecedents of Basic Psychological Need Satisfaction were investigated by means of statements which were developed for the purpose of this study. The statements pertained to the role of the lecturer, peers, family and study demands in the basic psychological need satisfaction of a pharmacy student. See chapter three or article two for a full description. The candidates had to rate each statement on a scale from 1 (*no agreement*) to 5 (*much agreement*).

1.4.2.4 Data analysis

The data was analysed using and SPSS version 22 for the descriptive statistics (IBM Corp 2013) and Mplus version 7.31 for the structural equation modelling (Muthén & Muthén, 1998-2014).

The data was explored using descriptive statistics and correlations. Reliabilities of the scales were computed. Reliability reflects a measure of the scale reliability of the construct or latent variable (Raykov, 2012).

The items of the questionnaires were defined as categorical when applicable and the estimator was weighted least squares with corrections to means and variances (WLSMV). To compare and assess the fit of measurement and structural models, absolute, incremental and comparative fit indices produced by Mplus were used as applicable: Comparative Fit Index (CFI; > 0.95), Tucker-Lewis Index (TLI; > 0.95) and the root mean square error of approximation (RMSEA close to 0.06) (Hu & Bentler, 1999). However, these cut-off standards for model fit were used as rough indicators because they were based on simulation studies (West, Taylor, & Wu, 2012). Wang and Wang (2012) provided the following values as indicative of good fit: CFI: 0.90; TLI: 0.90 and RMSEA: 0.08. Furthermore, a non-significant chi-square value, as well as the smaller AIC and BIC values and weighted root mean residual (WRMR) close to one, indicated better fit.

Chi-square difference testing was used to compare the models which investigated configural, metric and scalar invariance between the unconstrained model and the configural, metric and scalar models respectively.

The pharmacy students' levels of emotional, social and psychological well-being were used as basis to group participants by means of a Latent class analysis (LCA). A series of models with an increasing number of latent classes was tested. A significant improvement from the reference model to the model with more classes meant the model with more classes was retained. To evaluate the models, we looked at the lowest AIC, BIC and ABIC values comparing the different models; relative entropy (called entropy by Mplus) ranging from 0 to 1 (smaller than 0.60 not acceptable, higher is better); Lo-Mendel-Rubin likelihood ratio (LMR LR) test, comparing the estimated model with a model with one class less where $p < 0.05$ indicates that the model with the less classes has a significant better fit; the bootstrapped likelihood ratio test (BLRT) and Adjusted LMR LR test (Wang & Wang, 2012).

Posterior class-membership probabilities and the entropy values indicated the quality of class membership.

1.4.2.5 Ethical aspects

Participants were fully informed regarding the procedure, goal and outcomes of the study. Participation was voluntary and informed consent was obtained. Feedback will be provided wherever required. Ethical clearance was granted by the Ethics Sub-Committee for Social and Behavioural Sciences of the Faculty of Humanities, North-West University (number: FH-SB-2013-0008).

1.5 CHAPTER DIVISION

In **Chapter 1** the background and motivation for the study, the applicable theoretical constructs to the problem statement and objectives, the problem statement, objectives and research method were discussed.

Chapter 2 consists of an article submitted to the accredited Journal of Psychology, which has an impact factor of 1.925. It is an interdisciplinary journal that publishes theoretical and empirical research in applied areas of psychology. Please note that the article was formatted according to the journal's requirements. The title of the article is: *Pathways to the flourishing of pharmacy students: The role of study demands and lecturer support*.

Chapter 3 consists of an article submitted to the accredited journal, Advances in Health Sciences Education with an impact factor of 2.124. The journal publishes articles on all aspects of health sciences education. The article is currently under review. Please note that this article was formatted according to the journal's requirements. The title of the article is: *Antecedents of Basic Psychological Need Satisfaction of Health Sciences Students: The Role of Peers, Family and Lecturers*.

The article of **Chapter 4**, *Pathways to flourishing: Internal strategies of pharmacy students*, was submitted to the accredited journal *Applied Psychology: Health and Well-Being* with an impact factor of 1.757. The scope of the journal includes scientific findings and practical applications in the health and well-being domain. Please note that this article was formatted according to the journal's requirements.

In **Chapter 5** the conclusions, limitations and recommendations are discussed.

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CHAPTER 2

PATHWAYS TO FLOURISHING OF PHARMACY STUDENTS: THE ROLE OF STUDY DEMANDS AND LECTURER SUPPORT

Pathways to flourishing of pharmacy students: The role of study demands and lecturer support

Abstract

The aim of this study was to investigate possible pathways to flourishing of pharmacy students. A survey design was used. The measuring battery consisted of the Mental Health Continuum - Short Form (MHC-SF), and questions about overload and lecturer support for task structuring. The data was analyzed using structural equation modeling. A total of 40.3% of the 779 pharmacy students flourished. The level of emotional well-being of year group 2 was the highest. Overload and lecturer support explained between 18 and 31% of the variance in flourishing of the different year groups. The relation between overload and flourishing did not differ between the four year groups. From the second to the third year, the predictive value of lecturer support for flourishing decreased. Lecturers' support and low overload play a positive role in the flourishing of pharmacy students. In the third study year, lecturer support moderated the relation between workload and flourishing. Therefore lecturer support played a more important role in terms of flourishing when workload was high.

Keywords: Well-being, flourishing, study demands, resources, lecturer, pathway

Pathways to the flourishing of pharmacy students: The role of study demands and lecturer support

Students that currently study pharmacy will affect what will happen in the pharmacy profession during the next few decades. Therefore it is crucial to attend to their well-being at an early stage, even before they enter the pharmacy profession (Rothmann & Malan, 2011). On the one hand, there are those students with excellent academic results who participate in various activities and flourish. On the other hand, there are students who struggle to just obtain their minimum qualifications within the prescribed time and languish. Various studies (e.g. Ford, Olotu, Thach, Roberts, & Davis, 2014; Canales-Gonzales & Kranz, 2008) have focused on the struggling of students to determine all the intrinsic and extrinsic factors that hinder their progress. Studying flourishing of pharmacy students means the focus is on the students who excel, which makes it possible to investigate the factors that facilitate and/or inhibit their progress towards optimal functioning (Van Zyl & Rothmann, 2012). This approach, from positive psychology, goes beyond fixing problems into promoting excellence (Seligman, 2011). Focusing on flourishing students enables us to capitalize on their strengths and informs us how to get students to do their best work, to be creative and to be motivated. Ultimately we deliver pharmacy students that can keep up with fast-paced systems and the changes associated with globalization (Rothmann, 2015).

Flourishing individuals perform well (Diener & Ryan, 2009) are actively involved in society (Keyes, 2002) and adept at handling the pressures of academic (Keyes et al., 2012) and social life (Potgieter & Botha, 2014). The world needs pharmacists who function optimally even in changing circumstances. Pharmacy students should be able to “negotiate, resolve, and grow in the face of life’s stressors and challenges” (Keyes & Haidt, 2003). Currently, little information is available regarding the flourishing of pharmacy students.

Information is needed regarding the prevalence of flourishing (or the lack thereof) as well as pathways to flourishing among pharmacy students in different study years. More specifically, scientific information is needed regarding the relation between workload, lecturer support through task structuring and flourishing of pharmacy students. It is also not clear whether the relation between workload, lecturer support and flourishing would be different in different years of study. A fourth year pharmacy student at this higher educational institution is, for example, exposed to the “threat” of a pharmacology oral whilst a first year student has to deal with adaptation to the new environment. Finally, information is needed regarding the moderating effect of workload on the relation between lecturer support and flourishing.

In this regard we conducted a survey to investigate pharmacy students’ perceptions of demands and resources in their study environment and the relation thereof with their flourishing. This study adds to the body of knowledge regarding the levels of flourishing among the different year groups of pharmacy students and the role of workload and lecturer support in flourishing.

Flourishing

The interest in human well-being dates back as far as 350 BC when Aristotle wrote that the highest of all good achieved by human action was ‘eudaimonia’. Keyes (2002) operationalized human well-being on a continuum from flourishing to languishing that includes hedonic as well as eudaimonic components. Individuals flourish when they are emotionally, psychologically and socially well (Keyes, 2002). Emotional well-being (the hedonic component) refers to ‘feeling good’. Psychological and social well-being refers to ‘functioning well’ (the eudaimonic component). Emotional well-being is indicated by the following three aspects: Presence of positive affect, absence of negative affect and perceived

satisfaction with life. A person that is socially well is socially coherent, actualized, integrated, accepted and contributes socially. Psychological well-being is indicated by self-acceptance, positive relations with others, personal growth, purpose in life, environmental mastery and autonomy. Flourishing has benefits for a person, a society and the workplace. Flourishing (high mental health) is associated with superior psychological functioning. Flourishing adults report the fewest days absent from work, fewest health limitations in daily living activities and the healthiest psychosocial functioning, which is low helplessness, clear life goals, high resilience and high intimacy (Keyes, 2005, 2007). In South Africa, it has been found that flourishing individuals function better psychosocially than individuals who are languishing or showed moderate mental health (Keyes et al., 2008).

Flourishing of individuals is negatively associated with dysfunction in terms of work reductions, health limitations and psychosocial functioning. Languishing (a term used as opposite for flourishing) individuals can even experience more dysfunctions than persons with mental illness do. A longitudinal study showed that gains in mental health predict declines in mental illness, and losses in mental health predict gains in mental illness (Keyes et al., 2010). All changes in mental well-being cannot be explained by demographic variables, physical ailments, mental illnesses or chronic conditions (Snowden et al., 2010). Therefore it is necessary to study the effects of demands associated with the study environment and support from the lecturer on students' well-being.

Owing to the low presence of flourishing individuals in the general adult population (Keyes, 2007; Keyes et al., 2008) and the benefits thereof, it makes sense to investigate flourishing among pharmacy students. Mental health also plays a role in academic performance (Van Zyl & Rothmann, 2012). Therefore, instead of defining the wrongs, the

question is whether pharmacy students flourish and how that relate to overload and lecturer support for task structuring.

Pathways to Flourishing: The Role of Demands and Resources

In the work environment, the Job Demands-Resources (JD-R) model describes well-being and ill health with their related antecedents and consequences of employees at the same time (Schaufeli & Bakker, 2004). Similar to Mokgele and Rothmann (2014), we used the JD-R model to investigate the relations between workload (as a study demand), lecturer support (as a study resource) and the flourishing of pharmacy students.

In the Study Demands-Resources (SD-R) model, any psychosocial characteristic of study is either a demand or a resource. Resources are seen as the physical, psychological, social or organizational aspects of study that reduce study demands, are functional in achieving study goals or stimulate personal growth. Money and lecturers are examples of resources. Study demands are associated with physiological or psychological costs in the sense that it requires sustained physical and/or psychological effort. Quantitative workload and demanding work content are examples of study demands. A student can view a study demand either as a challenge or a hindrance (Bakker & Sanz-Vergel, 2013); a challenge demand is viewed as an obstacle to overcome in order to learn and achieve and a hindrance demand is viewed as thwarting personal growth and goal attainment. Two processes are involved in the SD-R model, namely an energetic process and a motivational process. In the first process, chronic demands can exhaust a student's mental and physical resources and result in the depletion of energy and ultimately health problems (Demerouti et al., 2001). In the second process, resources may lead to motivation and a fulfilling, positive state of mind.

Study demands may trigger a reduction in energy, which could result in less mental resources to perceive available resources in the study environment. The availability of resources activates intrinsic or extrinsic motivational processes (Mokgele & Rothmann, 2014), and is positively associated with emotional, psychological and social well-being. Specifically supportive relationships with lecturers play an important role in the energy and motivation of students. Lecturers as a resource can also play an active role in the prevention of students' exhaustion (Xanthopoulou et al., 2007).

Hobfoll's COR theory (Hobfoll, 2011) describes resource loss spirals and resource gain spirals. This theory defines a resource as '...those entities that either are centrally valued in their own right, or act as means to obtain centrally valued ends' (Hobfoll, 2002). A resource can be an object, a condition, personal characteristics and energies (Hobfoll, 1988, 2011). COR has two core assumptions, namely an individual will invest his/her resources in order to deal with threats to prevent negative outcomes (Hobfoll 1988, 2002, 2011), and the individual will also accumulate resources. In this respect resource caravans are created which may result in well-being (Hobfoll 2002, 2011).

There are three ways in which a pharmacy student can lose resources and experience unwell-being (Alarcon et al., 2011). Resources can be threatened, actually lost or invested with no resulted gain. Examples include a loss of self-esteem due to poor performance, loss of time to complete an assignment and spending time in preparing for the Pharmacology examination, but not seeing an increase in results. When a student has adequate resources, e.g., time, the demands (e.g., examinations) are experienced as less taxing and the student will cope successfully and conversely. According to COR, a student must invest resources in order to prevent loss cycles and enhance motivating gain cycles. Some resources like time and vitality are easily used up and easily replenished. On the other hand, skills and

knowledge are slower to build, but might be positively reinforced or reciprocated when applied (Hobfoll, 1988).

The resource theory of social exchange (Foa & Foa, 1976, 2012) focuses on the quality of social exchange, specifically what types of resources are exchanged. All interpersonal behavior entails the giving and receiving of resources. The type of social encounter determines how the resource (love, service, status, information, goods or money) is appreciated. An action of the student leads to a reciprocation or retaliation of the lecturer and vice versa. In the world of a student, the lecturer is in a prime position to act as a resource by focusing the student's attention on important information through, inter alia, task structuring. A lack of resources or opportunities compromises a student's mental health (Keyes et al., 2002). When a person's resources fall below a minimum level, his or her ability to function as a competent member of society is hampered (Foa & Foa, 2012). Resources are an excellent basis for flourishing and optimal functioning. Their intrinsic value coupled with an active search for more resources is motivating (Gorgievski et al., 2011).

Method

Participants and Setting

All the registered Pharmacy students of 2014 at the North-West University, 899 students academic year 1 to 4, were invited to participate. The survey design was Internet based. Students were asked to gather in a computer lecture room where the Internet access code was given to them. Participation was voluntary and informed consent was obtained from the participants. Ethical clearance was granted by the Ethics Sub-Committee for Social and Behavioral Sciences of the Faculty of Humanities, North-West University (number: FH-SB-2013-0008).

Measuring Battery

The measuring battery consisted of the Mental Health Continuum-Short Form (Keyes 2009), questions about demands and resources, and a demographic questionnaire.

The MHC-SF consists of 14 items which assess positive mental health in terms of emotional, social and psychological dimensions. Lamers, Westerhof, Bohlmeijer, Ten Klooster, and Keyes (2011) confirmed the three-factor structure of mental health. The first dimension is Emotional well-being (EWB), consisting of 3 items, e.g., “During the past month, how often did you feel interested in life?” The second dimension is Social well-being (SWB), consisting of 5 items, e.g., “During the past month, how often did you feel that you had something important to contribute to society?” and “During the past month, how often did you feel that people are basically good?” The last dimension is Psychological well-being (PWB) consisting of 6 items, e.g., “How often did you feel that you liked most parts of your personality?” and “How often did you feel that your life has a sense of direction or meaning to it?” The MHC-SF was shown to be internally reliable with $\alpha = 0.89$ for the total MHC-SF, and $\alpha = 0.83$ for the subscale EWB and $\alpha = 0.74$ for the subscale SWB. The convergent validity of the MHC-SF was also demonstrated (Lamers et al., 2011). Various corresponding measures of well-being were used. Examples are the Satisfaction with life scale for EWB, positive affect for PWB and social engagement for SWB. A study carried out in South Africa among Tswana speakers also confirmed the MHC-SF as reliable and valid (Keyes et al., 2008). The internal consistencies of the three subscales EWB, SWB and PWB were 0.74, 0.59 and 0.67 respectively. In a study among employees in South Africa the internal consistencies were found to be 0.87, 0.86 and 0.82 for EWB, PWB and SWB respectively (Diedericks & Rothmann, 2013).

Study demands were investigated by means of the following 3 statements which were developed for the purpose of this study: “The workload in some of the subjects is too much”, “My studies take up so much time that I do not have time to relax”, and “During the semester I feel physically drained at the end of the day”. The support of lecturers was investigated by means of 4 statements which were developed for the purpose of this study: “My lecturers provide accurate, performance-related feedback”, “My lecturers involve me in skills development and/or problem solving”, “My lecturers regard failure as part of the learning process”, and “My lecturers emphasize the fact that students are responsible for their own results”. The candidates had to rate each statement on a scale from 1 (no agreement) to 5 (much agreement).

Data Analysis

The data was analyzed using Mplus version 7.3 for the structural equation modeling (Muthén & Muthén, 1998-2014) and SPSS version 22 for the descriptive statistics (IBM Corp 2013). The items of the questionnaires were defined as categorical (when applicable) and WLSMV (weighted least squares with corrections to means and variances) was used as estimator. To assess the fit of measurement and structural models, the following indexes and values were utilized: Comparative Fit Index (CFI; > 0.95), Tucker-Lewis Index (TLI; > 0.95) and the root mean square error of approximation (RMSEA close to 0.06) (Hu & Bentler, 1999). Furthermore, a non-significant chi-square value, as well as the smaller AIC and BIC values and weighted root mean residual (WRMR) close to one indicated better fit. Chi-square difference testing was used to compare the models which investigated configural, metric and scalar invariance between the unconstrained model and the configural, metric and scalar models respectively. Descriptive statistics and correlations were used to explore the data. The reliabilities of the scales were computed. Reliability reflects a measure of the scale reliability

of the construct or latent variable (Raykov, 2012). In the structural model, Flourishing was regressed on Workload and Lecturer support. The moderation effect of lecturer support on the relation between workload and flourishing was computed and plotted with Mplus 7.3 with software developed by Stride (Muthén & Muthén, 1998-2014; Stride, 2015).

Results

Flourishing

The response rate was 86.7%. A total of 779 students participated. One hundred and forty three males participated in the study of which 46.7% flourished and 52.4% was classified as moderately mentally healthy. Of the 636 female students, 3.3% languished, 58.0% was moderately mentally healthy and 38.7% flourished. Table 1 gives the levels of flourishing for a student's academic as well as historic year. To flourish a student had to feel 1 of the 3 hedonic well-being symptoms and 6 of the 11 positive functioning symptoms "every day" or "almost every day" in the past month. A student was categorized as languishing when he or she felt 1 of the 3 hedonic well-being symptoms and 6 of the 11 positive functioning symptoms "never" or "once or twice" in the past month. Moderately mentally healthy students are those who were neither "flourishing" nor "languishing" (Keyes 2009).

Table 1: Mental Health of Students

	Languishing		Moderately mentally healthy		Flourishing	
Year group(n)	F	%	f	%	f	%
Total (779)	21	2.7	444	57.0	314	40.3
Academic year						
Year 1(204)	7	3.4	111	54.4	86	42.2
Year 2(210)	5	2.4	112	53.3	93	44.3
Year 3(203)	4	2.0	122	60.1	77	37.9
Year 4(162)	5	3.1	99	61.1	58	35.8
Historic year						
Year 1(207)	6	2.9	119	57.5	82	39.6
Year 2(172)	4	2.3	84	48.8	84	48.8
Year 3(181)	5	2.8	107	59.1	69	38.1
Year 4(151)	4	2.6	92	60.9	55	36.4
Year 5(49)	2	4.1	33	67.3	14	28.6
Year 6(12)	0	0	6	50	6	50
Year 7(7)	0	0	3	42.9	4	57.1

From Table 1 it is evident that Flourishing varies between 35.8 and 44.3% for the academic year groups. Flourishing among the students (academic year groups) is the highest in their second year and the lowest in their fourth year.

Measurement Models

We tested five measurement models, namely models A, B, C, D and E, which are described in the following paragraphs.

Model A consisted of 5 latent variables, Emotional, Psychological and Social well-being measured by 3, 6 and 5 observed variables respectively, Overload measured by 3 observed variables and Lecturer support measured by 4 observed variables. Model B consisted of 3 latent variables, Flourishing, Overload and Lecturer support. Flourishing was measured by 3 latent variables, namely Emotional, Psychological and Social well-being measured by 3, 6 and 5 observed variables respectively, Overload measured by 3 observed variables and Lecturer support measured by 4 observed variables.

Model C was structured with 3 latent variables: Flourishing (measured by 14 observed variables), Overload (measured by 3 observed variables) and Lecturer support (measured by 4 observed variables). Model D had 2 latent variables namely Flourishing (similarly determined as in Model B with the 3 latent variables: Emotional, Social and Psychological well-being) and Demands (consisting of the manifest variables of Lecturer support and the manifest variables of Overload). Model E consisted of 1 latent variable, namely Flourishing, which was measured by 21 observed variables.

The fit statistics for the measurement models are presented in Table 2. Based on the goodness-of-fit indexes as discussed in the section on data analysis, both Model A, a 5 factor model and Model B, a 3 factor model, fitted the data satisfactorily. Based on a CFI=0.957, TLI=0.950, $\chi^2 = 790.568$ and RMSEA=0.065, Model B, consisting of the factors Flourishing, Overload and Lecturer support fitted the data slightly better than Model A.

Table 2: Fit Statistics for Measurement Models

	Model A	Model B	Model C	Model D	Model E
Free parameters	129	125	122	123	119
AIC	41406.92	41495.98	41459.248	41706.997	42860.029
BIC	42007.80	42078.24	42008.894	42261.300	43414.332
χ^2	823.752 ^a	790.568 ^a	1325.093 ^a	1568.984 ^a	4794.903 ^a
df	179	183	186	185	189
RMSEA	0.068 ^b	0.065 ^b	0.089 ^b	0.098 ^b	0.177 ^b
90% CI	0.063-0.073	0.061-0.070	0.084-0.093	0.094-0.103	0.173-0.181
CFI	0.954	0.957	0.919	0.902	0.672
TLI	0.946	0.950	0.909	0.888	0.636
WRMR	1.440	1.461	1.943	2.321	3.773

^a $p \leq 0.000$, ^b probability RMSEA ≤ 0.05 is 0.000

Measurement Invariance and Latent Mean Differences

We tested for measurement invariance of the best-fitting model for students in the four year groups. We wanted to determine whether the scales were invariant for students in the different year groups so that we could compare the mean scores of the different year groups. We tested for three types of invariance, namely configural, metric and scalar invariance (Cheung & Rensvold, 2002). Configural invariance indicates whether the students belonging to the four year groups conceptualized the constructs similarly. Metric invariance means that all factor loading parameters are the same across the year groups. Scalar invariance indicates whether the measurement scales have the same operational definition for the 4 year groups of

pharmacy students. Latent mean scores on constructs can only be compared when configural, metric and scalar invariance exist (Wang & Wang, 2012).

We tested the measurement invariance of the best fitting measurement model for students in the four year groups using Mplus 7.31 (see Table 3).

Table 3: Measurement Invariance of the Best-fitting Model

Models compared	Chi-square	<i>df</i>	<i>p</i> -value
Metric against configural	51.868	48	0.326
Scalar against configural	292.837	252	0.039
Scalar against metric	247.500	204	0.202

Table 3 shows that no statistically significant changes in χ^2 values were found when configural, metric, and scalar invariance were tested. Given that no statistically significant changes in χ^2 value were found, we proceeded to compare latent mean differences between students in different year groups (see Table 4).

Table 4: Mean Score Comparisons of the Latent Variables between the Year Groups (Y1, Y2, Y3, Y4)

	Differences in means					
	Y1 - Y2	Y1 - Y3	Y1 - Y4	Y2 - Y3	Y2 - Y4	Y3 - Y4
EWB	-0.205 ^c	0.022	0.044	0.227 ^b	0.249 ^b	0.500
PWB	-0.075	0.020	0.085	0.095	0.160 ^c	0.065
SWB	-0.078	0.072	0.010	0.151 ^c	0.088	-0.063
Lecturer support	0.245 ^b	0.410 ^a	0.471 ^a	0.166 ^d	0.227 ^b	0.061
Overload	-0.092	-0.328 ^a	-0.350 ^a	-0.236 ^a	-0.257 ^a	-0.022

^a $p \leq 0.000$, ^b $p \leq 0.01$, ^c $p \leq 0.05$, ^d $p = 0.051$

Year group 2 has the highest level of EWB. The average level of EWB of year group 2 is between 0.205 and 0.249 statistically significantly higher than the average levels of EWB of the other year groups. The average level of PWB of year group 2 is statistically significantly higher than that of year group 4. The average level of SWB of year group 2 is statistically significantly higher than the average level of SWB of year group 3. The students' perception of Lecturer support declines from the first to the fourth year with statistically significant differences between all the year groups except for the third and fourth years. The students' report of the average level of Overload increases from the first to the fourth year. The increase is statistically significant from year group 1 to year groups 3 and 4 respectively as well as from year group 2 to year groups 3 and 4. The largest statistically significant increase is 0.350 ($p \leq 0.000$) from year group 1 to year group 4.

The reliabilities of the latent variables were as follows: 0.828 (EWB), 0.862 (PWB), 0.805 (SWB), 0.716 (Lecturer support) and 0.784 (Overload). These values were all greater than 0.70, which are acceptable (Wang & Wang, 2012).

Structural Model

In line with the hypotheses of this study, the differences in latent mean scores for Overload, Lecturer support and Flourishing were computed in Mplus. In the structural model Flourishing was regressed on Overload and Lecturer support. We determined whether there were differences between a model with no interaction between Overload and Lecturer support and a model where Overload and Lecturer support interacted. We used Wald tests to determine whether the regression coefficients of Overload and Lecturer support differed between year groups. We computed and plotted the moderation effect of Workload on Flourishing at different levels of Lecturer support.

Concerning the prediction of Flourishing, the regression coefficients of Overload ($\beta = -0.317, p < 0.000$) and Lecturer support ($\beta = 0.320, p < 0.000$) were statistically significant and had the expected signs. Overload had a negative relation with Flourishing, while task structuring by the lecturer had a positive relation with Flourishing. The WLSMV-estimated equation accounted for 24% of the variance in Flourishing ($R^2 = 0.239$).

Next the interaction effects between Overload and Lecturer support on Flourishing were computed for each year group. Table 5 shows the results of models without the interaction effect and models with the interaction effect included.

Table 5: Regression Coefficients for the Interaction and No-interaction Models

	Year group 1	Year group 2	Year group 3	Year group 4
N	204	210	203	162
<i>No interaction model</i>				
Flourishing ON				
Overload	-0.329*	-0.314*	-0.332*	-0.342*
Task structuring by lecturer	0.351*	0.447*	0.215*	0.342*
<i>Interaction model:</i>				
Flourishing ON				
Overload	-0.351*	-0.312*	-0.354*	-0.354*
Lecturer support	0.370*	0.450*	0.266*	0.354*
Interaction	0.088	-0.091	-0.204**	-0.095

* $p \leq 0.000$, ** $p \leq 0.05$

We first report the results of the interaction model: The respective regression coefficients of Overload for Flourishing in year groups 1, 2, 3 and 4 all had negative statistically significant relationships with Flourishing varying between $\beta = -0.312$ and $\beta = -0.354$. Lecturer support

predicted Flourishing statistically significant for all the year groups with the largest value for the second year group ($\beta=0.450$). The only statistically significant interaction between Overload and Lecturer support was for the third year group, $\beta=-0.204$. The variance in Flourishing explained was 31.2%, 26.6%, 17.8% and 25.7% respectively for the first, second, third and fourth year groups, all the values statistically significant ($p\leq 0.000$). The 95% confidence interval for the interaction between Overload and Lecturer support also did not include zero [-0.412; -0.003].

The regression coefficients in the model with no interaction between Overload and Lecturer support followed the same pattern as in the model with interaction between Overload and Lecturer support except for the fact that all the values were smaller. For all the year groups the variance in Flourishing explained was statistically significant but less than in the interaction model, namely 30.9%, 26.3%, 16.2% and 25.4% for the first, second, third and fourth year groups respectively.

Wald tests were done to investigate the statistical significance of differences between the regression coefficients of Flourishing on Overload and Lecturer support between the four year groups (see Table 6). The only statistically significant ($p\leq 0.01$) difference was between the second and third year groups regarding Lecturer support (7.203).

Table 6: Wald Tests

	Y1 = Y2	Y1 = Y3	Y1 = Y4	Y2 = Y3	Y2 = Y4	Y3 = Y4
Overload	0.024	0.001	0.015	0.027	0.060	0.009
<i>df</i>	1	1	1	1	1	1
<i>p</i>	0.877	0.982	0.903	0.870	0.807	0.925
Lecturer support	1.274	2.900	0.010	7.203	1.156	1.847
<i>df</i>	1	1	1	1	1	1
<i>p</i>	0.259	0.089	0.922	0.007	0.282	0.174

The interaction effect of Lecturer support and Workload is illustrated in Figure 1. In the third year Lecturer support interacted with Workload to affect Flourishing. More specifically, the negative relationship between workload and flourishing was stronger when Lecturer support was high. However, when Lecturer support was low, the negative relation between Workload and Flourishing was less strong.

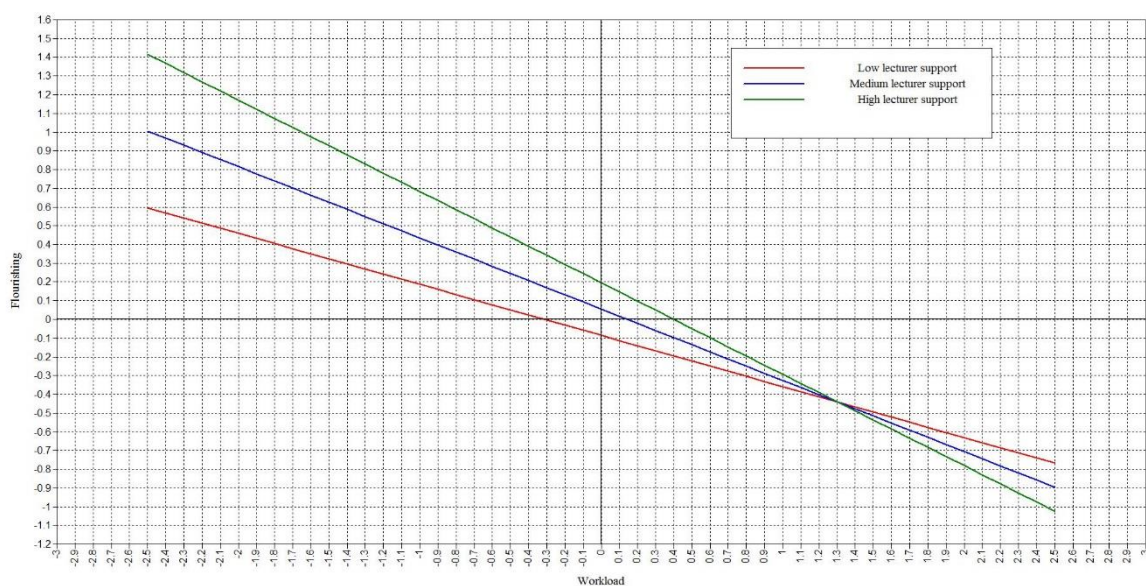


Figure 1: The moderation effect of lecturer support on the relationship between workload and flourishing

Discussion

For the academic year groups, 40.3% of the students were flourishing, whilst 57% were moderately healthy and only 2.7% were languishing. Most students presented with moderate levels of hedonic well-being (feeling good) and moderate levels of eudaimonic well-being (functioning well). The prevalence of flourishing was the highest in the second year (44.3%) and the lowest in the fourth year (35.8%), possibly because of students' workload and less resources. The B.Pharm degree is a four-year degree and only 28.6% of the historic year group 5 were flourishing. These findings are in contrast with findings in a study among Setswana speaking South Africans where only 20% were flourishing (Keyes et al., 2008). However, a study among college students in the USA found that 49.3% were flourishing (Keyes et al., 2012). It is possible that students have more resources than the average adult has. This study among pharmacy students corroborates the levels of flourishing among a cohort of South African pharmacists where 60% were flourishing, 33.8% were moderately healthy and 6.2% were languishing (Coetzer, 2014). It seems that the levels of flourishing among pharmacists or professional persons are higher than in the general population.

When we compared the differences in latent means, we found that year group two's levels of well-being were the highest. The higher levels of emotional well-being of year group 2 indicated that they were feeling good. It seems that in the third year the students' level of social well-being drops, maybe due to increasing study demands that leave less time for attending to their social functioning. In the fourth year the level of psychological well-being drops, indicating that the students might start to have problems with, inter alia, purpose in life, environmental mastery and autonomy. According to Hobfoll, psychological stress will occur when a student's individual resources are threatened, when the resources are actually

lost or where the individual fails to gain sufficient resources after a resource investment (Hobfoll, 2002).

The students' experiences of workload and the associated results increased statistically significantly from their first through to their fourth year. Simultaneously, their perception of resources available in terms of Lecturer support declined from their first through to their fourth year. The structural model indicated an interaction effect between lecturer support (a resource) and overload (a demand) in the third year group. It seems that as the workload increased, the students' ability to draw on the lecturer as a resource diminished. Bakker and Sanz-Vergel (2013) found that workload undermines the effect of personal resources on well-being because it undermines motivation. Alarcon, Edwards, and Menke (2011) suggest that in a situation where resources are low, demands (e.g., workload) play a larger role. However, this study showed that a resource such as lecturer support matters less when workload was high. It might be that students that experience too much workload perceive the social-organizational resources that are available (the lecturers) as not so supportive and fair (Boudrias et al., 2011). The students may interpret their study overload as the way they are treated and this may diminish their motivation to look for support in their study environment, which they do not expect to find. The interaction model explained between 18% (the third year group) and 31% (the first year group) of the variance in flourishing in the year groups.

The predictive value of workload for flourishing did not differ between the year groups. An increasing workload had a negative relationship with flourishing. Task structuring by the lecturer had a positive relationship with flourishing. In the second year group, task structuring by the lecturer is a more important predictor of flourishing than in the third year group. It seems that the first and second years use their lecturer more as a resource than the third and fourth years do.

The availability of study resources (e.g. lecturer support) can thus act as a pathway to flourishing for pharmacy students. Study resources are positively associated with psychological well-being (Mokgele & Rothmann, 2014). A lecturer can also activate motivating gain spirals of resources for students. For example, social support is defined as a resource in COR. It is described as information from other people that a person perceives as, inter alia, being cared for and being loved. Social support can enlarge a student's pool of available resources and replace those lost or lacking. Students on the other hand could focus on using resources that are not used up so easily. Resource gain becomes increasingly important for students when they are losing resources (Hobfoll, 2012).

Limitations

Common method bias could be a problem in this study as all the measures were based on self-reports. Some regard common method bias in surveys as “urban legend” (Spector 2006). This study was based on students representing only one profession, namely pharmacists. It was, however, at the largest pharmacy school in South Africa. Furthermore, supportive evidence of flourishing among a variety of professions already exists and this study's findings contribute specifically to the literature regarding flourishing and the health professions.

Conclusion and Recommendations

The availability of study resources (and more specifically lecturer support) plays a significant role in the flourishing of students. The availability of such resources could act as a pathway to flourishing for pharmacy students. Furthermore, dealing effectively with the workload over four years seems to be an important pathway to flourishing of pharmacy students. When the students' experiences of workload are too high, they are unable to detect the resources in their

environment, which ultimately affects their levels of well-being. Flourishing students have a spinoff of motivated, optimal functioning students and therefore also optimal results for the institution.

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CHAPTER 3

ANTECEDENTS OF BASIC PSYCHOLOGICAL NEED

SATISFACTION OF HEALTH SCIENCES STUDENTS: THE ROLE

OF PEERS, FAMILY AND LECTURERS

**Antecedents of Basic Psychological Need Satisfaction of Health Sciences
Students: The Role of Peers, Family and Lecturers****Abstract**

Health educators are looking for that illusive ‘one fits all’ model to improve health students’ functioning. Self-determination Theory, a motivational theory that tells us about the ‘what’, the ‘why’ and the ‘how’ of behaviour, provides such a model. The theory develops motivation from extrinsic and controlled to intrinsic and autonomous. For students to flourish, they need conditions that enhance their autonomous motivation. A student’s autonomous motivation can be enhanced by creating a context that satisfies his or her basic psychological needs of autonomy, competence and relatedness. In this study we investigated the contributions of lecturers, peers, family and workload to the psychological need satisfaction of students. A total of 779 of the 899 registered undergraduate pharmacy students at a higher education institution in South Africa participated in the study. A survey consisting of a demographic questionnaire, the Balanced Measure of Psychological Needs and Antecedents of Basic Psychological Need Satisfaction Scale was administered. The structural model explained 46%, 25% and 30% of the variances in autonomy, competence and relatedness satisfaction respectively of the total group. Peers and family played a significant role in the satisfaction of students’ autonomy, relatedness and competence needs. Workload hampered relatedness and autonomy satisfaction. Implications for the role of the lecturer are discussed.

Keywords: Basic psychological need satisfaction, contextual factors, lecturers, peers, family

INTRODUCTION

We know there is not one teaching method that guarantees optimal performance of all the students in a class, possibly because a method speaks to a specific group of students, but not to the rest (Mayer 2014; Ranganath & Priya, 2015). To facilitate optimal performance of students, the following question arises: “What can be done to enable students to function better?” There is a yearning for an answer to this question, notably in the Health Sciences, for example, in Pharmacy Education where the curriculum does not allow a variety of choices as it works towards a clearly defined profession (Kursurkar et al., 2011b).

From the literature we know that well-functioning students (compared with those who do not function well) perform better academically (Donaldson et al., 2015), adjust better to their environment (Potgieter & Botha, 2014), and are socially more adapted (Diener & Ryan, 2009). The critical underlying factor to better functioning is the eudaimonic well-being of students. The key focus of eudaimonic well-being is for individuals to live well (rather than only to feel good), to engage their best human capacities to pursue virtue and excellence, to continuously engage in reflectivity and deliberation concerning their actions and aims, and to pursue excellence through voluntary actions (Ryan et al., 2008). The mechanism through which a lecturer can address the eudaimonic well-being of students and therefore their functioning is described in the Self-determination Theory (SDT). The answer lies thus in the application of SDT (Ten Cate et al., 2011), a universal motivational theory (Deci & Ryan, 2012). It has been shown that better performance in different contexts, health sciences education included, is equated to autonomous motivation (Fortier et al., 1995; Radel et al., 2009; Kursurkar et al., 2013). According to SDT, autonomous motivation is enhanced by the support of the three basic psychological needs of autonomy, relatedness and competence.

Social context cannot be ignored when the growth of an individual is being investigated (Young et al., 2004). Social contexts that allow for the satisfaction of basic psychological needs facilitate the maintenance of intrinsic motivation and the internalisation of extrinsic motivation (Deci et al., 1996), in other words, autonomous motivation. For educators, the question is whether different contextual factors influence the levels of need satisfaction of students differently and how these factors can be managed to increase students' levels of need satisfaction. From the literature we know that increased levels of need satisfaction is related to autonomous motivation (Kursurkar et al., 2011b), which in turn is related to inter alia better performance (Williams et al., 1999) and well-being (Grolnick & Ryan, 1989).

Different factors are related to autonomous motivation and need satisfaction. What is not clear from the literature is whether some factors have a greater influence on the need satisfaction of students in their study environment. In this study we investigated the effects of family, lecturers, peers and workload on the levels of need satisfaction of students in their study context.

Self-determination theory

Self-determination Theory (SDT; Van den Broeck et al., 2008) is a motivational theory that explains the “what”, the “why” and the “how” of behaviour. The “why” of behaviour evolves from interplay between intrinsic and extrinsic motivation; the “what” of behaviour is evident from the motivational influences, and both are derived from the degree of need satisfaction (Van den Broeck et al., 2008) that explains the “how” of behaviour. Contrary to other motivational theories, the motivational distinction is not external versus internal motivation, but is concerned with whether the behaviour was motivated autonomously or controlled. According to SDT, motivation for behaviour lies on a continuum between autonomous and

controlled (see Table 1).

Behaviour cannot be fully understood if the process that energises and directs the behaviour is not scrutinised (Deci & Ryan, 2000). The degree to which an individual's basic psychological needs (see Table 2), namely autonomy, belongingness and competence are being satisfied explains the "why" and "what" of motivation. The basic psychological needs of autonomy, competence and relatedness are universal and satisfying these needs enhances motivation and well-being (Deci et al., 2001).

Table 1: The Behavioural Motivation Continuum*

Autonomous		Controlled			
Internal (intrinsic)		External (extrinsic)			
Most autonomous	Internal	Integrated regulation	Identified regulation	Introjections	External regulation
	Goals stimulate	Activity fits	Goal of	Reason for	Reason for
	actualisation of	individual's	behaviour is	behaviour is	behaviour
	inherent potential	broader set of	personally	internally	external to
		values and beliefs	endorsed and considered important	pressuring reasons	individual
					Most controlled

* Compiled from Van den Broeck et al., 2008

The three psychological needs describe the fuel an individual needs for psychological growth, integrity and well-being. The strength of the need or the hierarchical value of the need is not important, but rather the balance in the satisfaction of the needs. Between two persons with the same sum score for well-being, the one with the better balance between the three needs of autonomy, relatedness and competence, reports greater well-being (Sheldon & Niemiec,

2006). Under these circumstances persons are intrinsically motivated, able to fulfil their potentialities, and able to seek greater challenges (Seligman & Csikszentmihalyi, 2000). The degree to which people are able to satisfy their fundamental needs is the most important predictor of optimal functioning (Deci & Ryan, 2000).

Table 2: Basic Psychological Needs*

Need	Definition
Autonomy	An inherent desire to act with a sense of volition and choice
Relatedness	An inherent propensity to feel connected to others
Competence	A desire to feel capable to master the environment and to bring about the desired outcomes

*Compiled from Van den Broeck et al., 2008

According to SDT, the quality of motivation is important when it comes to academic performance, study strategy, adjustment and well-being (Vansteenkiste et al., 2005).

Regarding good performance in a medical context, the quality of motivation determined good performance through good study strategy and high effort (Kursurkar et al., 2011b).

Autonomous motivation or intrinsic motivation and identified regulation together help individuals to achieve their goals and to feel good in the process. The more autonomous the motivation, the better the outcomes. Burton et al. (2006) found that there is a link between intrinsic motivation and psychological well-being, independent of performance; however, they found a link between identified motivation and performance. Outcomes of autonomous motivation in the learning context can be deep learning (Kyndt et al., 2011), high academic performance (Burton et al., 2006), better academic adjustment (Nishimura & Sakurai, 2013) and positive well-being (Marcinko, 2015).

Motivation and psychological need satisfaction

In their review of laboratory studies, Deci, Ryan and Williams (1996) found that social contexts that allow satisfaction of basic psychological needs facilitate the maintenance of intrinsic motivation and the internalising of external motivation, in other words, autonomous motivation. These two motivational aspects are associated with high quality learning and personal adjustment. For students, psychological need satisfaction has a significant positive impact on their intrinsic motivation (Doménech-Betoret & Gómez-Artiga, 2014). A pre-requisite for the natural growth tendency which results in effective functioning and greater autonomous self-regulation is the experience of support for the needs of autonomy and relatedness (Niemic et al., 2006). Need satisfaction is universally linked to autonomous motivation and well-being in various life domains (Milyavskaya & Koestner, 2011). They found that need satisfaction explained 40% of the variance in autonomous motivation and 51% of the variance in well-being between various life domains and concluded that need satisfaction plays a dual role; it acts both directly and indirectly on well-being outcomes. Evident in social contexts that support basic psychological need satisfaction are opportunities for choice, optimal challenges, informational feedback, acknowledged feelings and interpersonal involvement.

From the above, it seems that the better functioning health sciences students are most probably those whose basic psychological needs are satisfied and who are autonomously motivated. SDT recognises that individuals have an inherent tendency to grow and develop if conditions are favourable, but also that individuals can malfunction if they do not have sufficient inner resources or if environmental support is lacking. The antecedent factors to psychological need satisfaction in the environment of health sciences students therefore play an important role.

Contextual events influence intrinsic motivation in the sense that a person's perceived locus of causality determines the degree to which persons feel they are autonomously engaged. When one defines the core of well-being as growth and human fulfilment, one cannot ignore the influence of context on a person's life (Ryff & Singer, 2008). SDT is the only motivational theory that links environmental factors to basic psychological needs as a basis for explaining the effects of the social environment on intrinsic motivation (Deci & Ryan, 2012). Greater well-being is also reported by participants in contexts where need satisfaction is facilitated. The basic needs are the mediators of the effects of the social context on well-being and performance (Deci & Ryan, 2012). Need support from mothers and fathers facilitated the development of autonomous self-regulation, which in turn supported adolescents' well-being (Niemic et al., 2006). Parental autonomy support has a greater impact on adolescents' well-being than the autonomy support of teachers, whereas teachers have a greater impact on experiences of challenge and interest (Chirkov & Ryan, 2001). Teacher and parent autonomy support is associated with autonomous motivation. The perception of autonomy support facilitates well-being and autonomous motivation in different cultures (Chirkov & Ryan, 2001). It seems that when parents or authorities support autonomy they also support competence and relatedness. Support for competence and relatedness is implicit in support for autonomy, because it is necessary for autonomous motivation (Deci et al., 2001). The satisfaction of all three needs is needed for internalisation of extrinsic motivation. Therefore social contexts that support the basic needs facilitate fuller internalisation (Deci & Ryan, 2012). Lecturers are in an ideal position to support autonomy needs of students. Autonomy supportive lecturers work in an understanding, encouraging and non-judgemental style (Williams & Deci, 1998).

The aim of this study was to test a structural model that identifies relationships among psychological need satisfaction and its antecedents. A specific aim was to investigate whether workload and the inputs from family, peers and lecturers regarding a student's psychological need satisfaction in the study context have similar effects.

METHODS

In 2014, the 899 registered Pharmacy students at the North-West University, academic year 1 to 4, were invited to participate in an Internet-based survey. Students were asked to gather in a computer lecture room where informed consent was obtained from the participants and the Internet access code was given to them. Participation was voluntary. Ethical clearance (number: FH-SB-2013-0008) was granted by the Ethics Sub-Committee for Social and Behavioural Sciences of the Faculty of Humanities of the North-West University.

MEASURING BATTERY

The measuring battery consisted of a general demographic questionnaire, the *Balanced Measure of Psychological Needs* (BMPN; Sheldon & Hilpert, 2012) and a developed questionnaire about the Antecedents of Psychological Need Satisfaction (ANPNS).

The *Balanced Measure of Psychological Needs* (BMPN; Sheldon & Hilpert, 2012) was used to assess need satisfaction of autonomy, competence and relatedness of the future pharmacists in their daily living, focused on their experience as students the previous semester. For this scale, autonomy, relatedness and competence are defined in line with SDT. Sheldon and Hilpert (2012) demonstrated the convergent and discriminant validity of the BMPN scale, and the reliabilities of BMPN autonomy, competence and relatedness were 0.78, 0.79 and 0.78 respectively. Each construct is measured by six statements that participants had to rate on a scale from 1 (no agreement) to 5 (much agreement).

The last questionnaire was about antecedents of PNS or contextual factors related to the students' environment that could influence their PNS. More specifically, the contribution of lecturers (11 items), peers (8 items), family (8 items) and workload (3 items) to the satisfaction of students' needs for autonomy, relatedness and competence, was determined (see Table 3). Participants had to rate each statement on a scale from 1 (no agreement) to 5 (much agreement).

DATA ANALYSIS

To analyse the data, Mplus version 7.3 (Muthen & Muthen, 2008-2014) was used for the structural equational modelling. SPSS version 22 (IBM Corp 2013) was used to compute descriptive statistics. The questionnaire items were defined as categorical and the estimator used was weighted least squares with corrections to means and variances (WLSMV). To compare the models, absolute, incremental and comparative fit indices produced by Mplus were used. Therefore the Chi Square Difference test, Comparative Fit Index (CFI), Tucker Lewis Index (TLI), weighted root mean residual (WRMR) and Root mean square error approximation (RMSEA) were used. Hu and Bentler (1999) regarded the following values as indicative of good fit: CFI: 0.95; TLI: 0.95 and RMSEA: 0.06. However, West, Taylor, and Wu (2012) point out that these cut-off standards for model fit were based on simulation studies and should be used as rough indicators only, especially when models and data further away from confirmatory factor analytical models with complete data are studied. Wang and Wang (2012) provided the following values as indicative of good fit: CFI: 0.90; TLI: 0.90 and RMSEA: 0.08. Furthermore, a non-significant chi-square value, as well as WRMR close to one indicated better fit. Raykov's (2009) confirmatory factor analysis-based estimate of scale reliability (ρ) was computed for each scale.

The researcher originally experimented with a multi trait multi method approach, but could not obtain a satisfactory fit; hence the following approach as is described in three phases.

Phase 1

The data set was divided in a test sample and a calibration sample. First the data was split into the four year groups and then the individuals in the year groups were randomly assigned to either the test sample ($n=390$) or the calibration sample ($n=389$). An exploratory factor analysis (EFA) was done on the items of the two measures in the test sample. The EFA ascertained the contextual factors that underlie the covariance among the observed variables and determined the extent to which item measurements were related to the latent constructs. Only items with factor loadings bigger than /0.300/ were included as part of the ANPNS.

Phase 2

A confirmatory factor analysis (CFA) was done on the calibration sample to see whether the obtained factor structure could be confirmed. A competing models strategy was employed and four measurement models were tested.

Phase 3

The structural model was tested in the total sample ($n=779$), in other words, the sum of the test and calibration sample. Thereafter the reliabilities and the covariances of all the factors were determined. Correlations were done on the total sample as well as on the different year groups in the total sample. The strength and directions of the relations between variables in the different year groups were determined.

LIMITATIONS

This study involved only one of the health sciences professions, namely pharmacy. As it is the first study of this specific nature, it can be replicated for all the health science professions in order to inform educators about the status quo and what can be done to improve performance and well-being of students. This was a cross-sectional study; therefore the information was about one point in time only. Longitudinal studies as well as mixed method studies will enable future researchers to triangulate the data.

RESULTS

Phase 1: EFA

The results of the EFA regarding the contextual factors on the test sample are reported in Table 3.

Table 3: Exploratory Factor Analysis: Antecedents of Basic Psychological Need satisfaction

Item	1	2	3	4
<u>Lecturer support</u>				
My lecturers acknowledge my perspective and feelings	0.594*	-0.025	0.004	-0.163*
I know what my lecturers expect of me	0.517*	0.013	-0.019	-0.116*
My lecturers trust me	0.537*	0.056	0.104*	-0.064
My lecturers accept me unconditionally	0.581*	0.053	0.103*	-0.138*
I have a personal relationship with my lecturers	0.383*	-0.094	-0.030	-0.103
I trust my lecturers	0.699*	0.009	0.013	-0.036
Lecturers are successful in getting students to work together	0.670*	0.003	0.015	-0.089*
My lecturers provide accurate, performance-related feedback	0.808*	-0.047	0.077*	-0.001
My lecturers involve me in skills development and/or problem solving	0.839*	-0.019	-0.049	0.015
My lecturers regard failure as part of the learning process	0.695*	-0.043	-0.052	0.103*
If I am in trouble, I can get help from the university	0.404*	0.044	0.115*	0.037
<u>Family support</u>				
My family acknowledges my perspective and feelings	0.129*	0.809*	-0.026	0.016
My parents/family always give reasons if they want me to do something	0.016	0.594*	-0.122	-0.005
My parents/family trust me	-0.030	0.796*	0.070	0.017
I trust my parents/family	-0.036	0.836*	0.082	0.005
My parents/family accept me unconditionally	-0.003	0.956*	-0.020	-0.026
My parents/family are supportive	-0.040	0.942*	-0.072	-0.054
My family is positive that I will become a pharmacist	0.184*	0.615*	0.080	0.238*
It is difficult to pay attention to my studies, because I have financial problems	-0.054	-0.308*	-0.072	0.136*
<u>Peer support</u>				
My fellow students acknowledge my perspective and feelings	0.136*	-0.053	0.733*	-0.047
My fellow students trust me	0.176*	-0.009	0.704*	-0.015
My fellow students accept me unconditionally	-0.035	0.054	0.859*	-0.035
I trust my fellow students	-0.065*	-0.054	0.957*	-0.075*
I and my fellow students care for each other	-0.020	-0.042	0.878*	0.013
My fellow students are positive that I will pass my subjects	0.290*	0.114*	0.516*	0.210*
My fellow students regard failure as part of the learning process	0.266*	0.086	0.412*	0.217*
My fellow students trust me when academic assignments have to be done	0.292*	0.038	0.534*	0.300*
<u>Workload</u>				
The workload in some of the subjects is too much	-0.199*	0.053	0.040	0.604*
My studies take up so much time that I do not have time to relax	-0.041	-0.076	-0.069	0.806*
During the semester I feel physically drained at the end of the day	-0.041	-0.131*	-0.041	0.787*

* $p < 0.05$

Four factors were extracted, namely Lecturer support (11 items), Family support (8 items), Peer support (8 items) and Workload (3 items). The items with the highest loadings on the constructs were as follows: “My lecturers involve me in skills development and/or problem solving” (lecturer support); “My parents/family accept me unconditionally” (family support); “I trust my fellow students” (peer support), “My studies take up so much time that I do not have time to relax” (workload). The highest factor loadings varied between 0.806 and 0.957. The lowest factor loading was -0.308 for the following item of Family support: “It is difficult to pay attention to my studies, because I have financial problems”. The items that were retained had loadings larger than 0.300 and smaller than -0.300.

Only three items were retained for Relatedness and Competence satisfaction respectively (see Table 4). The factor loadings varied from 0.407 to 0.871. All six the original items were retained for Autonomy satisfaction. The absolute factor loadings varied between 0.202 and 0.654.

Table 4: Exploratory Factor Analysis: Basic Psychological Need satisfaction

Item	1	2	3
<i>1. Relatedness satisfaction</i>			
I felt a sense of contact with people who care for me, and whom I care for	0.664*	0.118	0.017
I felt close and connected with other people who are important to me	0.744*	0.139	-0.031
I felt a strong sense of intimacy with the people I spent time with	0.407*	0.275*	0.019
<i>2. Competence satisfaction</i>			
I was successfully completing difficult tasks and projects	-0.011	0.659*	0.176*
I took on and mastered hard challenges	0.000	0.835*	0.270*
I did well, even at the hard things	-0.153*	0.871*	-0.008*
<i>3. Autonomy satisfaction</i>			
I had a lot of pressures I could do without	-0.077	0.001	0.471*
There were people telling me what to do	0.066	-0.003	0.654*
I had to do things against my will	-0.086	-0.013	0.603*
I was free to do things my own way	0.184*	0.241*	-0.208*
My choices expressed my true self	0.061	0.474*	-0.221*
I was really doing what interests me	0.022	0.480	-0.202*

* p< 0.05

Phase 2: CFA

The CFA that was performed on the calibration sample confirmed the factor structure obtained through the EFA, namely Lecturers, Family, Peers and Workload for ANPNS. The factors for the BMPN were Autonomy, Relatedness and Competence support.

Four nested measurement models were tested in the calibration sample. Model 1 was a measurement model consisting of 7 latent variables, namely Family (8 items), Lecturers (11 items), Peers (8 items), Workload (3 items), Autonomy satisfaction (6 items), Competence satisfaction (3 items) and Relatedness satisfaction (3 items). The specific items are listed in Tables 3 and 4.

Model 2, 3 and 4 consisted of the same latent variables as Model 1. The fit indices values are shown in Table 5. For Model 1, CFI=0.928, TLI=0.922 and $\chi^2=1543$ with $df=798$.

To further improve the fit of the model, modification indices were studied to identify error correlations. Correlated errors may represent respondent characteristics that reflect bias, social desirability, as well as a high degree of overlap in item content (Byrne, 2012). The modification index (MI = 46) for item 21 (“I trust my fellow students”) and item 22 (“I and my fellow students care for each other”) indicated that the model fit could be improved by correlating the errors of the items. The model was respecified with this error correlation (Model 2), resulting in an improved fit ($\Delta\chi^2=25.966$, $\Delta df = 1$, $p < 0.001$). Furthermore, the modification index (MI = 46) for item 24 (“My lecturers provide accurate performance related feedback”) and item 25 (“My lecturers involve me in skills development and/or problem solving”) indicated that the model fit could be further improved by correlating the errors of the items. The model was respecified with this error correlation, resulting in an improved fit ($\Delta\chi^2=25.966$, $\Delta df = 1$, $p < 0.001$). Finally, the modification index (MI = 46) for item 39 (“My fellow students are positive that I will pass my subjects”) and item 40 (“My fellow students regard failure as part of the learning process”) indicated that the model fit could be improved by correlating the errors of the items. The model was respecified with this error correlation, resulting in an improved fit ($\Delta\chi^2=14.738$, $\Delta df = 1$, $p < 0.001$).

The CFI increased from 0.93 in Model 1 to 0.95 in Model 4. Similarly TLI increased from 0.92 in Model 1 to 0.94 in Model 4. The results of the Chi square difference tests confirmed that the data fit Model 4 better than Model 1.

Table 5: Fit Statistics for the Measurement Model in the Calibration Sample

	Model 1	Model 2	Model 3	Model 4
Free parameters	230	231	232	233
χ^2	1523.197*	1479.390*	1437.107*	1397.107*
df	798	797	796	795
RMSEA	0.048	0.047	0.046	0.044
90% CI	0.045 - 0.052	0.043 – 0.051	0.042 – 0.049	0.040 – 0.048
Prob<=0.05	0.769	0.914	0.976	0.995
CFI	0.928	0.932	0.936	0.949
TLI	0.922	0.926	0.931	0.935
WRMR	1.311	1.283	1.255	1.227

* $p < 0.0000$

STRUCTURAL MODEL

Fit statistics

Measurement Model 4 was utilised as the structural model. The fit statistics for the structural model were obtained in the total sample. Based on the cut-off values discussed in the method

section, $\chi^2=2056.608$, RMSEA=0.045 with a 90% CI=[0.043;0.048], pRMSEA = 1;

CFI=0.945, TLI=0.941 and WRMR=1.456, the fit indices were deemed acceptable.

Reliabilities

Table 6 shows that except for Autonomy satisfaction, all the reliabilities of the factors in the test sample, calibration sample and total sample were larger than 0.70 and therefore acceptable (Wang & Wang, 2012).

Table 6: Reliabilities

Latent Variables	Test sample	Calibration sample	Total sample
Relatedness Satisfaction	0.674	0.723	0.723
Competence Satisfaction	0.714	0.731	0.731
Autonomy Satisfaction	0.636	0.597	0.597
Lecturers	0.854	0.825	0.825
Family	0.811	0.710	0.710
Peers	0.887	0.864	0.864
Workload	0.725	0.742	0.742

Correlation matrix

Table 7 shows the correlation matrix of all the variables. Except for Workload, all the correlations between the variables were positive and statistically significant. The smallest correlation was between Lecturer support and Relatedness satisfaction (0.231) and the largest correlation was between Competence and Autonomy satisfaction (0.631). Autonomy satisfaction correlated with Family support (0.509), Lecturer support (0.432), Peer support (0.476) and negatively with Workload (-0.386). The correlations between Autonomy

satisfaction and Family, Lecturer and Peer support and Workload were higher than the correlations between Relatedness and Competence satisfaction and the afore-mentioned factors respectively. From Table 7 it is evident that there was no statistically significant correlation between Workload and Family support. Workload had statistically significant negative correlations with all the other variables, varying from -0.386 to -0.102.

Table 7: Estimated correlation matrix for the latent variables in total sample

Variable	1	2	3	4	5	6
1. Family support	-	-	-	-	-	-
2. Lecturer support	0.372*	-	-	-	-	-
3. Peer support	0.398*	0.576*	-	-	-	-
4. Workload	-0.032	-0.316*	0.108**	-	-	-
5. Autonomy satisfaction	0.509*	0.423*	0.476*	-0.386*	-	-
6. Competence satisfaction	0.365*	0.362*	0.453*	-0.102**	0.631*	-
7. Relatedness satisfaction	0.466*	0.231*	0.416*	0.144**	0.562*	0.533*

* $p < 0.000$ ** $p < 0.01$ *** $p < 0.03$

REGRESSION COEFFICIENTS

Total group

Table 8 shows the standardised regression coefficients in the total group. Table 8 shows that in the total group, Family support and Peer support predicted Autonomy, Relatedness and

Competence satisfaction with statistically significant positive relationships varying from $\beta=0.204$ to $\beta=0.384$. Workload predicted Relatedness satisfaction and Autonomy satisfaction with statistically significant negative relationships of 0.143 and 0.339 respectively. Lecturer support predicted only Relatedness satisfaction with a statistically significant negative relationship of $\beta=0.150$. The WLSMV-estimated equation accounted for large proportions of the variance in Autonomy satisfaction ($R^2=0.464$), Relatedness satisfaction ($R^2=0.304$) and Competence satisfaction ($R^2=0.254$).

Analyses in each of the year groups showed that Autonomy satisfaction is predicted by Family support, Peer support and Workload. Workload has a negative relationship with Autonomy satisfaction. For the second year group all the contextual factors predicted Relatedness satisfaction. Peer support predicted Relatedness satisfaction for all the year groups. The relationships between Lecturer support and Relatedness satisfaction for the second and third year groups were negative and statistically significant. The Relatedness satisfaction of the fourth year group was predicted by Family support and Peer support and for the third year group by Family, Peer and Lecturer support. Lecturer and Family support played a role for the first year group, Peer support for the second year group, Family support and Peer support for the third year group and Peer support for the fourth year group.

Table 8: Standardised regression coefficients of the variables in the total group

Variables	Estimate	SE	Est/SE	<i>p</i>
Autonomy satisfaction ON				
Lecturer support	0.011	0.052	0.222	0.824
Family support	0.383	0.046	8.309	0.000
Peer support	0.281	0.046	6.078	0.000
Workload	-0.339	0.042	-8.009	0.000
Relatedness satisfaction ON				
Lecturer support	-0.150	0.057	-2.658	0.008
Family support	0.384	0.053	6.308	0.000
Peer support	0.335	0.053	6.308	0.000
Workload	-0.143	0.045	-3.200	0.001
Competence satisfaction ON				
Lecturer support	0.095	0.055	1.749	0.080
Family support	0.204	0.047	4.299	0.000
Peer support	0.313	0.049	6.346	0.000
Workload	-0.032	0.045	-0.706	0.480

Wald tests were done to investigate the statistical significance of differences between the regression coefficients of Need Satisfaction namely Autonomy, Relatedness and Competence on Family, Peer, Overload and Lecturer support between the four year groups. Statistically significant differences were found between the first and respectively the second [Wald χ^2 (1, $n = 414$ Group 1 and 2) = 5.778, $p \leq 0.05$], third [Wald χ^2 (1, $n = 407$ Group 1 and 3) = 4.067, $p \leq 0.05$], and fourth year [Wald χ^2 (1, $n = 366$ Group 1 and 4) = 10.434, $p \leq 0.01$] groups regarding Peer support for Competence satisfaction. Between the first and respectively the third [Wald χ^2 (1, $n = 407$ Group 1 and 3) = 5.159, $p \leq 0.05$] and fourth [Wald χ^2 (1, $n = 366$ Group 1 and 4) = 4.608, $p \leq 0.05$] year groups there were statistically significant differences regarding Lecturer support for Competence satisfaction. Between year group one and year group three, Lecturer support for Relatedness satisfaction differed statistically significant as well as between year groups three and four: Wald χ^2 (1, $n = 407$ Group 1 and 3) = 5.577, $p \leq 0.05$ and Wald χ^2 (1, $n = 365$ Group 3 and 4) = 3.943, $p \leq 0.05$.

Table 9 shows the percentages of variance in psychological need satisfaction in the different year groups that were accounted for by the independent variables. Table 9 shows that the four independent variables accounted for varied from $R^2 = 0.279$ for Competence satisfaction in the third year group to $R^2 = 0.725$ for Competence satisfaction in the fourth year group. The structural model therefore explained between 28% and 73% of the variances in need

Table 9: Explained variance of Autonomy, Competence and Relatedness satisfaction in the different year groups

Year group	Variance explained (R^2)			
	1	2	3	4
Autonomy satisfaction	0.327*	0.537*	0.541*	0.359*
Relatedness satisfaction	0.344*	0.336*	0.297*	0.559*
Competence satisfaction	0.388*	0.308*	0.297*	0.725*

* $p \leq 0.000$

DISCUSSION

There is a difference in the impact of different contextual factors on the need satisfaction of health sciences students. In this study, four contextual factors, namely Family, Lecturers, Peers and Workload were identified and their influence on the need satisfaction of the students was investigated. It is possible that the impact of family and peers obscured the impact of the lecturers on the need satisfaction of the students.

The EFA on the ANPNS yielded the contextual constructs with the largest factor loading per construct larger than 0.806. This tendency was confirmed with the CFA. The EFA and CFA confirmed the three factor structure of need satisfaction, namely needs for autonomy, relatedness and competence. The refined measurement model consisted of the afore-mentioned seven variables.

Compared to the cut-off value of 0.70 recommended by Wang and Wang (2012), the reliabilities of the basic Psychological Need Satisfaction Scale of Autonomy were low in all the samples. Factors or systematic errors that affect reliability are respondent errors and

administrative errors (Roodt, 2013). Respondent errors that might have played a role include self-selection bias, response bias and unconscious misrepresentation. For example, only volunteers participated and there is the possibility that the questions did not have the same meaning for these students in the South African context that they had for the previous study population who was students at the University of Missouri (Sheldon & Hilpert, 2012). It is not likely that administrative errors played a significant role regarding the BMPN questionnaire. Test characteristics that might have influenced the reliability are the length of the test (more items would have been more reliable) and item quality (the wording might have been ambiguous) (Traub, 1991). The BMPN questionnaire (Sheldon & Hilpert, 2012) was originally developed in English and it was translated into Afrikaans (and translated back into English) to enable participants to complete the questionnaires in their mother tongue.

Looking at the regression equations, it seems that lecturer support did not play any significant role in the satisfaction of autonomy, relatedness or competence needs of the students in the total group. When we look at the different year groups, the lecturer support played a significant role in competence satisfaction of the first year group. It seems that lecturer support eroded the relatedness satisfaction of the second and third year groups. However, the correlation coefficients of 0.423, 0.361 and 0.231 between lecturer support and autonomy, competence and relatedness satisfaction respectively indicate that lecturer support did play a role. The Wald tests indicated that the impact of the lecturer on the relatedness and competence satisfaction was not similar between all the year groups. These findings prompt the need for more research because the literature indicated that what lecturers do, matter for students (Russell & Slater, 2011). It is possible that the unexpected correlations of family and peers with the other variables and the problematic reliability of the autonomy scale influenced the results.

Engagement is fostered by lecturers who are *inter alia* interesting, friendly and available and engage themselves and their students in their studies. If lecturers impose activities that meet students' need for psychological well-being, in other words, their needs for autonomy, competence and relatedness, lecturers could sustain intrinsic motivation (Burton et al., 2006). Autonomy supportive teaching practices include the giving of emotional support, guiding with 'may, can and could' instead of 'need, must and should', providing choices and challenges, and acknowledge the experience of negative affect (Kursurkar et al., 2011a)

The regression coefficients as well as the correlation coefficients indicated that family and peer support play a significant role in the satisfaction of autonomy, relatedness and competence needs of the total group. This tendency was specifically reflected for the satisfaction of autonomy needs in the different year groups. Chirkov and Ryan (2001) also found that parental autonomy support has a greater influence on well-being than teacher autonomy support. The effect of peers on the competence satisfaction of the students is statistically different between the first year group and respectively the second, third and fourth year groups as is portrayed in the Wald tests. The regression coefficients indicated that peers played a substantial role in the competence satisfaction of the fourth year group. It seems that self-chosen support groups played an important role (Russell & Slater, 2011).

Workload had no predictive ability for competence satisfaction for any of the year groups or for the total group. Workload eroded the autonomy satisfaction of the total group and of all the year groups, especially of the fourth year group as the negative regression coefficient indicates. The high workload might have induced feelings of 'this is what I am being forced to do' in students. Ideally you want students that are autonomously motivated, therefore feeling 'this is what I want to do' or agreeing with why they have to do all the work. Workload also influenced relatedness satisfaction in the sense that the students did not have

time and energy to spend on meaningful relationships, which is evident from the high factor loadings in the EFA on the items of the construct workload. Even though 72% of the variance in competence satisfaction of the fourth years is being explained by the model, only Peer support had predictive ability in terms of competence satisfaction for the fourth year group. It seems that for the third year group the greatest variance in autonomy satisfaction is being explained by the model, namely 54%. Only 30% of their relatedness satisfaction and competence satisfaction is being explained by the model. In the total group, the structural model explained 46% of the variance in Autonomy satisfaction, 25% of the variance in Competence satisfaction and 30% of the variance in Relatedness satisfaction.

In optimal learning circumstances the needs for autonomy and relatedness complement each other; in sub-optimal circumstances they may compete or be in conflict (Deci & Ryan, 2000). The first year group had the best balance in need satisfaction explained by the model, which corroborates their levels of flourishing of 42% (Basson & Rothmann, in press). However, the second year group with higher levels of autonomy satisfaction explained by the model reported the highest level of flourishing in the group, namely 44%. Although the fourth year group's levels of relatedness and competence satisfaction explained by the model seem to be the highest, their level of flourishing is the lowest (Basson & Rothmann, in press). This underscores the contention of SDT that it is not the levels of need satisfaction only that is important, but the balance in the levels of satisfaction of autonomy, relatedness and competence needs. In creating a context that satisfies the relatedness, autonomy and competence needs of students, lecturers prompt the autonomous motivation of students and in doing so, enable them to function well with all the associated benefits. The quality of a student's engagement with his/her studies is associated with the amount of psychological need satisfaction that the student experiences (Milyavskaya & Koestner, 2011).

CONCLUSION

There is a difference in the impact that different contextual factors have on the need satisfaction of health students. Of the four factors investigated, peers and family played the most important role in the need satisfaction of students. Workload impacted negatively on autonomy and relatedness satisfaction. Lecturers have the opportunity to actively engage in order to have an impact on the need satisfaction of students, so that they can enhance students' levels of autonomous motivation and thereby increase their performance and well-being.

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CHAPTER 4

PATHWAYS TO FLOURISHING: INTERNAL STRATEGIES OF

PHARMACY STUDENTS

Pathways to flourishing: Internal strategies of pharmacy students

Abstract

Background

Flourishing is a state of well-being which consists of both hedonic (feeling good) and eudaimonic (functioning well) dimensions. Eudaimonic well-being comprises psychological and social well-being. Even though the benefits associated with flourishing persons are well researched, the pathways to flourishing are not clear. Individuals who flourish (compared to those who do not flourish) do something different than those who are moderately healthy or languishing. One of the strategies that flourishing individuals use may be the way they regulate their positive emotions. Persons tend to either savour or dampen their positive emotions. Savouring positive emotions may result in small, consequential increases in positive affect, which should have a spiral effect according to the Broaden-and-Build Theory and result in increased well-being.

Methods

Registered pharmacy students at the North-West University in South Africa completed the ERP and MHC-SF. A total of 779 students participated. The data was analysed using a Latent Class Analysis (LCA) in Mplus 7.31 (Muthén & Muthén, 1998-2014).

Results

Three latent classes were revealed comprising languishing (14.2%), moderately mentally healthy (47.5%) and flourishing students (38.3%). Students who flourished were more likely to use adaptive positive emotion regulation strategies (namely savouring the moment, behavioural display and capitalising). Students who languished were inclined to use

maladaptive emotion regulation strategies (namely inattention, fault finding and external attribution). There was a larger than 92% probability for a member of each latent class to demonstrate the characteristics associated with the class.

Conclusions

Flourishing students used adaptive (savouring) positive emotion regulation strategies.

Another pathway to flourishing is to refrain from using maladaptive (dampening) positive emotion regulation strategies.

Keywords

Flourishing, well-being, positive emotion regulation, pathway, savouring, dampening

Abbreviations

ERP: Emotion regulation profile

MHC-SF: Mental health continuum-short form

LCA: Latent class analysis

Practitioner points

- A person may simply change the way he or she reacts to positive emotions to enhance his or her flourishing.
- Refrain from dampening own and others' positive emotional experiences.
- Practise savouring positive emotion regulation strategies.

Introduction

Flourishing is an optimal state of well-being that is more than the absence of ill-being

(Huppert, 2009; Hupert & So, 2013; Keyes, 2002, 2007; Seligman, 2011). Persons that do not flourish have a higher risk for mental health problems than persons that do flourish (Keyes, 2002). From a Positive Psychology perspective, it would be wiser also to nurture positive capabilities and not only try to repair damage (Seligman & Csikszentmihalyi, 2000).

All the pathways to flourishing are not known (Hupert, 2009; Schotanus-Dijkstra et al., 2015). What is it that flourishing persons do differently from languishing and moderately mentally healthy persons? More specifically, in the educational context, a gap exists regarding knowledge about the flourishing of pharmacy students. Even though all the enrolled pharmacy students are subjected to the same context and the same pressure regarding their academic work, some flourish and some do not (Basson & Rothmann, in press).

Whether individuals flourish or not might be due to differences in their internal strategies, e.g. the way they regulate their emotions or affect. A relationship exists between the regulation of positive emotions and well-being (Barber, Bagsby, & Munz, 2010; Tugade & Fredrickson, 2007). The broaden-and-build theory (Fredrickson, 1998) describes the mechanism whereby a person capitalises on positive potentiation experiences to flourish (Catalino & Fredrickson, 2011).

The benefits of flourishing or positive human health to the individual, community and society are well researched (Keyes, 2002, 2007; Keyes, Dhingra, & Samoes, 2010; Ryff & Singer, 1998). Flourishing people show positive behaviour and good peer relationships (Sanning & Nabors, 2015). They also cope competently (Akin & Akin, 2015) and perform well (Keyes et al., 2012).

Positive psychology provides the foundation for the study of the flourishing of people (Seligman, 2011). Seligman and Csikszentmihalyi (2000, p. 5) defined positive psychology as a “science of positive subjective experience, positive individual traits, and positive

institutions”. Therefore, this study does not focus on how damage can be repaired or what went wrong, but rather on how the best in people can be enhanced. More specifically, this study addresses the knowledge base regarding flourishing. Pharmacy students might strengthen their well-being towards flourishing by regulating their emotions in specific ways.

Research on well-being could benefit by also focusing on internal factors (Hansson, Hillerås, & Forsell, 2005). In the work environment, studies seek to explain why employees flourish (Ilies, Aw, & Pluut, 2015) or how to enhance their well-being (Meyers, van Woerkom, & Bakker, 2013). The question on the factors that promote well-being is an open one (Coffey, Wray-lake, Mashek, & Branand, 2014). Positive emotions are key indicators of a person’s skills to live well (Cohn, Fredrickson, Brown, Mikels, & Conway, 2009) and predict flourishing via the Well-Being Theory (Seligman, 2011) of college students in an academic setting (Coffey et al., 2014). We know that positive emotions are important for well-being and flourishing (Tugade & Fredrickson, 2007). Positive emotions contribute to well-being both in a direct and indirect way: It is directly related to eudaimonic well-being and indirectly through the building of resources like ego-resilience (Seaton & Beaumont, 2015). From the theory it is not clear whether there is a difference in the way that flourishers or non-flourishers regulate their positive emotions. It is not clear whether adaptive and/or maladaptive regulation of positive emotions could act as pathways to flourishing.

Flourishing

The interest in human well-being dates back to 350 BC when Aristotle wrote that the highest of all goods achieved by human action was ‘eudaimonia’. The World Health Organization (WHO) defined positive mental health as “a state of well-being in which the individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to his or her community”

(WHO, 2014).

The absence of mental illness cannot be equated to mental health (Keyes, 2005). Mental health and mental illness are correlated but distinct continuums. Therefore Keyes' Mental health continuum (2002) diagnoses states of mental health as 'something positive', not merely the absence of psychopathology. Depending on the position of an individual (with or without a mental illness) on the mental health continuum, his or her level of functioning can be determined (Keyes & Annas, 2009). Gains in mental health predict declines in mental illness and losses in mental health predict gains in mental illness (Keyes et al., 2010).

The study of well-being can focus on two traditions: one on feelings toward life (i.e. hedonic or emotional well-being), the other on functioning in life (i.e. eudaimonic well-being). Feeling good and functioning well are related but distinct (Keyes & Annas, 2009). Research regarding hedonic or emotional well-being focused on the experience of positive emotions, namely happiness, life satisfaction and positive-negative affect balance. Eudaimonia has been researched as psychological well-being (PWB) and social well-being (SWB). Research about PWB well-being included purpose in life, environmental mastery, positive relationships, personal growth, autonomy and self-acceptance (Ryff & Singer, 2008). PWB represents how the individual sees him/herself functioning as the 'I' or 'Me' and SWB as the 'we' or 'us' (Keyes, Wissing, Potgieter, Temane, Kruger, & Van Rooy, 2008).

Flourishing is the term that defines well-being as consisting of hedonic (EWB) and eudaimonic (PWB and SWB) components. It is about feeling good and functioning well (Keyes, 2002). EWB, SWB and PWB parsimoniously represent well-being (Gallagher, Lopez, & Preacher, 2009). Huta and Ryan (2010) support this notion by suggesting that for optimal and diverse well-being, both hedonic and eudaimonic activities should be pursued. Feeling good (EWB) incorporates emotional experiences such as interest, engagement, happiness, confidence and affection (Huppert, 2009). It also includes a cognitive appraisal of

life satisfaction in general (Keyes, 2009). To function effectively from a psychological perspective (PWB) one would develop one's potential, have control over one's life, have a sense of purpose and experience positive relationships (Huppert, 2009). According to Ryff (1989), PWB has six dimensions, namely self-acceptance, personal growth, purpose in life, positive relations with others, autonomy and environmental mastery. SWB focuses on functioning in social and public life. SWB includes factors such as social integration, social contribution, social coherence, social actualisation and social acceptance (Keyes, 2002).

Flourishing is also associated with high levels of conscientiousness, extraversion and low levels of neuroticism (Schotanus-Dijkstra et al., 2015). Ten features of combined functioning well and feeling good are competence, emotional stability, engagement, meaning, optimism, positive emotion, positive relationships, resilience, self-esteem and vitality (Huppert & So, 2013). Flourishing individuals feel and function better than those who are languishing or moderately healthy (Keyes et al., 2008).

Positive Emotions

Emotions are feelings in the conscious awareness of a strong tone and clear cause (Larsen & Prizmic, 2004). It is multi-component responses in a short time span about some personally meaningful circumstance (Fredrickson, 2004). Affect refers to the feeling tone that a person experiences at any point in time (Larsen & Prizmic, 2004).

Positive mood states can enhance cognitive processes (Huppert, 2009). For example, it induces a broader focus of attention, and persons generate more ideas (Fredrickson & Branigan, 2005). Also, individuals in a positive mood state are more creative and flexible in their thinking (Ashby, Isen, & Turken, 1999). Joy, a distinct positive emotion, creates the urge to play and to be creative; interest results in exploring and expanding and contentment into the integration of circumstances into new perspectives (Fredrickson, 2004). Positive

emotions also enhance individuals' social experiences. Compared to individuals who experience negative emotions, people that experience positive emotions evaluate themselves and others more positively. Also their attributions are more lenient and their actions confident, optimistic and generous (Forgas, 2002, 2006).

Positive emotions are directly linked to eudaimonic well-being (Seaton & Beaumont, 2015). Small, consequential differences in a person's daily pleasant experiences may fuel flourishing (Catalino & Fredrickson, 2011). Even small daily experiences, for example, socialising, positive feedback and goal accomplishment relate positively to improved health (Bono, Glomb, Shen, Kim, & Koch, 2013). Negative events have a threefold stronger affective effect than positive emotions (Larsen, 2002), which emphasises the importance of positive emotions. The function of positive affect is in part to speed up recovery from negative events (Bono et al., 2013; Fredrickson, 1998; Fredrickson, Mancuso, Branigan, & Tugade, 2000).

The broaden-and-build theory (Fredrickson, 2004) consists of five core propositions: Positive emotions broaden thought-action repertoires, undo lingering negative emotions, fuel psychological resilience, build personal resources and fuel psychological and physical well-being. Positive emotions lead to adaptive behaviour (Cohn & Fredrickson, 2006). Happiness facilitates the building of cognitive, physical and social resources (Cohn & Fredrickson, 2006). From the broaden-and-build theory (Fredrickson, 1998, 2001, 2004) we know that small positive experiences build psychological capital to handle negative experiences. The experience of small positive emotional experiences broadens the mind, which enables the person to capitalise on more positive emotional experiences and use a broader variety of coping mechanisms – the whole process working like a spiral. The downward spiral works in the opposite direction: a lack of positive experiences narrows a person's capacity to deal with

problems. Consequently, the successful solution is less likely and thereby erodes an individual's capacity to deal with problems.

Fredrickson's (1998) hypothesis that positive emotions build resources has been supported by various investigations (Garland et al., 2010; Seaton & Beaumont, 2015). According to the broaden-and-build theory (Fredrickson, 1998), positive emotions expand an individual's thoughts and actions, resulting in higher attentiveness, more divergent thinking, and personal growth through new experiences. Consequently, individuals experience more frequent episodes of positive emotions (Cohn et al., 2009), and resources become accessible in times of need. Positive emotions expand one's thought-action repertoire (Fredrickson, 2001). By broadening the way information is being processed, positive emotions enable persons to increase the type and amount of activities they want to pursue. Routine activities can promote flourishing (Catalino & Fredrickson, 2011). Given that flourishing people experience greater positive emotional reactivity to positive experiences, they build more resources over time. Therefore, small, consequential differences in individuals' emotional experiences of everyday pleasant events promote well-being. Compared to individuals who do not flourish, flourishing people respond more positively when learning, helping, playing and interacting (Catalino & Fredrickson, 2011).

Emotions that are of the wrong type, the wrong intensity or coming at the wrong time are experienced as dysfunctional; therefore they are regulated (Gross & Thompson, 2007). Emotion regulation is the process whereby individuals influence emotions they have, when they have them, and how they express or experience the emotion (Gross, 1998).

Positive affect regulation strategies can be grouped into categories of behaviour that savour positive affect or dampen positive affect (Nelis, Quoidbach, Hansenne, & Mikolajczak, 2011). Savouring strategies are strategies that can be used to maintain and increase positive emotional experiences while dampening strategies decrease the positive emotional

experience. Strategies that savour positive emotions are adaptive, and those that dampen positive emotional experiences are maladaptive. Table 1 shows the strategies that people use to savour or dampen their positive emotions. Individuals differ regarding the ways in which they use savouring and dampening emotional regulation strategies (Tugade & Fredrickson, 2007).

From the broaden-and-build theory, we theorise that it will be worthwhile to savour positive emotional experiences because the savouring action results in small, consequential positive emotional experiences that activate the upward spiral of positive emotions.

Flourishers thrive because they experience greater positive emotional reactivity to pleasant events and thereby build more resources over time (Catalino & Fredrickson, 2011).

Dampening positive emotions would lead to smaller positive emotional experiences and therefore in fewer resources to access in times of need. The adaptive positive emotion regulation strategies (savouring strategies), namely behaviour display, capitalising, savouring the moment and positive mental time travel were also repeatedly associated with a decrease of physiological activation in experimental studies and/or with positive indicators of mental health in clinical studies. The converse is true for the maladaptive (dampening) positive emotion regulation strategies, namely inhibition of emotional expression, inattention, fault finding and external attribution (Nelis et al., 2011).

Table 1: Positive emotion regulation strategies*

Category	Strategy	Description
Savouring or Adaptive	Behavioural display	Expressing positive emotions with non-verbal behaviours
	Savouring the moment	Deliberately direct attention to present pleasant experience
	Capitalising	Communicate and celebrate positive events with others
	Positive mental time travel	Vividly remember or anticipate positive events
Dampening or Maladaptive	Inhibition of emotional expression	Repressing or hiding positive emotions
	Inattention	Engage in thoughts or activities unrelated to current positive event
	Fault finding	Look at the negative elements of otherwise positive situation
	External attribution	Negative reminiscence and negative anticipation of future

* Compiled from Nelis et al. 2011

Aim and Hypotheses

In this study, we investigate whether flourishing people use different emotion regulation strategies from moderately mentally healthy and languishing students.

Method

Participants and Setting

All the registered Pharmacy students of 2014 at the North-West University, 899 students academic year 1 to 4, were invited to participate in the Internet-based survey design, 779 participated. The students gathered in a computer lecture room where the Internet access code was given to them. Participation was voluntary and informed consent was obtained from the participants. The Ethics Sub-Committee for Social and Behavioural Sciences of the Faculty of Humanities, North-West University granted ethics clearance for the study.

Measuring Battery

The measuring battery consisted of the *Mental Health Continuum-Short Form* (MHC-SF; Keyes, 2009), the *Emotional Regulation Profile-Revised* (ERP-R; Nelis et al., 2011) and a demographic questionnaire.

The MHC-SF consists of 14 items that measure three dimensions of well-being, namely Emotional, Social well-being and Psychological well-being. Three items measure Emotional well-being, e.g., “During the past month, how often did you feel happy?” Five items measure Social well-being, for example, “During the past month, how often did you feel that you belonged to a community?” Six items measure Psychological well-being, for instance, “How often did you feel that you are confident to think and express your ideas and opinions?” Lamers, Westerhof, Bohlmeijer, Ten Klooster, and Keyes (2011) confirmed the three-factor structure of the MHC-SF. Lamers et al. demonstrated the convergent validity of the MHC-SF, using various corresponding measures of well-being. The MHC-SF was also shown to be reliable with $\alpha = 0.89$ for the total MHC-SF, and $\alpha = 0.83$ for the subscale Emotional well-being and $\alpha = 0.74$ for the subscale Social well-being. Diedericks and Rothmann (2013) confirmed the factor structure of the MHC-SF in a survey among information technology professionals in South Africa. They found internal consistencies of 0.87, 0.86 and 0.82 for EWB, PWB and SWB respectively.

The *Emotional Regulation Profile-Revised* (ERP-R; Nelis et al., 2011) consists of vignettes (in French) that describe specific emotions. We only used the positive emotions, based on their link to well-being. Each scenario of positive emotion (i.e., joy, excitement, pride, gratitude, contentment, awe) is followed by four adaptive and four maladaptive reactions. A respondent chooses as many responses as he or she wants, as long as it gives an accurate reflection of his/her behaviour (persons typically use more than one response in a situation). The ERP-R indicates how a person regulates emotions, as well as which specific

strategies are being used. The global ERP-R was reliable with $\alpha = 0.84$. The two factors “down-regulation of negative emotions and up-regulation of positive emotions” were internally consistent with Cronbach $\alpha = 0.83$ and 0.79 .

Research Procedure

Both questionnaires were translated into Afrikaans, the mother tongue of the majority of the participants by accredited language professionals, translated back into the source language by other accredited language professionals and verified by a third set of language professionals. A similar procedure was utilised to translate the ERP-R into English.

Data Analysis

First the data was explored using a frequency analysis, utilising SPSS22 (IBM, 2013). A latent class analysis (LCA) with Mplus 7.31 (Muthén & Muthén, 1998-2014) was used to group participants based on their levels of emotional, social and psychological well-being. A series of models with an increasing number of latent classes was tested. A model was retained when there was a significant improvement from the reference model to this model with more classes. The models were evaluated according to the lowest BIC value comparing the different models, relative entropy (called entropy by Mplus) ranging from 0 to 1 (smaller than 0.60 not acceptable, higher is better). Mplus can test the number of classes in a mixture analysis using the Lo-Mendell-Rubin (LMR LR) test, Adjusted LMR LR test, and the bootstrapped likelihood ratio test (BLRT) (Wang & Wang, 2012). The quality of class membership was indicated by posterior class membership probabilities and the entropy values.

Results

A total of 779 participants responded to the electronic questionnaire. The frequency analysis revealed that strategies that were most likely to be endorsed were Behaviour display (45.3%), Positive mental time travel (41%), Savouring the moment (39.9%), and Capitalising (34.5%). Strategies that were least likely to be endorsed were Fault finding (10.6%), Inhibition of emotional expression (9.9%), Inattention (9.8%), and External attribution (6.9%).

Several steps were followed to estimate the LCA model. First, the optimal number of latent classes was determined. Second, the latent class classification was examined. Third, the latent classes were labelled. Fourth, latent class membership was predicted. To determine the number of latent classes, four models with different numbers of latent classes were estimated and compared, starting with a single class model and increasing the number of classes by one each time. Table 2 shows the fit indices. The AIC (5160.682), BIC (5188.631) and ABIC (5169.578) values of the model with one latent class were the largest, indicating that this model has the worst fit.

Three steps were followed to test the hypothesised model of three classes. The first step was to find the best log-likelihood values for the models. The 3-class solution replicated the best log-likelihood value (−1810.06) several times using the default number of starting values. To verify that a better log-likelihood cannot be obtained, a second run increased the number of random starting values five times and found the same best-replicated log-likelihood value. With three classes, the default starts setting was sufficient to obtain replication of the best log-likelihood 40 times when the start values were 10 times higher. The second step was to conduct a 4-class analysis to make sure that the $k - 1$ class model (three classes) shows the best log-likelihood value found in Step I. The OPTSEED value 534483 from the previous run was used in the 4-class run. The Vuong-Lo-Mendell-Rubin LR test for three versus four classes had a log-likelihood value of −1810.06 (2 times the log-

likelihood difference = 322.204, difference in the number of parameters = 4, Mean = 65.817, $SD = 197.858$, $p = 0.0852$). The Lo-Mendell-Rubin Adjusted LR test (Value = 310.544) was also not statistically significant ($p = 0.0905$). In the third step, a 3-class analysis was done using the same OPTSEED value as in step with LRT starting values = 0 0 100 20. The Parametric Bootstrapped LR test for two versus three classes was statistically significant ($p < 0.0001$), rejecting the two-class model in favour of the three-class model (Wang & Wang, 2012). The p -values of the LMR LR test and ALMR LR test of the two-class model were smaller than 0.05. The three-class model also had the smallest AIC, BIC and ABIC values and, therefore, fitted the data best.

Table 2: Comparison of different LCA models ($N=779$)

Model	AIC	BIC	ABIC	LMR LR test p - value	ALMR LR test p - value	BLRT p -value
1-class LCA	5160.682	5188.631	5169.578	n.a	n.a	n.a
2-class LCA	4158.438	4205.018	4173.263	< 0.0001	< 0.0001	< 0.0001
3-class LCA	3648.123	3713.336	3668.879	< 0.0031	< 0.0037	< 0.0001
4-class LCA	33392.92	3417.76	3360.60	< 0.0852	< 0.0905	< 0.0001

Next we examined the quality of the latent class membership. The entropy values for the 2-class and 3-class LCA were 0.853 and 0.842 respectively, which indicates a good classification (Clark, 2010). Furthermore, the posterior class membership probabilities for the

3-class LCA model were all larger than 0.92, which is acceptable compared to the recommended cut-off value of 0.70 or greater (Nagin, 2005).

Thirdly we labelled the classes based on their means for EWB, PWB and SWB. Class 1 (languishers) had the lowest means and contained 111 (14.2%) of the pharmacy students. Class 2 (moderately mentally healthy) obtained average scores and contained 370 (47.5%) of the sample. Class 3 (flourishing) obtained high mean scores and contained 298 (38.3%) of the sample. Figure 1 illustrates the three latent classes.

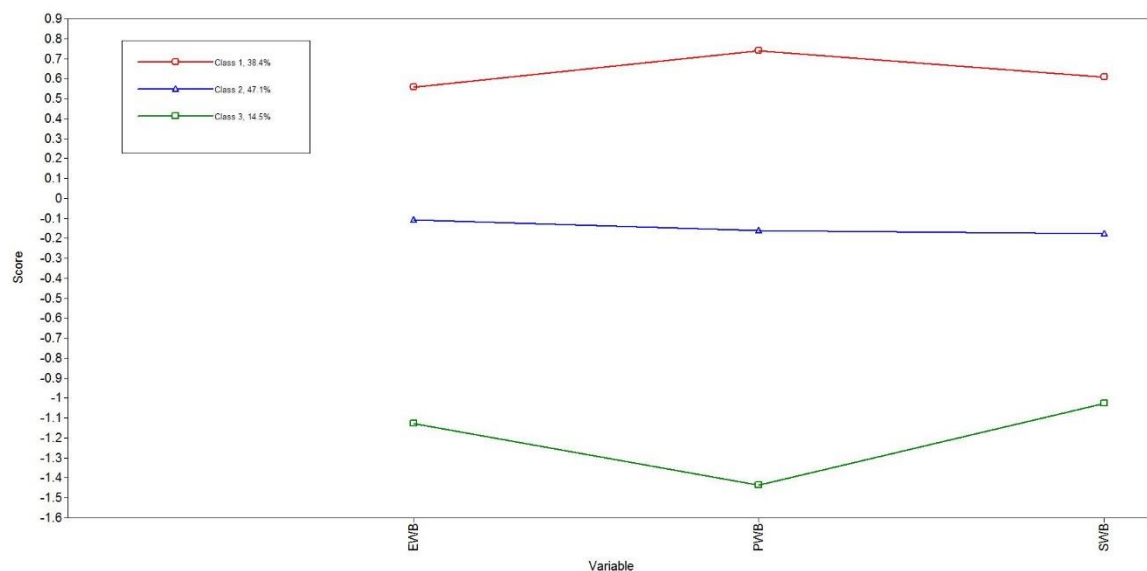


Figure 1: The three latent classes

The following covariates were included to predict class membership: Inattention, Capitalising, Behaviour display, Fault finding, Savouring the moment, External attribution, Inhibition of emotional expression and Positive mental time travel. All the fit statistics were acceptable namely: AIC (3648.123), BIC (3713.336), ABIC (3668.879).

Table 3 indicates that flourishing (compared to languishing) students are more likely to use Behaviour display ($\beta = 1.312$) and Savouring the moment ($\beta = 1.558$) as emotional regulation strategies. Flourishing students are less likely than languishing students to use Inattention ($\beta = -1.988$), Fault finding ($\beta = -3.126$) and External attribution ($\beta = -5.332$) as

emotional regulation strategies. Moderately mentally healthy pharmacy students are less likely than languishing students to use Fault finding ($\beta = -1.664$) and External attribution ($\beta = -3.035$) as emotional regulation strategies.

Flourishing students are more likely to use Savouring the moment ($\beta = 1.260$) and less likely to use External attribution ($\beta = -2.298$) than moderately mentally healthy pharmacy students.

Table 3: Regression coefficients for the different latent classes

	Languishing ON	Moderate mental health ON
Inattention	1.988*	1.182
Capitalising	-0.795	0.095
Behaviour display	-1.312*	-0.521
Fault finding	3.126***	1.462
Savouring the moment	-1.558*	-1.260**
External attribution (NMTT)	5.332***	2.298*
Positive mental time travel	-0.533	-0.079
Inhibition of emotional expression	0.716	0.398
Languishing (1) compared to		
	Moderate mental health (2)	Flourishing (3)
Inattention	-0.806	-1.988* (1 > 3)
Capitalising	0.890	0.795
Behaviour display	0.791	1.312* (1 < 3)
Fault finding	-1.664* (1 > 2)	-3.126*** (1 > 3)
Savouring the moment	0.298	1.558* (1 < 3)
External attribution (NMTT)	-3.035** (1 > 2)	-5.332*** (1 > 3)
Positive mental time travel	0.454	0.533
Inhibition of emotional expression	-0.328	-0.716

	Languishing ON	Moderate mental health ON
	Moderate mental health (2) compared to Flourishing (3)	
Inattention		-1.182
Capitalising		-0.095
Behaviour display		0.521
Fault finding		-1.462
Savouring the moment		1.260** 2 < 3
External attribution (NMTT)		-2.298* 2 > 3
Positive mental time travel		0.079
Inhibition of emotional expression		-0.389

* $p \leq 0.05$; ** $p \leq 0.01$; *** $p \leq 0.001$

Discussion

The aim of this study was to determine whether flourishers use positive emotion regulation strategies as a pathway to flourishing. It seems that the adaptive positive emotion regulation strategies of Behaviour display, Positive mental time travel, Savouring the moment and Capitalising were utilised by the total group in 34.5 to 45.3% of the incidences. The maladaptive positive emotion regulation strategies Fault finding, Inhibition of emotional expression, Inattention and External attribution were only utilised in 6.9 to 10.6% of the incidences. Even though all the positive emotion regulation strategies were utilised by the

group, not all of them played a role when we distinguished between flourishers, languishers and moderately healthy persons, as will become evident in the rest of the discussion.

We used LCA to group participants with similar response patterns regarding their EWB, SWB and PWB. Based on the fit indices, three classes were optimum. After inspection of the classes, they were named Flourishers, Moderately mentally healthy and Languishers. The flourishers, moderately mentally healthy and languishers comprised 38.3%, 47.5% and 14.2% of the pharmacy students respectively. In a study across Europe, Huppert and So (2013) found that flourishing varies between 41% in Denmark and less than 10% in Slovakia, Russia and Portugal. The probability that a class member demonstrates the characteristics associated with his or her class was larger than 92% for all three classes. Figure 1 demonstrates that the flourishers had the highest levels of EWB, SWB and PWB and the languishers respectively the lowest levels. The three graphs in Figure 1 are ‘parallel’, indicating there are three distinct classes.

In this study, emotional well-being meant that a pharmacy student felt happy, interested in life and satisfied. Social well-being implies that students felt that they had something to contribute to society, that they belong, that society is becoming a better place, that people are basically good, and that the working of society makes sense. Psychological well-being meant that students felt that they like most parts of their personalities, are good at managing daily responsibilities, have warm and trusting relationships, have challenging experiences that foster growth, are confident about their ideas and opinions and that life has a sense of meaning and direction (Keyes, 2002; Lamers et al., 2011).

Flourishing students (compared to those who were languishing) were more likely to use adaptive emotion regulation strategies, specifically behaviour display and savouring the moment. They were more likely than moderately healthy students to savour the moment. It is

noteworthy that the positive personal resources accrued during an adaptive emotional regulation process are durable (Fredrickson, 2004). The results showed that it is not very likely that languishing students will use behavioural display as an emotion regulation strategy. It seems that people who are happy and satisfied with life see the world through ‘rose-coloured glasses’ (Scholl & Gruber, 2015). Flourishing students were less likely than languishing students to use maladaptive emotional regulation strategies such as inattention, external attribution and fault finding. They were also less likely than moderately healthy students to use external attribution and fault finding. These results are in line with the notion that individuals may need to reduce avoidance strategies and increase engagement strategies to increase flourishing (Barber, Bagsby, & Munz, 2010). Moderately healthy students are less likely than those who are languishing to use maladaptive emotional regulation strategies such as fault finding and external attribution.

Compared to flourishing students, languishing students were less likely to use adaptive emotional regulation strategies such as savouring the moment and behavioural display. Languishing students were more likely than flourishing students to use maladaptive emotion regulation strategies like inattention, fault finding and especially external attribution.

It seems that flourishing students use adaptive emotional regulation strategies while languishing students use maladaptive emotion regulation strategies. It is significant to note that moderately healthy (compared to flourishing) students are less likely to use adaptive strategies. Moderately mentally healthy students were less likely than languishing students to use maladaptive strategies. The way flourishing students use their positive emotions moves them to optimal well-being (Fredrickson, 2004). This notion is also supported by the finding that ‘positive emotions broaden cognition and behavioural repertoires, and in so doing, build durable biopsychosocial resources that support coping and flourishing mental health’ (Garland et al., 2010, p. 850).

Students who savour positive emotions build more resources compared to those who dampen their positive emotions (Garland et al., 2010). By dampening positive emotions, students do not get the possible mileage from their positive emotions. They build fewer resources because their experiences are less positive. Through savouring the moment, students engage in positive feelings and make them last longer and repeat the feeling when they are thinking of the positive experience again. By displaying positive emotions, students may smile and engage in talking about the positive event and share positive emotions.

When students dampen a positive emotion by attributing their success to an external event, the positive emotion does not last long. Similarly by not giving attention to a positive emotion, the effect of the positive emotion is short lived and by fault finding the focus moves away from the positive. Dampening means the positive emotion is being cut off, so according to the broaden-and-build theory, there is less positive affect to assist in the building process. The results support Catalino and Fredrickson's (2011:938) suggestion that 'well-being may be fuelled by small, yet consequential differences in individuals' emotional experience of pleasant everyday events.'

From the above it is evident that the data supported our key issue fully. It seems that the most important positive emotions in the pathway to flourishing are savouring the moment and behaviour display. Negative emotion regulation strategies that flourishing students refrain from using include fault finding, external attribution and inattention. However, the adaptive positive emotion regulation strategies of capitalising and positive mental time travel did not have any predictive ability for flourishing. The case was similar for the maladaptive emotion regulation strategy of inhibition of emotional expression.

There are several limitations of this study that are noteworthy. This study was done among pharmacy students and the results, therefore, need to be tested among other

populations before it can be generalised. Furthermore, it was a survey which only gives an indication of the state of affairs at one point in time. However, these results may serve as a basis for diary studies or longitudinal studies.

Conclusion

What is it that flourishing students do differently from those who are not flourishing? Only flourishing students are likely to use adaptive emotion regulation strategies. They use adaptive emotion regulation strategies such as behaviour display and savouring the moment as pathways to flourishing. Therefore, flourishing students possibly transform themselves through positive emotional experiences and become, among other things, more knowledgeable, creative, socially integrated and healthy, as the broaden-and-build theory suggests (Fredrickson, 2004). Another pathway that flourishing students use is the refraining from using maladaptive emotion regulation strategies like external attribution, fault finding and inattention. These results support Fredrickson's (2004) claim that positive emotions signal not only optimal functioning but also produce optimal functioning.

This research indicates how pharmacy students that flourish use internal strategies as pathways to flourishing. The results of this study provide support for the broaden-and-build theory. However, it also expands on previous research by demonstrating that the use of adaptive positive emotion regulation strategies and the non-use of maladaptive positive emotion regulation strategies can be regarded as pathways to flourishing.

Further research can explore whether the use of adaptive positive emotion regulation strategies and the non-use of maladaptive positive emotion regulation strategies serve as pathways to flourishing among other populations, e.g., other professional occupations like nursing. Longitudinal research could establish whether it is a trend for flourishers to regulate their emotions in an adaptive way. There are still many internal and external factors

associated with flourishing that can be explored as pathways to flourishing. The answer to the question ‘what flourishers do differently from non flourishers’ is still not exhausted.

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CHAPTER 5:

CONCLUSIONS, LIMITATIONS AND RECOMMENDATIONS

This chapter briefly redresses the research questions, finalises the conclusions emanating from the research, discusses the limitations and specifies the contributions.

5.1 Research questions reconsidered

In Chapter one the researcher indicated that this research addressed six research questions:

1. What is the prevalence of flourishing and non-flourishing among pharmacy students?
2. Can demands and/or resources act as pathways to flourishing?
3. Are there differences between the year groups in terms of the measures used?
4. What are the differences in the role of antecedent factors in the basic psychological need satisfaction of students (and therefore in their flourishing)?
5. Does year of study act as moderator in the respective relationships between demands, resources, antecedent factors of basic psychological need satisfaction, basic psychological need satisfaction and flourishing?
6. Could affect regulation strategies as intrinsic factors act as pathways to flourishing?

In order to address the research questions, specific research objectives were set, namely:

1. Assess the prevalence of flourishing versus non-flourishing pharmacy students.
2. Determine the reliabilities of the *Mental Health Continuum-Short Form* (MHC-SF; Keyes, 2009) and the *Balanced Measure of Psychological Needs* (BMPN; Sheldon & Hilpert, 2012) for the study population.
3. Study whether demands and resources can act as pathways to the flourishing of pharmacy students.
4. Evaluate the role of the antecedent factors of basic psychological need satisfaction of students on their basic psychological need satisfaction.
5. Investigate whether year of study moderates the relationships between demands, resources and flourishing of pharmacy students.
6. Explore the moderation effect of lecturer support (a resource) on flourishing at different levels of workload (a demand).

7. Assess whether there is a difference between the year groups regarding the latent mean scores of the well-being constructs.
8. Investigate whether year of study moderates the relationships between antecedents of basic psychological need satisfaction and psychological need satisfaction of pharmacy students.
9. Study whether flourishers use specific affect regulation strategies as pathways to flourishing.

The discussion that follows will briefly illustrate how the three manuscripts addressed the research questions and specific objectives.

What is the prevalence of flourishing and non-flourishing among pharmacy students?

Manuscript one addressed this question (and therefore also specific objective 1 and part of specific objective 2) in detail. Among the enrolled pharmacy students for the year 2014, 40.3% flourished, 57% was moderately healthy and 2.7% languished. Table 1, p. 44 gives an exposition of the mental health status of the students when differentiated in academic year groups, but also when differentiated in historic year groups. In both cases year group two has the largest proportion of flourishing students. Historic year group five has the smallest proportion of flourishing students (28.6%) and the largest proportion of languishing students (4.1%) when compared to the other historic year expositions and the academic year group expositions. The reliabilities of all the latent variables (emotional well-being, social well-being and psychological well-being) used were acceptable (Wang & Wang, 2012).

Can demands and/or resources act as pathways to flourishing?

Manuscript one investigated this question, which was also specific objective 3. Specific objective 6 was also addressed via Wald tests. SEM was used to explore the research question. Table 2, p. 46 gives the fit statistics for the various measurement models. The structural model, which included an interaction effect between overload (a demand) and lecturer support (a resource), explained between 18 and 31% of the variance in flourishing

(see Table 5, p. 49). In the third year group, there was an interaction effect between lecturer support and workload that affected flourishing. When lecturer support was high, the negative relationship between workload and flourishing was stronger (Fig. 1, p. 51).

Are there differences between the year groups in terms of the measures used?

Manuscripts one and two investigated whether the measures used meant the same to the different year groups through invariance (configural, metric and scalar) testing, which is portrayed in Table 3, p. 47. The year groups could therefore be compared, looking at the latent mean differences of the constructs (see Table 4, p. 47). Year group two had the highest level of EWB, the students' perceptions of lecturer support declined from the first to the fourth year whilst their perception of overload increased from their first to their fourth year. Specific objective 7 was therefore answered.

What are the differences in the role of antecedent factors in the basic psychological need satisfaction of students and therefore in their flourishing?

This question (and therefore specific objective 4 and part of 2) was explored in manuscript two via an exploratory factor analysis, a confirmatory factor analysis, competing measurement models and a structural model. Reliabilities, co-variances and correlations of the factors were determined. Firstly the correlation matrix (Table 7, p. 79) shows that there was no statistically significant correlation between workload and family support and statistically significant negative correlations between workload on the one hand and family, peer and lecturer support respectively. The reliabilities of the factors were acceptable except for autonomy support. Family and peer support predicted relatedness, competence and autonomy satisfaction, workload predicted relatedness and autonomy satisfaction and lecturer support predicted only relatedness satisfaction (see Table 8, p. 81). The model explained 46% of the variance in autonomy satisfaction, 30% of the variance in relatedness satisfaction and 25% of the variance in competence satisfaction in the total group.

Does year of study act as moderator in the respective relationships between demands, resources, antecedent factors of basic psychological need satisfaction, basic psychological need satisfaction and flourishing?

Manuscripts one and two answered these questions. The predictive value of workload for flourishing did not differ between the year groups. Lecturer support moderated the relation between workload and flourishing for the third year group. By means of Wald tests the researcher found that there are differences between year groups in terms of peer and lecturer support for competence satisfaction as well as lecturer support for relatedness satisfaction. In Table 9, p. 83, the percentage of variance in psychological need satisfaction of the four year groups that were accounted for by the independent variables is portrayed. Specific objectives 5, 6 and 8 were therefore addressed.

Could affect regulation strategies as intrinsic factors act as pathways to flourishing?

In manuscript three this research question (and therefore specific objective 9) was investigated through a latent class analysis based on individual characteristics regarding flourishing. Three groups were revealed, namely flourishers, moderately mentally healthy students and languishers, which are portrayed in Figure 1, p. 108. The savouring and dampening positive emotion regulation strategies were introduced as co-variables in order to predict class membership. Although all the positive emotion regulation strategies were utilised by the group, only inattention, behaviour display, fault finding, savouring the moment, and external attribution played a role when we differentiated between flourishers and the rest. The results indicated that only the flourishers were most likely to use adaptive positive emotion regulation strategies and that they refrain from using maladaptive positive emotion regulation strategies.

5.2 Conclusions

This thesis investigated pathways to flourishing of pharmacy students. Different external and internal factors and their resultant impact on flourishing of pharmacy students were studied.

The possible hypothesised pathways to flourishing were confirmed.

5.2.1 Manuscript one

1. The prevalence of flourishing among the study cohort (779 or 86.5% of the registered pharmacy students) was 40.3% and of languishing, 2.7%. Most students presented with moderate levels of hedonic and eudaimonic well-being.
2. Historic year group five had the lowest portion of flourishers, namely 28.6%.
3. The structural model consisting of the latent variables flourishing, overload and lecturer support accounted for 24% of the variance in flourishing. Overload had a negative relationship with flourishing and task structuring by the lecturer had a positive relationship with flourishing.
4. The scales (emotional well-being, social well-being, psychological well-being, overload and lecturer support) were invariant for the students in the different year groups. They therefore conceptualised the constructs similarly, factor loading parameters were the same across the year groups and the measurement scales had the same operational definition for the four year groups.
5. Year group two had the highest level of emotional well-being (statistically significantly higher than year groups one, three and four).
6. The psychological well-being of year group two was statistically significantly higher than the psychological well-being of year group four.
7. The social well-being of year group two was statistically significantly higher than that of year group three.
8. The students' perception of lecturer support declined from their first to fourth year.
9. The students' report of average overload increased from their first to fourth year.
10. The latent variables overload, lecturer support, emotional well-being, social well-being and psychological well-being were all reliable.
11. The model where overload and lecturer support interacted explained 31.2%, 26.6%, 17.8% and 25.7% of the variance in flourishing of the first, second, third and fourth year group respectively.

12. In the third year group the negative relationship between workload and flourishing was stronger when lecturer support was high and less strong when lecturer support was low.
13. Lecturer support as a study resource played a significant role in the flourishing of pharmacy students. Therefore, the availability of such resources could act as pathways to flourishing for pharmacy students.
14. Dealing effectively with workload (a study demand) over the four years crystallised as a pathway to flourishing.

5.2.2 Manuscript two

1. The impacts of contextual factors (peers, family, lecturers, and workload) on the need satisfaction of health (pharmacy) students differ.
2. The items with the highest loadings on lecturer support, family support, peer support and workload were respectively “My lecturers involve me in skills development and/or problem solving”, “My parents/family accept me unconditionally”, “I trust my fellow students” and “My studies take up so much of my time that I do not have time to relax”.
3. The exploratory and confirmatory factor analyses yielded the same contextual factors namely family, lecturers, peers and workload.
4. All the factors in the structural model (consisting of latent variables family, lecturers, peers, workload, autonomy satisfaction, competence satisfaction and relatedness satisfaction), except autonomy satisfaction, were reliable.
5. All the correlations between the above mentioned factors were positive except for workload.
6. There was no statistically significant correlation between workload and family support.
7. The statistically significant correlations between workload and respectively lecturer support, peer support, autonomy satisfaction, relatedness satisfaction and competence satisfaction were negative.
8. Family and peer support predicted autonomy, relatedness and competence satisfaction of the total group.
9. An increase in workload predicted a decrease in relatedness and autonomy satisfaction.
10. Lecturer support predicted relatedness satisfaction, but with a negative relationship.

11. For the total group the model explained 46%, 30% and 25% of the variances in autonomy, relatedness and competence satisfaction respectively.
12. In all the year groups, autonomy satisfaction was predicted by family and peer support (positive relationship) and workload (negative relationship).
13. Relatedness satisfaction was predicted by peer support in all the year groups.
14. For the second year group, support by peers, family and lecturers as well as workload predicted relatedness satisfaction.
15. For the second and third year groups the relationship between lecturer support and relatedness satisfaction was negative.
16. Family and peer support predicted relatedness satisfaction of the fourth year group and for the third year group relatedness satisfaction was predicted by family, peer and lecturer support.
17. In terms of competence satisfaction, lecturer and family support played a role in the first year group, peer support in the second year group, family and peer support in the third year group and peer support in the fourth year group.
18. The impact of peer support on competence satisfaction differed statistically significant between all the year groups.
19. The impact of lecturer support on competence satisfaction differed between year group one and year group three and four respectively.
20. The impact of lecturer support on relatedness satisfaction differed between year group one and three as well as between year groups three and four.
21. Peer, lecturer and family support and workload accounted for at least 33% of the variance in autonomy satisfaction, 30% of the variance in relatedness satisfaction and 28% of the variance in competence satisfaction of the different year groups.
22. The contextual variables accounted for 73% of the variance in competence satisfaction of the fourth year group.
23. Family and peers played the most important role in the need satisfaction of students (and therefore in their flourishing).
24. Contextual factors (family, lecturers, peers and workload) impact on need satisfaction of students (and in this way on their well-being).

5.2.3 Manuscript three

1. The latent class analysis revealed three groups based on the characteristics of the participants.

2. After a close inspection, the three classes were named flourishers, moderately mentally healthy students and languishers.
3. All the positive emotion regulation strategies (four savouring and four dampening) were utilised by the group.
4. Of the savouring positive emotion regulation strategies, the likely use (or non-use) of behaviour display and savouring the moment discriminated between the classes.
5. Of the dampening positive emotion regulation strategies the likely use (or non-use) of inattention, fault finding and external attribution were characteristic of the classes.
6. Languishing students were the most likely to utilise dampening positive emotion regulation strategies (namely inattention, fault finding and external attribution).
7. Languishing students were the least likely to utilise savouring the moment and behaviour display, that is, savouring positive emotion regulation strategies.
8. Moderately mentally healthy students were positioned in-between flourishers and languishers regarding their use of positive emotion regulation strategies.
9. Flourishing students were the only group that were likely to use adaptive (savouring) positive emotion regulation strategies.
10. Flourishing students refrained from using maladaptive (dampening) positive emotion regulation strategies.
11. Internal strategies such as positive emotion regulation (use of adaptive and the non-use of maladaptive) can be used as pathways to flourishing.

5.3 Limitations

Several limitations of this study need to be considered:

1. This study was based on students representing only one health profession, namely pharmacists. It was, however, at the largest pharmacy school in South Africa and could act as a basis for further investigations regarding pathways to flourishing.
2. All the measures in this study were based on self-reports, therefore common method bias could be a problem in this study. However, the respondents participated voluntarily and all the questionnaires were available in the two languages in which tuition is offered at this institution.
3. This was a cross-sectional study. Therefore the information was about one point in time only. It was a time and cost effective way to gather information from the large

cohort of respondents. Longitudinal studies could determine whether the identified pathways to flourishing hold over time.

4. As this was a quantitative study, future qualitative studies may resolve some of the pending questions.
5. That the reliability of the Basic Psychological Need Scale of Autonomy was low in all the samples may be due to test length (more items would have been more reliable) or item quality (the wording might have been ambiguous, for the questionnaire was originally developed in English, translated into Afrikaans - and translated back into English - to enable participants to complete the questionnaire in their mother tongue).
6. Participants were not a randomly selected representative sample, therefore the results of this study can only be generalised to pharmacy students at this institution in South Africa. It was the first study of its kind, which opened the door for further studies to see whether pharmacy students in general and students in general utilise similar pathways to flourishing.
7. This study only investigated possible positive effects on well-being and pathways to flourishing without considering the dialectical nature of flourishing (Lumas & Ivrtzan, 2015). However, further studies could investigate whether the pathways to flourishing indicated in this study might be detrimental to well-being under certain circumstances.

5.4 Contributions of this study

Supportive evidence of flourishing among a variety of professions already exists. This study's findings contribute specifically to the literature regarding flourishing and the health professions, as it was the first of its kind:

1. It assessed the prevalence of flourishing among pharmacy students, a first for pharmacy students;
2. The reliability of the measuring instruments for this study population was established;
3. The ascertained measurement invariance meant that the different year groups could be compared; the establishment of within pharmacy group differences was another first;
4. The impact of an increasing workload (from first to second to third to fourth year) on the well-being or flourishing of students was demonstrated;
5. This study demonstrated that study demands and study resources do matter when we talk about the well-being of students;

6. It also showed that the different year groups had different experiences regarding the study demands and study resources;
7. The possibility for lecturers to act as study resources and thereby curb the negative effects of study demands with the related impact on flourishing, was illustrated;
8. This study showed that the effective management of demands and resources can be regarded as pathways to flourishing for health sciences students;
9. This study added to the body of knowledge regarding contextual factors and their impact on need satisfaction of health sciences students by showing that not all factors can be considered equal, neither are year group perceptions and experiences;
10. Family and peers crystallised as the most important role players in the need satisfaction (autonomy, competence and relatedness) of students and therefore in their flourishing;
11. Workload has a noticeable effect on the relatedness and autonomy satisfaction of students;
12. The results of this study supported the broaden-and-build theory by demonstrating that flourishers capitalise on positive emotions and thereby feed the upward spiral of building resources;
13. Of the eight positive emotion regulation strategies, only the use or non-use of savouring the moment, behaviour display, inattention, fault finding and external attribution discriminated between flourishers, moderately mentally healthy students and languishers;
14. The study expanded the broaden-and-build theory: The non-use of maladaptive positive emotion regulation strategies and/or the use of adaptive positive emotion regulation strategies serve as pathways to flourishing.

The contributions to the literature regarding flourishing implicate various practical applications to enhance the well-being (or flourishing) of students:

1. It seems that the increasing workload in the pharmacy curriculum hampers the well-being (flourishing) of students. During the curriculum revision process the ‘workload’ could be assessed and adjusted. All the subjects should keep to their allocated credits in terms of hours of work that they expect from the students.

2. Family members should be recognised in terms of the value of their support to the students and its impact on the students' need satisfaction. This should be done early in the study career of a student and be reinforced during the following years.
3. The important role of peers in the well-being of students should be acknowledged, especially by lecturers in their planning of academic activities. Academic activities could be structured in such a way that students could utilise their peer group for support.
4. Lecturers can enhance students' levels of autonomous motivation (thus increase their performance and well-being) if they engage to have an impact on students' need satisfaction.
5. It is in the power of lecturers to create autonomy supportive lecture environments and thereby support need satisfaction (Hodge & Gucciardi, 2015) by supporting students' feelings of volition and choice (Vansteenkiste, Ryan, & Deci, 2008):
 - Provide meaningful rationales for tasks;
 - Provide opportunities for choice when possible;
 - Consider students' perspective;
 - Be responsive to students' needs;
 - Encourage self-initiation;
 - Provide feedback; and
 - Use an encouraging style of communication.
6. Lecturers should refrain from creating controlling lecture environments in which students are pressurised to feel, think and behave in certain ways (Vansteenkiste et al., 2008).
7. This study indicated that it is possible for lecturers to help students to negotiate their workload. The language that a lecturer uses contributes to the interpersonal environment that he/she creates and therefore lecturers should focus on supportive rather than controlling use of language.
8. The use of an adaptive positive emotion regulation style can enhance a person's flourishing. Therefore lecturers could:
Investigate their own positive emotion regulation styles;

Give students opportunities to capitalise on positive emotional experiences, e.g. savouring the moment when a good result is received;

And should not encourage external attribution, e.g. “You have good marks, but this was an easy test”, inattention or fault finding.

9. Lecturers could utilise the spiral of positive emotional experiences by creating positive experiences in the classroom (Bono, Glomb, Shen, Kim, & Koch, 2013). In this way students will be more apt academically, build more resources and ultimately function well.
10. This study could be used to inform the pharmacy profession in terms of what can be done to strengthen the profession.

5.5 Future research recommendations emanating from this study

As this study was the first of its specific nature, it can be replicated for all the health science professions in order to inform educators about the status quo of their students’ well-being and what can be done to improve students’ performance and well-being.

1. Future studies can assess whether the pathways to flourishing which were identified hold for students of other health science professions;
2. Future studies can assess whether the pathways to flourishing which were identified hold for the general population;
3. Longitudinal and mixed method studies will enable future researchers to address the shortcomings of this cross-sectional survey research;
4. Intervention studies, based on the identified pathways to flourishing, could ascertain that it is possible to assist moderate mentally healthy students on their path to flourishing.

5.6 Final conclusions

This thesis “Pathways to the flourishing of pharmacy students” investigated internal and external factors which could impact on pharmacy students’ levels of well-being. The researcher highlighted the way that flourishers (compared to moderately healthy or languishing students) deal with the different factors which indicated possible pathways to flourishing. The various identified pathways to flourishing indicated that the journey towards

flourishing of a pharmacy student can be enhanced in many ways, as was shown in the three manuscripts.

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ADDENDUM A

**AUTHER INSTRUCTIONS: JOURNAL OF PSYCHOLOGY,
INTERDISCIPLINARY AND APPLIED**



The Journal of Psychology

Interdisciplinary and Applied

ISSN

0022-3980 (Print), 1940-1019 (Online)

Publication Frequency

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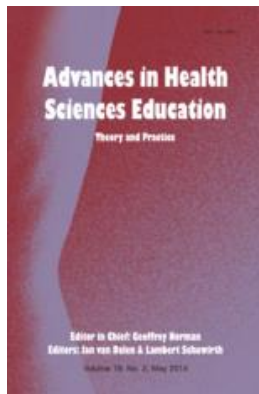
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**ADDENDUM B AUTHER INSTRUCTIONS: ADVANCES IN
HEALTH SCIENCES EDUCATION**



Advances in Health Sciences Education

Theory and Practice

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(Winograd, 1986a, b)

(Winograd, 1986; Flores et al., 1988)

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1. Journal article:

Barlow, D. H. & Lehman, C. L. (1996). Advances in the psychosocial treatment of anxiety disorders. *Archives of General Psychiatry*, 53, 727-735

2. Book chapter:

Cutrona, C. E. & Russell, D. (1990). Type of social support and specific stress: Towards a theory of optimum matching. (In I.G. Sarason, B. R. Sarason, & G. Pierce (Eds.), *Social support: An interactional view* (pp. 341-366). New York: Wiley.)

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Felner, R. D., Jason, L. A., Moritsugu, J. N. & Farber, S. S. (Eds.) (1983). *Preventive psychology: Theory, research and practice*. (New York: Pergamon Press)

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Phelan, J. C., Link, B. G., Stueve, A. & Pescosolido, B. A. (1996, November). Have public conceptions of mental health changed in the past half century? Does it matter? (Paper presented at the 124th Annual Meeting of the American Public Health Association, New York)

6. Patent:

Name and date of patent are optional

Norman, L. O. (1998) Lightning rods. US Patent 4,379,752, 9 Sept 1998

7. Dissertation:

Trent, J.W. (1975) Experimental acute renal failure. Dissertation, University of California

8. Published and In press articles with or without DOI:

8.1 In press

Wilson, M., et al. (2006). References. In: Wilson, Mm (ed) *Style manual*. Springer. (Berlin Heidelberg New York: Springer) (in press)

8.2. Article by DOI (with page numbers)

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9. Internet publication/Online document

9.1. Internet articles based on a print source

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9.2. Article in an Internet-only journal

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Glueckauf, R. L., Whitton, J., Baxter, J., Kain, J., Vogelgesang, S., Hudson, M., et al. (1998, July). Videocounseling for families of rural teens with epilepsy -- Project update. *Telehealth News*, 2(2). Retrieved from <http://www.telehealth.net/subscribe/newslettr4a.html>

9.4. Stand-alone document, no author identified, no date

GVU's 8th WWW user survey. (n.d.). Retrieved August 8, 2000, from <http://www.cc.gatech.edu/gvu/usersurveys/survey1997-10/>.

9.5. Document available on university program or department Web site

Chou, L., McClintock, R., Moretti, F., Nix, D. H. (1993). Technology and education: New wine in new bottles: Choosing pasts and imagining educational futures. Retrieved August 24, 2000, from Columbia University, Institute for Learning Technologies Web site: <http://www.ilt.columbia.edu/publications/papers/newwine1.html> Other Electronic Sources

9.6. Electronic copy of a journal article, three to five authors, retrieved from database

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It is important to emphasize that the acceptance rate is driven by quality standards and there is no quota. Our perspective is that if an article represents a useful contribution to the field, and has no serious methodological flaws, it should be published. Unfortunately, the evidence cited above indicates that about 87% of submitted manuscripts do not meet these two criteria. Although we have not formally analyzed it, our impression is that about half fail because they do not represent a real contribution and half because of methodological flaws. Furthermore, we have studied the fate of rejected manuscripts, and only about 1/3 are eventually published.

These statistics reveal a disturbing state of affairs. The low acceptance rate of *Advances*, and overall, represents a serious waste of resources. There are likely no easy fixes. However as one attempt to make the quality judgments more explicit, we have created this document to explicitly identify the criteria we use in deciding to accept or reject. We must emphasize that these criteria are not universal, but instead, reflect the particular perspective of *Advances*. As stated in the Aims and Scope on the journal webpage:

From the perspective of external validity, it is critical that authors place their study in a theoretical and empirical context. AHSE has no page limit, in order that each paper can be accompanied by a critical review of related research, and the discussion can highlight how the study findings add to knowledge. Authors are encouraged to explore their study from multiple analytical perspectives, to include multiple converging studies if possible, and to specifically state how the study findings add to knowledge in the field.

The editors will not consider studies where the only outcome is a person's opinion or perception of the extent to which they believe they have learned something or improved their skills. The reason is simply that the evidence is consistent that people are not capable of accurate

self-assessment, so any form of self-assessed improvement cannot be used as an outcome. Self-assessed measures of confidence or competence may well appear to show large differences in response to an educational intervention, but are themselves weak surrogates for actual achievement.

From the perspective of educational importance, studies of a single course or program with weak evidence of effectiveness, such as student ratings, are discouraged as they are unlikely to add to generalizable knowledge, unless the study permits empirical test of theoretical predictions. Further, evaluations of any technology, without consideration of the mechanisms that lead to an observed change, are of limited value. Similarly, proving that some education is better than no education, an educational “placebo-controlled trial;” has very limited value. We will not consider such studies for publication.

We now address specific areas of concern:

1) BACKGROUND AND RELATED LITERATURE

It is critically important that the article provides sufficient background that the reviewer can judge whether the article represents real “value added.” There are a number of ways to describe this section – “conceptual framework”, “theoretical foundation”, but none do justice to the range of possibilities. Not every study question tests a theory, and not every study relies on conceptual frameworks. But unless the author can make it clear that the particular study question has not been previously addressed and is important for the field, we will not consider it for publication.

1a) Specialty and Institutional context

Frequently the study rationale consists of solution to a local problem – either a particular health profession or specialty (“Training of pediatric gerontologists is an important ...”), a country (The Ameraustrialasian Task Force on Health Manpower decreed that....”), or a school (“At Slippery Slope U we had a problem with...”).

Advances is an international journal, and is read by researchers and educators in a broad range of health disciplines in many countries. It is incumbent on the author to explicitly

demonstrate that the study findings are generalizable to other disciplines, educational contexts and countries. If this is not possible, the article does not belong in an international multidisciplinary journal.

1b) Theory development and testing

Far too often, educational interventions are theory-based, not theory-testing or theory-generating. To paraphrase Winifred Castle, a British statistician, “Most educators use theory the way a drunkard uses a lamppost. More for support than illumination” (Norman 2004). A study that is designed to test the predictions of a theory potentially represents a real contribution to advancing the knowledge of a field, as does one that robustly extends or develops new theoretical perspectives. Conversely, a study that elaborates a theory simply to provide a veneer of scientific respectability adds little.

1c) Invention vs. clarification

We are not particularly interested in studies that demonstrate that some educational intervention or invention “works”, whether it is a simulation, a curriculum, an assessment method. This amounts to little more than market research. Instead we want to identify the underlying variables that may contribute to success or failure, and to systematically explore these factors individually and in combination.

This distinction has been described in a number of ways. Cook, Bordage and Schmidt (2008a) distinguish between “justification” and clarification” research, where “justification” shows that a particular innovation “works”, and “clarification” attempts to understand why it works. Cook (2005) points out that studies comparing one medium (hi-fi simulation) to another (video) confound a number of factors and are therefore essentially uninterpretable. Prideaux and Bligh (2002) also discuss the critical role of literature in advancing a discipline.

1d) There are clear differences between efficacy and effectiveness studies: “efficacy refers to the beneficial effects of a program or policy under optimal conditions of delivery, whereas effectiveness refers to effects of a program or policy under more real-world conditions.” We are interested in both kinds of studies but the type of study should be clearly articulated and its methods, contributions and implications selected and critiqued accordingly, not least because “efficacy trials significantly overestimate how strong an effect will be when the treatment is used under more usual conditions.” (Streiner and Norman, 2009).

1e) Some dead issues

There are some areas in medical education that persist, despite substantial evidence that they are not scientifically defensible. As Roediger (2013) says:

“The field of education seems particularly susceptible to the allure of plausible but untested ideas and fads (especially ones that are lucrative for their inventors). One could write an interesting history of ideas based on either plausible theory or somewhat flimsy research that have come and gone over the years. And .. once an idea takes hold, it is hard to root out.”

Accordingly, we will not consider any original studies or reviews of learning styles or critical thinking skills. The literature on these domains is conclusive. We will consider studies of personality, practical intelligence, emotional intelligence only if they are correlated with measures of behaviour or performance, and NOT with other self-reported measures

RESEARCH QUESTION, GOAL, HYPOTHESES

The focus of any scientific paper is the research question. Ideally the literature review should lead naturally to the research question and the question in turn sets the agenda for the research methods and results.

We are not at all concerned whether it is framed as a research question, goal or hypothesis; we view this as a matter of etiquette, not substance. Frequently the study design more naturally lends itself to be framed as a question or hypothesis. For example, describing a reliability or validity study in terms of a hypothesis becomes awkward. Null hypotheses look good in statistics books but are typically awkward in papers.

For qualitative or mixed methods research the authors should clearly state whether the goal is to describe a particular situation (case study), to explain it (what mechanisms are involved), to evaluate it (is it of any use or importance), or to test a particular hypothesis (does this have an impact on that), or whatever combination of goals was involved.

2a) Specificity of the question

What *does* matter is that the question is answerable by the study design. This is what characterizes scientific questions. Far too frequently the question is framed in such general terms that it is difficult to judge what kind of data would answer it. “What are students opinions of technology in nursing?”

2b) Research programs and salami-slicing

Advances was the first journal in the field to abandon a word limit. In doing so, we emulated journals in experimental psychology, where a single article may have as many as 10 or 12 studies in a carefully designed research program, so that, by the end, the phenomenon is well understood.

This is unlikely to arise in education for a number of reasons, which are not relevant here. But we retain the lack of word limit to encourage authors to publish results in a single, comprehensive paper. We abhor the practice of taking a single study and spinning it into several short papers, each of which is just a brief snapshot of the whole study. The whole is usually more than the sum of the parts.

There are exceptions of course. Large databases frequently yield valuable insights into multiple questions. Research programs may result in multiple studies that provide more insight, while each study still stands on its own as a contribution. There is a grey zone between multiple publications that are too repetitive and a legitimate research program.

We now routinely ask authors to disclose related publications and will not hesitate to reject manuscripts that have a “me-too” character.

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METHODOLOGY

3A) Intervention studies

One mainstay of educational research is the experimental intervention study. This may arise in validating a new curriculum approach like Team Based Learning, a simulator for instruction in motor skills, different processes of learning (e.g. student-led vs. instructor led tutorials) and so on. We are frequently criticized because we do not do enough randomized controlled trials (Torgerson, 2002).

Unlike many clinicians, we do not view the RCT as the only or the most legitimate design. It is useful for studying interventions, but interventions are only one class of educational research. Moreover, educational research has specific affordances and constraints that must be recognized in designing experiments.

3Ai) Research designs

One group – pretest-posttest

Undoubtedly the most common design to examine interventions is the one-group pretest – posttest design. You measure something, do an intervention and then measure it again. Fifty years ago, Campbell and Stanley (1963) called this a “pre-experimental design” and did not view it as interpretable. Simply put, it has no control for all the other things that may have happened to the subjects during the intervention, from maturation to Google. It is not possible to draw any conclusion about effectiveness from such a design.

Placebo controlled

A better design is a two group design, the classic RCT. However, although in clinical medicine, with many diseases and small effects, it may make sense to conduct a “placebo-controlled” trial, this is no longer defensible in education. We have ample evidence that time spent learning something will result in more learning than no time spent learning something (Cook, 2012).

c) Curriculum – level interventions

In our view, interventions designed to determine whether an entire curriculum was effective are of minimal value, and fall under the category of “inventions” and “justification” research described earlier. They are unlikely to lead to any generalizable knowledge (Cook & Beckman, 2010).

3Aii) The role of pretest

Although many researchers believe that it is essential to conduct a pretest to ensure that the “randomization worked”, we believe this is flawed logic. True randomization always works; the finding that there is a statistically significant difference on some baseline variable is not evidence that it failed. Five percent of all randomizations will “fail” by this criterion. In any case, there is no need to determine the probability that a baseline difference arose by chance. It is 100%, because it **did** arise by chance.

Practically, pretests are not learning neutral. They provide the participants with

foreknowledge of the posttest, so are part of the intervention and may be as powerful as anything that is manipulated experimentally (Cook, 2009).

3A iii) To randomize or not

In medical studies, a preoccupation with randomization is likely well-placed. Effects are small and vested interests are sometimes large. In education, the opposite is more likely true. The average effect size of educational interventions is 0.5 (Lipsey & Wilson, 1998) and has been shown to be independent of whether or not people were randomized.

Randomization is a means to an end. If students end up in groups by some mechanism (e.g. clerkship assignment to various hospitals) unrelated to the intervention and outcome (e.g. learning auscultation) that is good enough.

3A iv) The outcome measure

The outcome measure should be chosen with respect to 2 conflicting goals. It should be sufficiently proximal to the intervention that it is likely to be sensitive to the differences between interventions. On the other hand, it should be sufficiently related to performance to have credibility.

Practically, this effectively rules out any outcome based on some satisfaction, confidence, or self-rated ability measure (“I am confident I can tie knots now”). As discussed earlier, self-assessment is not valid, so an outcome based on self-assessment is not credible. On the other hand, despite exhortations to look at patient outcomes, the reality is that they are relatively insensitive to most medical therapies, so are very unlikely to be sensitive to some educational intervention on students who are themselves at arm’s length from patient care (Cook & West, 2013).

3B) Psychometric / assessment studies

Studies of assessment methods are the most common type of research in health sciences education. To some extent these are more straightforward than other areas, in that there are well-defined terminologies described in the APA manual and other sources. Nevertheless, some practices are unacceptable.

As a preamble, we remind the reader again that self-report measures are highly suspect and cannot be accepted as the only outcome measure. Second, we recommend that you seek information from a book like Health Measurement Scales (Streiner & Norman, 2014).

Below are some serious methodological flaws associated with reliability and validity studies

3Bi) Reliability

There is one standard approach to computing the reliability coefficient – the intraclass correlation (Streiner & Norman, 2014). Cohen’s Kappa is mathematically equivalent but is restricted to pairwise observations. Pearson correlation is similar, but also restricted to pairs.

Caution should be taken to ensure that the study sample is similar to the population to which the instrument will be applied. As a counterexample administering a set of diagnostic cases to samples of first and 4th year residents says nothing about its application in measuring competence of first year students. The study has massively inflated the true variance so overestimated the reliability.

Generalizability theory, an extension of classical test theory, is a very powerful alternative to classical reliability.

3Bii) Internal consistency – the reliability of the total score averaged across items is a useful statistic for some measures like high-stakes written multiple choice tests. However, with rating scales it is frequently of minimal usefulness. If you have designed a scale to assess, for example CanMEDS roles, you should expect low correlations across different roles, but you will commonly get alpha coefficients of 0.7-0.8 for these rating scales. This is likely too high, but no one says what it should be.

3Biii) Construct validity and differences among groups

Showing that an instrument gets higher scores with 4th year than 1st year students is of little value when the goal is to distinguish among 4th years. It also provides minimal information about validity, as 4th years are different from first years in all sorts of ways including debts, grey hairs, and likely of car ownership. Constructs should be much more specific than this.

3C) SURVEYS

When surveys are used in education, they tend to be “purpose – built” to address a particular question of the researcher. A consequence is that they frequently have minimal evidence of reliability and validity.

3Ci) Survey design

There are well-described principles of questionnaire design (Streiner and Norman, 2014). Response scales should use minimum of 5 to 7 steps. Appropriate methods such as focus groups should be used to obtain questions.

3Cii) Psychometrics

Issues described above under “Psychometric studies” are relevant to surveys as well. Commonly, only internal consistency reliability is reported, since this can be obtained from a single administration. This is rarely informative. Some attempt to look at other areas such as test-retest reliability. Is desirable.

Some attempt to establish validity of the survey, beyond simple face and content validity, is desirable.

3Ciii) Analysis

Generally surveys should, wherever possible summarize individual items into scores and subscores to improve validity and to minimize the number of possible analyses. Analysis at an item level is discouraged, unless specific hypotheses are identified a priori, and researcher takes steps to minimize Type I errors (See 4 A iii below).

3D) QUALITATIVE STUDIES

There are many branches to qualitative research, each of which has particular methodological and reporting standards. Studies should clearly articulate their theoretical stance and the basis for their work including appropriate methods and data collection. It is insufficient to simply declare that a study is qualitative. For instance, there can be a significant difference between adopting a particular methodological stance, such as grounded theory, and using some of its techniques (Kennedy and Lingard, 2006).

Patton (1999) identifies three key requirements for high quality qualitative research. Firstly, there needs to be a clear description of what was done, step by step, including who did it and the basis of these actions in established qualitative research methods with particular “attention to issues of validity, reliability, and triangulation”. Secondly a clear articulation of the researchers’ backgrounds and skills, and thirdly a clear articulation of the philosophical and theoretical bases of the study and how they translate into the methods used. If new methods have been developed then they need to be robustly described and grounded in theory and related approaches.

3E) MIXED AND MULTIPLE METHODS STUDIES

Not only should quantitative and qualitative components follow good practice in their respective domains, methods should be selected and pursued in ways that address the question or topic of the study and yield meaningful data that can be correlated, triangulated or otherwise integrated to create a meaningful whole.

4) ANALYSIS AND STATISTICS

4A) QUANTITATIVE STUDIES

4Ai) Descriptive data

Typically results sections fail on one simple criterion – they do NOT provide sufficient information for the reader to understand what the data actually look like. A p-value should NEVER appear in a text without the data (means, SDs, frequencies) on which it is calculated. All it says is that a difference is unlikely to arise by chance – no more, no less. And in large studies small effects can be significant; in small studies large effects can be non-significant.

It is a MINIMUM expectation that the author will provide the appropriate descriptive statistics – means, standard deviations, or frequencies. That does not mean providing all the raw data however; the goal is transparency. This can be provided in tabular or graph form, as long as meaning is clear. We do not insist on effect sizes; with adequate descriptive data this is an easy exercise in mental arithmetic. We are also indifferent to choice of p-values or confidence intervals – again give me one, I'll give you the other.

4A ii) Parametric and non-parametric statistics

With the exception of frequencies in categories (male vs. female) it is rarely necessary to revert to non-parametric statistics. In particular, some urban myths should be dispelled:

- a) Likert scales are ordinal, but can and should be analyzed with parametric stats
- b) The data need not be normally distributed to use parametric stats, since methods like ANOVA look at the distribution of means, and the central limit theorem guarantees that means are normally distributed for sample size greater than 10 or so. In any case parametric stats are very robust.

- c) Why parametric? They are much more universally understood, and are much more powerful. There is no non-parametric equivalent of a 3 way repeated measures ANOVA.

For more information on these issues, see Norman (2010)

4A iii) Multiple testing

It is unfortunately common, particularly with survey research, to create a table of correlations and then build a post-hoc story about the 3 correlations out of 100 that had a p-value less than .05.

When you are doing multiple testing like this – involving multiple questions in a survey, subscales on a test, different outcome measures, stations in an OSCE, it is an absolute requirement that you first do a Bonferroni correction – dividing the p – value (.05) by the number of tests. So if there are 20 correlations you are going to look at, you must use a p-value of $.05/20 = .0025$.

4A iv) Sample size and power calculations

Sample size calculations have a useful role in the design of a study, but, in our view, are not needed in reporting a study. If a result was statistically significant, then the sample size was large enough. If the result was not significant (and there was an expectation that it should be) then it may be appropriate to do a power calculation using a plausible estimate of the expected difference.

4B) QUALITATIVE STUDIES

Again indicators of quality should refer to the particular qualitative paradigm or tradition that is being employed (and should be clearly articulated as such). Patton's criteria also apply here. Each step in the analysis should be described and grounded and there should be a clear articulation of how findings were derived, the possibility of alternatives and the means by which trustworthiness and rigour were established and maintained.

4C) MIXED AND MULTIPLE METHODS STUDIES

In addition to the comments under the methods section, there is a difference between mixed and multiple methods (e.g. data combination or parallel processing) which should be clearly articulated and pursued. The means by which correlation, triangulation, or some other kind of synthesis is used should be described and grounded.

REVIEW ARTICLES – CRITICAL AND SYSTEMATIC

5A) CRITICAL/SCOPING REVIEWS

AHSE publishes many critical reviews of issues in education. There is good reason for this: we are convinced that the critical review by someone steeped in the field can offer real insight into the area – what is known, where it is heading, and what are the unanswered questions. Such a review can only emerge from deep understanding of the field.

Of course the possibility exists for author bias to emerge, as the reviewer inevitably has some personal investment in the way the area is portrayed. We believe this is of relatively little concern as the peer review process is hopefully capable of sorting this out. Nevertheless, as a minimum, the critical reviewer must specify the search strategy to some degree, although it may not be as systematic or exhaustive as those of systematic reviews.

We are more interested in the quality of the synthesis than the exhaustiveness of the search. We expect real synthesis, not a recounting of “this study did this and found that. The next study did that and found the other thing” It is on the synthesis that the critical review stands or falls.

The difference between a critical and a scoping review is that the former synthesizes and critiques understanding of an established subject or issue while the latter explores or sets out new ground for subsequent inquiry. The purpose of a review should be clearly stated and its execution reflect this purpose.

5B) SYSTEMATIC REVIEWS +/- META ANALYSIS

By contrast, we publish relatively few systematic reviews. We have seen too many examples of systematic reviews that had very limited value. There are several reasons for this, which should be borne in mind by authors.

5Bi) Systematic reviews of quantitative research are most useful for studies of effectiveness, and less useful for other studies. Historically, Glass, an educational researcher, did the first systematic meta-analysis of psychotherapy effectiveness. However, systematic reviews are now commonplace in medicine. There are good reasons for this: in medical interventions, the population is relatively homogeneous (patients with MS); the therapy can be standardized (300 mg. t.i.d.) and the outcome can be standard and objective (death). Such circumstances are relatively absent in

education, although there are certainly some useful systematic reviews in our field (e.g. Cook, 2011; Cook, 2008b; Issenberg, 2005). All of these were able to identify a minimum of over 100 studies on which to conduct an analysis.

5Bii) If questions are well chosen, systematic reviews can be informative (e.g. predictive validity of medical licensing examinations, effectiveness of technology enhanced simulations). However, because of the lack of standardization of questions, therapies and outcomes, far more systematic reviews are inconclusive (e.g. does interprofessional education work? What is interprofessional education? For whom? How do you define “work?”).

5Biii) Moreover, because the outcomes are so far ranging and heterogeneous, many quantitative reviews abandon any attempt at meta analysis and end up bean counting (“12 out of 15 studies looked at self report”), which is not helpful.

In short, a credible systematic review must have:

- a) A well defined question, of broad interest
- b) Sufficient numbers of studies on which to base an analysis
- c) Sufficient richness of data on which to draw quantitative conclusions about what is and is not effective.

5Biv) Systematic reviews may also pursue qualitative evidence and employ qualitative methods or combine qualitative and quantitative materials and methods. Although the nature of synthesis may differ from purely quantitative reviews there are standards for qualitative reviews (such as RAMESES for realist reviews - Wong et al. 2013) and these should be followed where at all possible. To be credible qualitative systematic reviews must have:

- a) A well defined question, of broad interest, with a theoretical grounding and methods that match the question
- b) A systematic execution of the review
- c) Sufficient numbers of studies on which to base an analysis
- d) Sufficient richness of data on which to respond to the review question

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**ADDENDUM C AUTHER INSTRUCTIONS: APPLIED
PSYCHOLOGY, HEALTH AND WELL-BEING**



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