Validation of the Basic Psychological Needs Scale in a South African student group

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Summary

During the past few years research has increasingly focused on the constituents of well-being, resulting in the development of various theories aimed at explaining what it means to be psychologically well. Self-determination theory (SDT), a metatheory of human motivation, discerns three basic psychological needs which are universal across cultures, namely autonomy, competence, and relatedness. According to basic psychological needs theory, a subtheory of SDT, all three basic psychological needs must be satisfied for growth and well-being to occur. When one or more of the basic psychological needs are not satisfied, it may result in maladaptive and compensatory behaviour patterns. Research also indicated that need satisfaction, need dissatisfaction, and need thwarting are different constructs, each with its own associations with different levels of well-being or ill-being. This emphasises the importance of having valid and reliable measures to assess an individual's levels of need (dis)satisfaction.

The aim of this study was to investigate the psychometric properties of the Basic Psychological Needs Scale (BPNS), a measure of basic psychological need satisfaction, in a South African student sample, by exploring its factorial validity, internal consistency reliability, and the criterion-related validity. This study formed part of the FORT 3 umbrella project which was approved by the Ethics Committee of the North-West University, South Africa, with project number NWU 00002-07-A2.

A quantitative, cross-sectional survey design was employed. The participants were a nonprobability sample of 322 students from multiple campuses from a South African university. Participants were between 18 and 54 years of age. Each participant completed a battery of measurement scales, including the BPNS.

Confirmatory factor analysis was used to determine the factor structure of the BPNS. The results indicated that neither a one-factor, nor a three-factor model fitted the original 21-item BPNS. After problematic items were removed a three factor, 17-item measure with a negatively worded method effect best fitted our data. However, the fit was only marginal and internal consistency reliability indicators remained low. Although the 17-item BPNS had good criterion-related validity, the marginal factorial validity and low internal consistency reliability suggest that the scale should be used with caution in the present context. Specifically, an inspection of the remaining items indicated potential theoretical problems such as that the real meaning, or the full extent, of the intended constructs was not captured. There were also duplicated and ambiguous items. In addition, negatively worded items could tap a different dimension of each construct, while contextual and cultural factors could also have influenced how items operated in the present sample.

Future research may focus on investigating the psychometric properties of the BPNS in different populations. An emic approach to understanding basic psychological needs in a South African context is suggested. Furthermore, the BPNS can be improved by rewriting or removing problematic items, and/or by constructing new items.

Keywords: Basic psychological needs, self-determination theory, factor structure, internal consistency reliability, criterion-related validity, scale validation, psychometric properties

Preface

This dissertation is submitted in partial fulfillment of the requirements of the Magister Artium in Positive Psychology, where the dissertation accounts for one third (60 credits) of the total course credits (180 credits). This dissertation is conducted in article format as indicated in the 2015 General Academic Rules (A4.1.1.1.4 and A4.4.2.9) of the North-West University. The article is prepared according to the requirements of the specific journal to which it will be submitted. Some exceptions are made for purposes of the dissertation, which includes the numbering of pages and the use of the font type, Times New Roman, in tables and figures instead of the font type, Helvetica text, for the sake of uniformity.

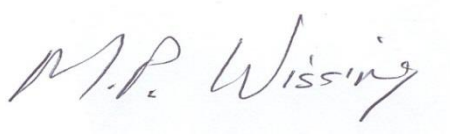
The body of this dissertation comprises of three sections, namely Chapter 1 which contains the background and literature review, Chapter 2 which contains the research report in article format, and Chapter 3 which contains the conclusion, recommendations, and a reflection on the research process.

Letter of permission

The co-authors gave permission to the first author to submit this article for the purpose of a dissertation.

The first author contributed to theme development, did the major part of the literature review, contributed to the data analysis and interpretation, and did the major work for the discussion. She drafted the manuscript and incorporated all suggestions from the co-authors into the manuscript.

Mrs L. Schutte (supervisor)



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Chapter 1

Background and Literature Review

Chapter 1: Background and Literature Review

In order to measure constructs and to evaluate, plan, and focus interventions it is imperative that the measures aimed at assessing phenomena are valid and reliable. The aim of this study was to validate the Basic Psychological Needs Scale (BPNS), a domain-general measure of basic psychological need satisfaction, in a South African student context. Basic psychological need satisfaction is articulated in basic psychological needs theory which is a subtheory of self-determination theory. In order to validate measures it is imperative to understand the theory underlying the measure. This gives us an understanding of how constructs were conceptualised and enables us to determine if scale items theoretically measure what they aim to measure. Measures also need to be empirically validated, using various statistical techniques to determine their validity and reliability. This chapter will focus on giving a literature review on self-determination theory and basic psychological needs theory, while also addressing aspects related to scale validation.

Literature Review of Self-determination Theory and Basic Psychological Needs Theory

With the increasing interest in what constitutes psychosocial well-being, several theories and measures have been developed to explain and measure psychosocial well-being. One such theory is self-determination theory (SDT). SDT is a metatheory of human motivation which explains aspects such as: "personality development, self-regulation, universal psychological needs, life goals and aspirations, energy and vitality, non-conscious processes, the relations of culture to motivation, and the impact of social environments on motivation, affect, behaviour, and well-being" (Deci & Ryan, 2008, p. 182).

Basic psychological needs theory is a subtheory of SDT, and argues that when the environment supports the satisfaction of basic psychological needs it results in growth and

optimal functioning, while environments that thwart the satisfaction of basic psychological needs result in ill-being (Deci & Ryan, 2000). Psychological needs are characterised by the effect that their satisfaction or thwarting has on growth and well-being (Deci & Ryan, 2000). Psychological needs are therefore defined as those needs that result in positive psychological outcomes when they are satisfied (e.g., effective functioning and optimal development), but in negative psychological outcomes when they are thwarted (e.g., compensatory and rigid behavioural patterns; Deci & Ryan, 2000).

Three basic psychological needs are discerned by SDT. Autonomy is the need to feel that one's behaviour is self-regulated, rather than enforced by external agents (Deci & Ryan, 2000), that is, a sense of choice and free will (Haivas, Hofmans, & Pepermans, 2014). Competence is the need to feel capable and efficacious when performing tasks and engaging with the environment (Deci & Ryan, 2000; Haivas et al., 2014). Relatedness is the need to feel that one is connected to others, and include experiences such as having close relationships with others, and feeling cared for and supported by others (Deci & Ryan, 2000; Haivas et al., 2014, Ryan, Huta, & Deci, 2008).

With regard to need satisfaction it is important to differentiate between need dissatisfaction and need thwarting. Need dissatisfaction relates to the extent to which a person feels his or her needs are not met, while need thwarting relates to the active prevention of need satisfaction (Bartholomew, Ntoumanis, Ryan, & Thogersen-Ntoumani, 2011). Need satisfaction, need dissatisfaction, and need thwarting are associated with different outcomes on well-being or ill-being. For example, Costa, Ntoumanis, and Bartholomew (2015) found that need satisfaction, need dissatisfaction, and need thwarting represent three independent constructs, each with its own effect on relational well-being.

For growth and well-being to occur, all three psychological needs must be satisfied (Deci & Ryan, 2000; Ryan et al., 2008). When one or more of these psychological needs are not satisfied, or chronically thwarted, it may lead to developing maladaptive and compensatory behavioural patterns (Deci & Ryan, 2000; Vansteenkiste & Ryan, 2013), which are aimed at preserving as much need satisfaction as the circumstances allow or to protect against threat to need satisfaction (Deci & Ryan, 2000). Although compensatory behavioural patterns provide some sense of need satisfaction they do not really satisfy the frustrated need (Deci & Ryan, 2000) and tend to form permanent patterns of behaviour that are applied in situations where they serve no real purpose (Deci & Ryan, 2000). These compensatory behavioural patterns have the further drawback that a person may remain unaware of the deeper causes of the perceived need thwarting (Vansteenkiste & Ryan, 2013) because his or her attention is focused on coping with perceived need thwarting, instead of on finding a solution towards need satisfaction.

According to SDT basic psychological needs are universal across cultures, and therefore the outcomes associated with need satisfaction and need frustration will replicate across cultures. This claim of SDT will be discussed in the next paragraph.

Psychological Needs are Universal across Cultures

SDT holds that the basic psychological needs are universal across cultures and individual differences in need strength, and that the outcomes associated with need satisfaction and need thwarting will replicate across cultures and individual differences (Deci & Ryan, 2000, 2008). This claim of SDT was tested by Chen et al. (2014) in two studies. They tested whether there was cross-cultural variation in the degree to which individuals derived benefit from need satisfaction (studies 1 and 2) or suffered harm from need thwarting (only in study 2), and whether the benefits derived from need satisfaction and harm suffered from need thwarting were

moderated by individual differences in need strength, that is the importance attached to having the need satisfied (study 1) or the desire to have the needs satisfied (study 2). In the first study the participants were adolescents from China and Belgium. China is a relatively vertical collectivist culture, while Belgium is more individualistic and egalitarian (Chen et al., 2014). In study 1, need strength was defined as the degree to which individuals find it important to have their needs satisfied (need valuation). Positive correlations between need satisfaction and well-being (self-esteem) and negative correlations between need satisfaction and ill-being (depression) were found in both groups. The satisfaction of the needs for autonomy and competence especially contributed to well-being, while there was no unique association between the satisfaction of the need for relatedness and well-being (for both groups). The relationship between the satisfaction of the three needs and well-being was not moderated by need valuation (for both groups). Together, these results indicate that, across cultures, even if an individual does not value the satisfaction of these needs he or she still benefits from having his or her needs satisfied. In the second study the participants were university students from the mid-western part of the USA, Beijing (China), Belgium (Flanders), and Lima (Peru). The USA and Belgium rank high on the individualistic end of the individualistic-collectivistic continuum while China and Peru rank low on individualism and are thus more collectivistic (Chen et al., 2014). Need strength was defined as the degree to which individuals desire to have a particular need satisfied (need desire). Need satisfaction was positively related to well-being (life satisfaction and vitality), but unrelated to ill-being (depression). Need frustration positively correlated to ill-being (depression) and negatively correlated to well-being (life satisfaction and vitality). This was the result in all four cultural groups. The relationships between need satisfaction or need thwarting and well-being or ill-being were not moderated by need desire. Together, these results indicate

that even those individuals who did not desire to have their psychological needs satisfied benefited from the satisfaction of their needs and suffered adverse consequences when these needs were thwarted.

Thus, across cultural groups and irrespective of individual differences in need strength (whether defined as need valuation or as need desire) the satisfaction of basic psychological needs was associated with well-being, while the thwarting of these needs was associated with ill-being. Although basic psychological needs apply cross-culturally according to basic psychological needs theory, there are individual differences in how these needs are expressed. This aspect will be addressed in the next paragraph.

Individual Differences in Basic Psychological Need Expression

Although basic psychological needs have universal application, there are individual differences in how these needs are expressed. These individual differences are accounted for by the degree to which basic psychological needs are satisfied (Deci & Ryan, 2008; Ryan & Deci, 2000) and are associated with causality orientation and aspirations (Deci & Ryan, 2008).

Causality orientation. Causality orientation refers to an individual's general motivational orientation with regard to how the individual orients himself or herself to the social environment with regard to behavioural regulation; and how autonomous, versus controlled, the individual's behaviour generally is over a variety of situations and settings (Deci & Ryan, 2008). SDT discerns three types of orientations that relate to the degree to which basic psychological needs are satisfied, namely autonomous orientation, controlled orientation, and an impersonal orientation (Deci & Ryan, 2000, 2008). These orientations link with the different types of motivation discerned by SDT, namely autonomous motivation, controlled motivation, and amotivation (Deci & Ryan, 2008).

An autonomous orientation refers to behavioural regulation based on one's own interests and self-determined values (Deci & Ryan, 2000), and requires the regular satisfaction of all three basic psychological needs in order to develop (Deci & Ryan, 2008). When individuals are autonomously motivated they experience a sense of choice and self-determination in regulating their behaviour. Autonomous motivation includes intrinsic motivation (engaging in activities because they are interesting and not because any external reward is offered for engaging in the activities), and the following forms of extrinsic motivation: identification (behaviour is regulated by identification with the value of the activity) and integration (behaviour is regulated because of identification with the importance of the activity while also integrating the identification into the sense of self).

A controlled orientation refers to behavioural regulation based on prescriptions by external agents (Deci & Ryan, 2000), and develops when the need for autonomy is thwarted, even though the need for competence and the need for relatedness are relatively satisfied (Deci & Ryan, 2008). Individuals with controlled motivation feel pressured to behave in certain ways. Controlled motivation includes external motivation (engaging in activities to receive reward or to avoid punishment) and introjection (the regulation of action is partially internalised, but energised by external factors; Deci & Ryan, 2000, 2008).

An impersonal orientation refers to a focus on incapability and to behaviour that is not intentional (Deci & Ryan, 2000), and develops when all three basic psychological needs are thwarted (Deci & Ryan, 2008). An impersonal orientation relates to amotivation, which refers to a lack of motivation and an inability to regulate oneself with respect to a specific behaviour (Deci & Ryan, 2000).

Individuals have each of these orientations to some degree and one or more of these orientations can be used to predict psychological and behavioural outcomes. An autonomous orientation is associated with psychological health and effective behavioural outcomes, a controlled orientation is associated with reduced levels of well-being and rigid behavioural patterns, and an impersonal orientation is associated with ill-being and poor functioning (Deci & Ryan, 2008).

Aspirations. Apart from causality orientation, basic psychological needs satisfaction is associated with aspirations (Deci & Ryan, 2008). Aspirations are long-term goals that direct behaviour (Deci & Ryan, 2008). The degree to which basic psychological needs are satisfied determines the type of aspirations that are pursued (Deci & Ryan, 2008). When basic psychological needs are regularly satisfied individuals may rather pursue intrinsic life goals (e.g., personal development, affiliation, etc.), while thwarting of basic psychological needs may lead to the pursuit of extrinsic life goals (e.g., wealth, fame, etc; Deci & Ryan, 2008). The pursuit of extrinsic life goals becomes a substitute for actual basic need satisfaction, but does not really satisfy the thwarted need, even if the extrinsic goal is attained (Deci & Ryan, 2000, 2008). The pursuit of intrinsic life goals is associated with more autonomous regulation and positive well-being outcomes, while the pursuit of extrinsic life goals is associated with more controlled regulation and reduced well-being (Deci & Ryan, 2008). In summary, the degree of satisfaction of basic psychological needs plays an important role in the development of specific causality orientations and the pursuit of different types of life goals, while each causality orientation and the pursuit of each type of life goal are associated with specific well-being or ill-being outcomes. In the next paragraph we will discuss how the satisfaction versus thwarting of basic

psychological needs affects individual behaviour with regard to seeking experiences aimed at need satisfaction, as well as the role of the social environment in this endeavor.

The Role of the Individual and the Social Environment in Need Satisfaction

SDT differs from drive theories in terms of the role of the individual in need satisfaction. While drive theorists view the person as playing a passive role in need satisfaction, that is only once a physiological deficit occurs it drives individuals towards restoring the disequilibrium caused by nonsatisfaction of needs, SDT views the person as playing an active role in psychological need satisfaction (Deci & Ryan, 2000). According to SDT humans are growth-oriented and have a natural inclination to integrate their psychological experiences in a coherent sense of self, while they also integrate themselves into society as a whole, that is an organismic dialectic approach (Deci & Ryan, 2000). Individuals therefore do not need to be prompted to act as the behaviours that are associated with innate life processes will occur naturally. It is therefore not a requirement that behaviour, according to SDT, is aimed at need satisfaction per se. It is mostly in environments where need satisfaction is thwarted that need satisfaction becomes the aim in itself (Deci & Ryan, 2000). For example, when basic psychological needs are regularly satisfied behaviour will not specifically be aimed at seeking experiences that satisfy these needs, but when one or more of these basic psychological needs are thwarted behaviour may become aimed at need satisfaction (Deci & Ryan, 2000). When individuals experience reasonable need satisfaction they may rather be involved in activities that they find interesting or important (Deci & Ryan, 2000).

For example, Sheldon and Gunz (2009) have investigated whether the basic psychological needs as proposed by SDT also have motivational force. When a need has motivational force its deficiency should foster behaviour directed at fulfilling that (specific) need

(Sheldon & Gunz, 2009), while the satisfaction of a particular need should result in seeking to have other unsatisfied needs satisfied. In the first study Sheldon and Gunz (2009) found support therefore that preexisting need dissatisfaction correlates with desiring more experiences related to the specific need that is dissatisfied, that is a person who has a preexisting dissatisfaction of the need for competence desires more competence experiences. This result was true for autonomy, competence, and relatedness as indicated by significant negative correlations between need satisfaction and motivation to experience each type of need. It was the negatively worded items in the measurement instrument that was used to measure basic psychological needs that were responsible for this correlation, while the positively worded items did not negatively predict the corresponding motivation. This is indicative thereof that whereas deficient need satisfaction correlates with desiring more experiences related to the specific need that is dissatisfied, the satisfaction of the need does not lead to a reduced desire to have experiences related to the specific need, that is that individuals who experience need satisfaction do not desire less experiences related to the specific need (Sheldon & Gunz, 2009).

In the second study of Sheldon and Gunz (2009) an experimental design was followed to establish a causal link between need dissatisfaction and desire to have more experiences related to the specific need. Participants' sense of autonomy, competence, or relatedness was undermined in an experiment. The results indicated that for competence and relatedness the threat to need satisfaction has led to a desire to solve only the problem that specifically relates to the need that was threatened. The same result was not observed for autonomy. Instead, the threat to the need for autonomy resulted in a desire to have more competence experiences. Sheldon and Gunz (2009) indicate that the way in which participants perceived the task manipulation could account for this result. Participants may have perceived the threat to autonomy as a threat to

competence instead. It could also be that the autonomy task manipulation was not perceived to be as threatening as the task manipulations for competence and relatedness.

In the third study, a short term longitudinal study over six weeks, Sheldon and Gunz (2009) found that changes in levels of need satisfaction was associated with changes in the desire for need-related experiences. Again, as in the first study, the negatively worded items significantly predicted changes in the motivation to experience the corresponding need, while the positively worded items did not (Sheldon & Gunz, 2009). Thus, over the three studies Sheldon and Gunz (2009) found that when psychological needs are thwarted, individuals will seek experiences that satisfy the specific need that is thwarted.

While acknowledging the active role of the individual in need satisfaction, SDT also emphasises the role of the environment in basic need satisfaction (Deci & Ryan, 2000). SDT discerns three types of social environments, namely need supportive environments, need depriving environments, and need thwarting environments (Vansteenkiste & Ryan, 2013). In need supportive environments individuals can actively foster satisfaction of basic psychological needs. This type of environment contributes to growth through need satisfaction, as inner coping resources are built which can buffer against malfunctioning (Vansteenkiste & Ryan, 2013). In need depriving environments agents can be indifferent to the person's basic psychological need satisfaction, while agents in a need thwarting environment are hostile towards a person's basic psychological need satisfaction (Vansteenkiste & Ryan, 2013) and actively frustrate a person's need satisfaction (Bartholomew et al., 2011; Deci & Ryan, 2000). Need thwarting environments typically produce maladaptive behaviour and the development of fewer resources for growth (Vansteenkiste & Ryan, 2013).

Thus, while the individual plays an active role in having basic psychological needs satisfied, the social environment plays a supportive or nonsupportive role in basic need satisfaction, such that when the social environment allows for regular satisfaction of basic psychological needs behaviour will not be directed at need satisfaction per se. It is only when the social environment deprives or thwarts basic psychological need satisfaction that the satisfaction of basic psychological needs will become the aim in itself. Specifically, individuals will seek experiences that satisfy the specific need that is thwarted.

One of the important endeavours that will allow SDT and basic psychological needs theory to develop further, is the rigorous measurement of the constructs involved. Measurement instruments of important constructs in these theories will now be introduced briefly.

Measuring Instruments within the Field of Self-Determination Theory and Basic Psychological Needs Theory

There are various measures aimed at measuring concepts found in SDT. Some of these measures are the General Causality Orientation Scale that measures individuals' enduring motivational orientations, the Aspirations Index that assesses individuals' intrinsic and extrinsic aspirations with reference to wealth, fame, image, personal growth, relationships, community contribution, and health, and the Self-Regulation Questionnaires that assesses the degree to which an individual's preference for a particular behaviour or behavioural domain is autonomous versus controlled (all the aforementioned measures are available on http://www.selfdeterminationtheory.org/questionnaires).

There are also several measures within the context of basic psychological needs theory which aim to measure the satisfaction, dissatisfaction, and thwarting of basic psychological needs in various specific contexts, as well as in domain-general contexts. For example, the Basic

Psychological Needs Scale (BPNS) was developed by Gagné (2003) as a domain-general measure of basic psychological needs satisfaction. Examples of domain-specific measures of basic psychological need satisfaction are the Basic Psychological Needs at Work Scale (Brien et al., 2012) and the Basic Psychological Needs in Exercise Scale (Liu, Chung, & Duan, 2013; Vlachopolous & Michailidou, 2006). Subsequent to research findings by Bartholomew et al. (2011) that need satisfaction and need thwarting constitute different concepts, measures have also been developed to measure basic psychological need thwarting, for example the Psychological Need Thwarting Scale (Bartholomew et al., 2011), and the Psychological Need Thwarting Scale in a Physical Activity (Gunnell, Crocker, Wilson, Mack, & Zumbo, 2013). In addition, other researchers developed measures that tap both need satisfaction and need dissatisfaction. For example, the Balanced Measure of Psychological Needs (Sheldon & Hilpert, 2012) that measures basic psychological needs in terms of both need satisfaction and need dissatisfaction in a general context.

It is important that measurement instruments aimed at measuring psychological phenomena, such as the instruments mentioned above, are validated to determine their psychometric properties and their utility for the contexts in which they will be used. When measures are valid and reliable for the context in which they will be used these measures can, for example, be used to evaluate, plan, and focus interventions aimed at improving the phenomena that they measure. The study that will be reported in this dissertation focused on determining the psychometric properties of the BPNS and its applicability in a South African student group. The process of scale validation will now be briefly introduced.

Scale Validation

When measures are validated it enables us to test theory (e.g., determining if the factor structure suggested by the theory is indeed valid), and to add to the existing body of scientific knowledge, for example by determining how the constructs measured by a specific measure operate in different cultures or groups of people. Validated measures also contribute to the integrity of our research. If we are not sure that a measure indeed measures what it claims to measure, that it delivers consistent results, and that it is valid for the relevant population that is researched we cannot rely on the results obtained from these measures to make valid conclusions about the constructs or the phenomena that we measure, and the results cannot be reliably used to evaluate, plan and focus interventions. When using measures we therefore need to consider whether a measure is reliable, valid, and fair.

Reliability

Reliability refers to the consistency with which a measure delivers the same result when the phenomenon that is measured does not change (Engel & Schutt, 2014), that is the consistency with which a measure measures the phenomenon that it claims to measure (Foxcroft & Roodt, 2009; Moerdyk, 2009). Reliability is a prerequisite for the validity of a measure (Engel & Schutt, 2014). If a measure gives inconsistent results we cannot attach any value to the results obtained from it and as such we cannot make conclusions about the phenomenon that we want to measure (Gravetter & Forzano, 2009). Reliable measures are also less affected by random error and chance variation (Engel & Schutt, 2014).

There are various forms of reliability of a measure, for example test-retest reliability, internal consistency reliability, alternate forms reliability, interrater reliability and intrarater

reliability (Engel & Schutt, 2014; Foxcroft & Roodt, 2009; Moerdyk, 2009). These will now be briefly introduced.

Test-retest reliability. When a measure yields similar results when it is applied to the same group of people on different occasions it shows test-retest reliability (Moerdyk, 2009). Test-retest reliability refers to the extent that the scores on a measure, taken at different time points, correlate when the phenomenon measured does not change (Engel & Schutt, 2014). Test-retest reliability also refers to a measure's stability over time, and the statistic derived from this correlation is called a coefficient of stability (Moerdyk, 2009).

Internal consistency reliability. Internal consistency reliability means that all parts of a measurement instrument measures the same phenomenon, and not also properties that it is not supposed to measure (Moerdyk, 2009). Internal consistency reliability is determined by correlating the different parts of a measure with each other (Moerdyk, 2009). When the different parts correlate highly it is indicative of internal consistency reliability, meaning that the measurement instrument measures the same aspect or phenomena, while low correlations suggest that the different parts of the measurement instrument measures different aspects or phenomena (Moerdyk, 2009). The statistic derived from this correlation is called a coefficient of internal consistency (Moerdyk, 2009).

The split-half method is one way to determine internal consistency reliability and involves splitting the measure in half and correlating the two halves with each other (Engel & Schutt, 2014; Moerdyk, 2009). The Cronbach's alpha is another statistic of internal consistency and refers to the average score of all the possible split-half combination scores (Engel & Schutt, 2014). Cronbach's alpha values higher than .70 are generally deemed acceptable (Moerdyk, 2009).

Alternate forms reliability. Alternate forms reliability is obtained when slightly different versions of the same measure are administered to the same group, and the scores on the measures correlate strongly (Engel & Schutt, 2014; Moerdyk, 2009). This correlation is called a coefficient of equivalence (Moerdyk, 2009).

Interrater reliability. Inter-rater reliability refers to the extent that the ratings of two or more raters correlate (Foxcroft & Roodt, 2009; Moerdyk, 2009). This correlation is expressed as an inter-scorer reliability coefficient (Foxcroft & Roodt, 2009). The higher the correlation, the greater the confidence that the ratings are indeed reflective of the phenomenon being measured, and not the views of the raters (Engel & Schutt, 2014).

Intrarater reliability. Intra-rater reliability means that the same rater assesses the same phenomenon on more than one time point (Engel & Schutt, 2014), and refers to the consistency with which a single rater rates the scores on a scale (Foxcroft & Roodt, 2009). This correlation is expressed as an intra-scorer reliability coefficient (Foxcroft & Roodt, 2009).

Validity

Validity refers to the extent that a measure measures the phenomenon that it claims to measure (Moerdyk, 2009), and how well it measures that phenomenon (Foxcroft & Roodt, 2009). It further refers to how closely a measure of a phenomenon is related to other valid measures of a phenomenon and the known or supposed correlates of that phenomenon, while it is unrelated to other phenomena or correlates of other phenomena (Engel & Schutt, 2014).

There are various techniques to determine the validity of a measure, for example face validity, content validity, and construct (theoretical) validity (Engel & Schutt, 2014; Moerdyk, 2009). Each of these will now be briefly introduced.

Face validity. A measure has face validity when on inspection of the measure it relates more to the phenomenon that it intends to measure than to other phenomena (Engel & Schutt, 2014), that is when the items of the measure seem to be appropriate for measuring the specific phenomenon that the measure intends to measure (Moerdyk, 2009). Face validity on its own is not sufficient indication of validity, as it lacks empirical support (Engel & Schutt, 2014).

Content validity. A measure has content validity when it captures the full range of the meaning of the phenomena that it intends to measure (Engel & Schutt, 2014), that is, when the measure accurately reflects the content of the phenomena that it intends to measure (Moerdyk, 2009). The meaning range of a phenomenon is determined by expert opinion and literature reviews (Engel & Schutt, 2014; Moerdyk, 2009). Content validity also lacks empirical support since expert opinions on whether the content of a phenomenon is fully captured by a measure may differ (Engel & Scutt, 2014).

Construct (theoretical) validity. A measure has construct validity when "it behaves as it should relative to other constructs in the theory" (Engel & Schutt, 2014, p. 70), that is when it produces results consistent with what we know theoretically (Moerdyk, 2009). Construct validity uses a deductive approach and hypothesises that there are relationships among certain constructs (Engel & Schutt, 2014).

There are different types of construct validity, for example convergent validity, discriminant validity and factorial validity (Moerdyk, 2009). Convergent validity means that the results obtained from a measure correlate with the results obtained from another similar measure and with the results obtained from measures that are theoretically linked to the measure (Moerdyk 2009). A measure shows discriminant validity when the measure does not correlate with measures that it is not supposed to correlate with (Moerdyk, 2009). Factorial validity refers

to the underlying factor structure of a measure (Foxcroft & Roodt, 2009), and means that a measure is theoretically sound, that is that the factor structure of the measure is in accordance with the underlying theory and similar to that of other measures that measure the same construct (Moerdyk, 2009). Factorial validity is determined by factor analysis, that is an analysis of the interrelationships among variables by identifying the common variance between the variables (Foxcroft & Roodt, 2009). Factor analysis is used to determine the factor structure of a measure and to identify subscales (Foxcroft & Roodt, 2009). A distinction can be made between exploratory and confirmatory factor analysis (Moerdyk, 2009). With exploratory factor analysis the aim is to determine the optimal factor structure that underlies the data (i.e., determining how many factors the measure consists of) while confirmatory factor analysis aims to confirm whether the data is compatible with a certain factor structure (i.e., determining if the measure indeed consists of, for example, three factors; Moerdyk, 2009).

Fairness in the Cross-Cultural use of Measurement Instruments

Even though a measure was found to be valid and reliable in one context, it does not necessarily mean that the measure is also valid and reliable in other contexts or for other populations. Concepts that are known to one culture may be foreign to another, or the meaning of concepts may differ from culture to culture. As such scale items may operate differently across different groups (De Kock, Kanjee, & Roodt, 2013) which may result in item bias. It is therefore essential that measures are validated for the populations for which they will be used (Stevelink & Van Brakel, 2013). This ensures fairness in assessment as the risk of bias associated with using unfamiliar concepts or having to answer questions in a different language is reduced (De Kock et al., 2013; Foxcroft & Roodt, 2009).

As mentioned above, it is important to show that measurement instruments are reliable, valid and culturally fair when they are used in different contexts. In fact, the use of a scale in each new context and population requires an exploration of the scale's psychometric properties in that context. Scale validation is a process that often spans several studies and a single study rarely addresses all aspects of scale validation. In this study, the focus falls on the internal consistency reliability and the construct validity of the Basic Psychological Needs Scale (Gagné, 2003) in a South African student context.

Conclusion

As indicated above, the satisfaction of all three basic psychological needs are associated with growth and optimal functioning, while need dissatisfaction and need thwarting are associated with maladaptive and compensatory behavioural patterns. In addition, if the extent to which an individual's basic psychological needs are (dis)satisfied is known, we can plan, focus, and evaluate interventions aimed at psychological need satisfaction. In order to study the associations between psychological needs and well-being and ill-being and to investigate interventions targeting psychological need satisfaction, valid and reliable measurement of the constructs in the context where it is applied is imperative. The Basic Psychological Needs Scale (BPNS, Gagné, 2003) is a scale that attempts to measure basic psychological need satisfaction. The validity of this scale has not yet been assessed in a South African context. The present study will fill this gap and focus on validating the BPNS in a South African student sample by investigating the internal consistency reliability and the construct validity of the scale.

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Chapter 2

Manuscript Guidelines and Manuscript

Chapter 2

Manuscript in Article Format

This dissertation is conducted in article format as indicated in the 2015 General Academic Rules (A4.1.1.1.4 and A4.4.2.9) of the North-West University. The manuscript and article style is prepared according to the requirements of the specific journal, *Journal of Psychology in Africa*, to which it will be submitted. Some exceptions are made for purposes of the dissertation, which includes the numbering of pages and the use of the font type, Times New Roman, in tables and figures instead of the font type, Helvetica text, for the sake of uniformity. The article will be shortened before submission for publication.

Guidelines to Authors for the *Journal of Psychology in Africa*

Manuscripts. Manuscripts should be submitted in English. The manuscripts should be typewritten and double-spaced, with wide margins, using one side of the page only. Manuscripts should conform to the publication guidelines of the latest edition of the American Psychological Association (APA) publication manual of instructions for authors.

Manuscript format. All pages must be numbered consecutively, including those containing the references, tables and figures. The typescript of a manuscript should be arranged as follows:

Title. This should be brief, sufficiently informative for retrieval by automatic searching techniques and should contain important key-words (preferably <13 words).

Author(s) and Address(es) of author(s). The corresponding author must be indicated. The author's respective addresses where the work was done must be indicated. An e-mail address, telephone number and fax number for the corresponding author must be provided.

Abstract. Articles and abstracts must be in English. Submission of abstracts translated to French, Portuguese and/ or Spanish is encouraged. For data-based contributions, the abstract should be structured as follows: *Objective* - the primary purpose of the paper, *Method* - data source, participants, design, measures, data analysis, *Results* - key findings, implications, future directions and *Conclusions* - in relation to the research questions and theory development. For all other contributions (except editorials, book reviews, special announcements) the abstract must be a concise statement of the content of the paper. Abstracts must not exceed 150 words. The statement of the abstract should summarise the information presented in the paper but should not include references.

Text. Do not align text using spaces or tabs in references: (1) Use one of the following: (a) use CTRL-T in Word 2007 to generate a hanging indent; or (b) MS Word allows author to define a style (e.g., reference) that will create the correct formatting; (2) Per APA guide-lines, only one space should follow any punctuation; (3) Do not insert spaces at the beginning or end of paragraphs; (4) Do not use colour in text.

Tables. Tables should be either included at the end of the manuscript or as a separate file. Indicate the correct placement by indicating the insertion point in brackets, e.g., <Inset Table 1 approximately here>. Tables should be provided as either tab-delimited text or as a MS Word table (one item/cell). Font for tables should be Helvetica text to maintain consistency.

Figures/Graphs/Photos. Figures, graphs and photos should be provided in graphic format (either JPG or TIF) with a separate file for each figure, graph or photo. Indicate the correct placement by indicating the insertion point in brackets e.g., <Inset Figure 1 approximately here>. Provide the title for the item and any notes that should appear at bottom of item in the manuscript text. Items should be cropped to avoid the appearance of superfluous

white space around items. Text on figures and graphs should be Helvetica to maintain consistency. Figures must not repeat data presented in the text or tables. Figures should be planned to appear to a maximum final width of either 80 or 175mm. (3.5 or 7.0"). Complicated symbols or patterns must be avoided. Graphs and histograms should preferably be two-dimensional and scale marks provided. All lines should be black but not too heavy or thick (including boxes). Colour only in photos or colour sensitive graphic illustrations.

Validation of the Basic Psychological Needs Scale in a South African student group

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Abstract

Objective: The aim of this study was to validate the English version of the Basic Psychological Needs Scale (BPNS) with subscales Autonomy, Competence, and Relatedness in a South African student sample.

Method: The participants were a non-probability sample of 322 students from a South African university. Confirmatory factor analysis was used to determine the factor structure of the scale.

Results: Neither a one-factor nor a three-factor model fitted the original 21-item scale. After problematic items were removed a 17-item BPNS with a negative-worded method effect fitted the data best, but the fit was still only marginal. Although the 17-item scale exhibited good criterion-related validity, the internal consistency reliability remained low.

Conclusions: The BPNS had limited application in a South African student sample as a domain general measure of basic need satisfaction. Questions are raised regarding the extent to which the scale taps the construct under study.

Keywords: Basic psychological needs, self-determination theory, factor structure, internal consistency reliability, criterion-related validity, scale validation, psychometric properties

Validation of the Basic Psychological Needs Scale in a South African Student Group

The last few years there has been an increasing interest in what constitutes well-being, with hedonic and eudaimonic well-being as the two umbrella terms that describe psychosocial well-being. Hedonic well-being is associated with experiencing enjoyment and life satisfaction (Diener, 1984; Waterman, 1993), contentment and positive affect (Ryff & Singer, 2008), and emotional well-being (Keyes, 2002), that is outcomes associated with experiencing pleasure (Kahneman, Diener, & Schwarz, 1999), positive affect (Diener, 1984), and the absence of emotional pain (Ryan, Huta, & Deci, 2008). Eudaimonic well-being is associated with self-realisation and personal expressiveness (Waterman, 1993), a combination of social and psychological well-being (Keyes, 2000), and being fully functional and succeeding in facing life's challenges (Ryff & Singer, 2008), that is the content of an individual's life, the processes that are involved in living well, and the expected outcomes of a life lived well (Ryan et al., 2008).

One theory that fits into the eudaimonic well-being literature is self-determination theory (Deci & Ryan, 2000). Self-determination theory (SDT), a meta-theory of human motivation, addresses issues such as "personality development, self-regulation, universal psychological needs, life goals and aspirations, energy and vitality, non-conscious processes, the relations of culture to motivation, and the impact of social environments on motivation, affect, behaviour, and well-being" (Deci & Ryan, 2008, p. 182). One of the sub-theories of SDT is the basic psychological needs theory according to which growth and optimal functioning take place in an environment that supports psychological need satisfaction, while environments that thwart need satisfaction contribute to ill-being (Deci & Ryan, 2000).

Basic Psychological Needs Theory

SDT discerns three basic psychological needs, namely autonomy, competence, and relatedness. Autonomy refers to the need to feel that one is free to regulate one's own behaviour, rather than being controlled by external sources (Deci & Ryan, 2000). It refers to a sense of personal choice, free will and ownership of one's behaviour (Haivas, Hofmans, & Pepermans, 2014). Competence refers to the need to interact effectively with one's environment, to feel that one is capable of performing tasks of various levels of difficulty (Deci & Ryan, 2000; Haivas et al., 2014). Relatedness refers to the need to feel connected to others, to have close relationships and to feel that one is supported by and cared for by others (Deci & Ryan, 2000; Ryan et al., 2008; Haivas et al., 2014).

A psychological need is identified by observing the effects that its satisfaction or thwarting has on growth and well-being (Deci & Ryan, 2000). A psychological need is therefore a need which, when satisfied, results in positive psychological outcomes, while thwarting of the need will result in negative psychological outcomes (Deci & Ryan, 2000). When these psychological needs are satisfied it leads to effective functioning and optimal development (Deci & Ryan, 2000). According to the basic psychological needs theory, all three psychological needs must be satisfied to attain psychological well-being. When one or more of these needs are thwarted or neglected it leads to non-optimal functioning and compensatory behaviour patterns (Deci & Ryan, 2000).

According to the theory, basic psychological needs are universal across cultures (Deci & Ryan, 2000). As such the outcomes associated with both need satisfaction and need thwarting will replicate across cultures (Deci & Ryan, 2000, 2008). Support for this claim of SDT was found by Chen et al. (2014) who found that in both individualistic and collectivist cultures

individuals derived benefit when their basic psychological needs were satisfied and suffered ill-being when basic need satisfaction was thwarted. This was the result even when individuals did not value the satisfaction of their basic psychological needs, nor desired to have their basic psychological needs satisfied.

Measuring Basic Psychological Needs: The Basic Psychological Needs Scale (BPNS)

In order for science to grow in our understanding of basic psychological needs, its concomitants and the effects of interventions aimed at increasing the satisfaction thereof, also cross-culturally, rigorous measurement of the construct is imperative. The importance of valid and reliable measures of basic psychological need satisfaction cannot be overstated. Validated measures have the benefit that they allow us to test theory, that we have a measure that validly and reliably measures what it claims to measure, and that they can be used as a reliable basis to evaluate, plan and focus interventions, for example once it is determined that a person's needs are not sufficiently satisfied, an intervention can be planned. However, instruments validated in one context are not necessarily valid and reliable in other contexts. Therefore, another important aspect to consider is cross-cultural validation of measures. Measuring instruments cannot be directly applied to different cultures as the meaning of concepts may differ from culture to culture, and items may therefore function differently for different groups (De Kock, Kanjee, & Roodt, 2013). Direct translation of measures also poses challenges since some concepts may not be known to another culture which may result in item bias. It is therefore of utmost importance to ensure that the measure is valid for each group in which it is applied (Stevelink & Van Brakel, 2013). This contributes to fairness in assessment as it reduces the risk of bias when a person is assessed on a measure using unfamiliar concepts or a different language (De Kock et al., 2013; Foxcroft & Roodt, 2009).

One attempt to measure basic psychological needs is the Basic Psychological Needs Scale (BPNS), also known as the Basic Needs Satisfaction in General Scale, which has been adapted from the Basic Needs Satisfaction at Work Scale (BNSW-S) by Gagné (2003). The BNSW-S measures need satisfaction in a work context, while the BPNS measures general need satisfaction. When developing the BPNS, Gagné (2003) modified the items of the BNSW-S to be more suitable to a general context, for example, "Most days I feel a sense of accomplishment from working" (BNSW-S) has been adapted to read "Most days I feel a sense of accomplishment from what I do" (BPNS).

Multiple studies used the BPNS since its development (e.g., Costa, Ntoumanis, & Bartholomew, 2015; Gagné; 2003; Meyer, Enström, Harstveit, Bowles, & Beevers, 2007; Niemiec, Ryan, & Deci, 2009; Schiffrin et al., 2014). However, the psychometric properties of neither the BNSW-S, nor the psychometric properties of the BPNS have been factorially explored in the initial studies where the scales were used, although reliability coefficients and subscale correlations were reported (Johnston & Finney, 2010).

Johnston and Finney (2010) addressed the lack of validation studies on the BPNS by validating the scale in three American student samples. Certain items were found not to have much utility, or to be area misfits. For certain items there were also large standardised residuals and unexplained variance and a negatively worded method effect was detected. A method effect occurs when the characteristics of the measurement process or the measuring instrument accounts for variance in scores over and above that accounted for by the construct that is measured (Maul, 2013). A negatively worded method effect therefore means that negatively worded items contribute to variance in scores that are not only explained by the constructs that are measured, but also by the effect of their negative wording (Johnston & Finney, 2010). After

removing items that were statistically and substantively problematic, they found support for a 16-item three-factor model (items 16, 14, 11, 20 and 4) with a negatively worded method effect using a series of confirmatory factor analyses. The factors exhibited positive factor correlations. Although support for the factor structure of this modified scale was confirmed across the three samples in Johnston and Finney's study (2010), other psychometric properties were still problematic. Specifically, only the relatedness subscale had acceptable reliability (α's between .78 and .82), while the autonomy and competence subscales had low reliability scores (α's between .60 and .68 and between .55 and .62, respectively). A large proportion of the variance of the need for competence items was explained by the negatively worded method effect and not by the competence factor. Generally, the psychometric properties of the original 21-item BPNS were not ideal due to low reliabilities and large amounts of variance that were not accounted for by the substantive factors. Evidence was found for external validity, where the distinctiveness of the three psychological needs was supported by differential relationships between measures of well-being and worry for the three needs respectively. Johnston and Finney (2010) suggest that future research should focus on replicating the study in independent samples to determine if the area misfits replicate in different populations as these misfits may have been due to the distinctive characteristics of the specific samples they have used. They further suggest that, if low factor pattern coefficients and the resultant inadequate reliability coefficients replicate, then items may have to be refined or new items created to increase the reliability of the measure.

Sheldon and Hilpert (2012) also investigated the psychometric properties of the 21-item BPNS as well as the 16-item BPNS suggested by Johnston and Finney (2010) in an American student sample. According to RMSEA (0.064 for the 21-item BPNS, 0.072 for the 16-item BPNS) and CFI scores (.911 for the 21-item BPNS, .915 for the 16-item BPNS) both the 21-item

BPNS and the 16-item BPNS had only reasonable model fit. In their sample the 21-item BPNS had Cronbach's alpha values of .68 (Autonomy), .75 (Competence), and .84 (Relatedness). No Cronbach's alphas were reported for the 16- item BPNS, probably because the aim of their study was to compare the Balanced Measure of Psychological Needs (BMPN) with the original BPNS. Sheldon and Hilpert (2012) suggested the BMPN as an alternative measure of psychological needs. The BMPN is a measure that measures each of the basic psychological needs in terms of three positively worded items (measuring need satisfaction) and three negatively worded items (measuring need dissatisfaction). The BMPN showed good model fit (RMSEA = 0.039, CFI = .974) and Cronbach's alpha values of .78 (Autonomy), .79 (Competence), and .78 (Relatedness).

As far as we could establish, the validity of the scale has not yet been studied in a South African context and the present study will address this gap, while, at the same time, investigating whether Johnston and Finney's (2010) results replicate in another context.

The Present Study

As pointed out by Johnston and Finney (2010), more studies are needed to examine whether their findings replicate in other contexts. In addition, the validity of the BPNS has never been explored in a South African context as far as we are aware.

In order to address these gaps, the aim of this study was to investigate the psychometric properties of the English version of the BPNS in a South African student context, by exploring the validity and reliability of the scale. The objectives were to investigate: (a) the factorial validity of the BPNS; (b) the internal consistency reliability of the BPNS; and (c) the criterion-related validity of the BPNS within a South African student context.

Based on the findings of Johnston and Finney (2010) we formulated the following hypotheses that were tested to address the stipulated objectives: (a) Hypothesis 1. In terms of the

factorial validity of the BPNS, we did not expect the original three-factor, 21-item scale to fit the data well. Instead, a three-factor shortened scale comprising 16 items (items 16, 14, 11, 20 and 4 removed) with a negatively worded method effect was expected to fit the data well, as found by Johnston and Finney (2010); (b) Hypothesis 2. Regarding internal consistency reliability, the BPNS and its subscales were expected to have insufficient internal consistency reliability, with only the relatedness subscale having sufficient reliability, and the autonomy and competence subscales having low reliabilities; and (c) Hypothesis 3. Regarding the criterion-related validity of the BPNS we expected that the BPNS total score and the subscale scores would have medium to high positive correlations with scores on other measures of well-being (the Mental Health Continuum – Short Form [MHC-SF]; the Satisfaction with Life Scale [SWLS]; the Questionnaire for Eudaimonic Well-Being [QEWB]; and the Meaning in Life Questionnaire – Presence subscale [MLQ-P]), a negligible correlation with scores on the Meaning in Life Questionnaire – Search subscale (MLQ-S), and a negative correlation with scores on an indicator of ill-being (the Patient Health Questionnaire-9 [PHQ-9]).

This study will contribute to the body of knowledge on basic psychological needs and its operationalisation by the BPNS by providing information on the psychometric properties of the English version of the BPNS and by enhancing our understanding of how autonomy, competence, and relatedness operate in a South African student sample.

Method

Design and Participants

This study implemented a quantitative, cross-sectional survey design, where each participant completed a battery of quantitative measurement scales at a single time point. The participants included a nonprobability sample of 322 students (male = 79, female = 240, three

unspecified). Three participants were excluded from the original sample (which contained 325 participants) because they completed less than half of the BPNS. Participants were from multiple campuses of a South African university. The participants were between 18 and 54 years of age (mean = 21.04; *SD* = 4.12, three participants did not answer) and were in different years of study (first year = 28%, second year = 57%, third year = 12%, fourth year/honours = 2%, and post-graduate = 1%, 1 % did not answer). The participants were students in different fields of study (Education = 5%, Human and Social Science or Art = 58%, Law = 2%, Natural Sciences, Enigneering, Agriculture, or Technology = 3%, Economic and Management Sciences = 6%, Health Sciences = 18%, Theology = 3%, 6% did not answer) The participants indicated different languages as native language (English = 18%, Setswana = 18%, Afrikaans = 7%, Other = 55%, 1% did not answer). Those participants who indicated "other" as native language are likely to speak one of the 11 official languages of South-Africa. All participants completed the research battery in English. Although many participants did not indicate English as native language, it was assumed that all participants would be sufficiently fluent in English to complete the questionnaire, since English is the medium of tuition on the campuses of the university where the majority of the respondents studied. A portion of the participants (26%) studied on a campus of the university where English is not the primary medium of tuition (at this campus translation services to English are available to all students), but at this campus only participants who indicated that English was their native language were included in the study.

Measuring Instruments

The following measurement scales that measure different aspects of well-being were used to determine the convergent validity of the BPNS: The Mental Health Continuum – Short Form (MHC-SF); the Satisfaction with Life Scale (SWLS); the Meaning in Life Questionnaire (MLQ)

– Presence subscale; and the Questionnaire for Eudaimonic Well-being (QEWB). To determine the discriminant validity of the BPNS the MLQ – Search subscale and the Patient Health Questionnaire - 9 (PHQ-9) were used. Each of the scales used in the study will now be briefly introduced.

The Basic Psychological Needs Scale (BPNS). This 21-item measure was adapted by Gagné (2003) and measures the satisfaction of basic psychological needs in a general context. The measure consists of three subscales measuring autonomy (7 items), competence (6 items), and relatedness (8 items) on a 7-point Likert-type scale, ranging from 1 (*not true at all*) to 7 (*very true*). Examples of items from each of the subscales are: "I feel like I am free to decide for myself how to live my life" (Autonomy); "Often, I do not feel very competent" (Competence, reversed phrased); and "I really like the people I interact with" (Relatedness). Some items are positively worded, while others are negatively worded**.** Researchers have scored the measure by either calculating a total score of need satisfaction (Meyer et al., 2007), or by calculating individual scores for each of the subscales (Johnston & Finney, 2010). In the initial study where the scale was used, the Cronbach's alpha values of this scale as reported by Gagné (2003) were.69 for the Autonomy subscale, .71 for the Competence subscale, and .86 for the Relatedness subscale, while the total scale had a Cronbach's alpha value of .88.

The Mental Health Continuum-SF (MHC-SF). The MHC-SF (Keyes, 2002; Lamers, Westerhof, Bohlmeijer, ten Klooster, & Keyes, 2011) consists of 14 items and measures positive mental health in terms of three subscales, namely Emotional Well-being (EWB, items 1-3), Social Well-being (SWB, items 4-8), and Psychological Well-being (PWB, items 9-14) on a 6-point Likert-type scale ranging from 0 (*never*) to 5 (*every day*). Examples of items for each of the subscales are: "In the past month how often did you feel happy" (EWB); "In the past month how

often did you feel that you had something important to contribute to society" (SWB); and "In the past month how often did you feel that you liked most parts of your personality" (PWB). All items are positively worded. Subscale scores are calculated by adding the scores on items that constitute a subscale, and a total score between 0 and 70 is calculated to give an indication of overall positive mental health. Lamers et al. (2011) reported Cronbach's alpha values of .89 for the total MHC-SF, $\alpha = .83$ for the EWB subscale, $\alpha = .74$ for the SWB subscale, and $\alpha = .83$ for the PWB subscale within a Dutch sample who completed the Dutch version of the MHC-SF. In South Africa Keyes, Wissing, Potgieter, Temane, Kruger, and Van Rooy (2008) explored the validity of the Setswana version of the MHC-SF and found marginal support for the three-factor model, with Cronbach's alpha values of .74 for the total MHC-SF, .73 for the EWB subscale, .59 for the SWB subscale, and .67 for the PWB subscale in a Setswana speaking sample. Cronbach's alpha values for the MHC-SF for our sample were .77 (EWB), .72 (SWB), and .79 (PWB).

The Satisfaction with Life Scale (SWLS). The Satisfaction with Life Scale (Diener, Emmons, Larson, & Griffen, 1985) measures the cognitive component of subjective well-being. It constitutes a global judgment of a person's satisfaction with life as a whole. Satisfaction with life is measured on a 7-point Likert-type scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). The measure consists of 5 items. An example of an item from the scale is: "In most ways, my life is close to my ideal". The items are positively worded and added together to form a total score which can be between 5 and 35. Diener et al. (1985) report a test-retest reliability score of .82 and sufficient internal consistency reliability ($\alpha = .87$). In South Africa Wissing and Van Eeden (2002) found support for a unidimensional factor structure with sufficient internal consistency reliability, with Cronbach's alpha values of .70 for young adults (18-35 years of

age), .83 for middle adults (36-64 years of age), and .85 for older adults (65 years and older). The Cronbach's alpha value for the SWLS for our sample was .73.

The Meaning in Life Questionnaire (MLQ). The Meaning in Life Questionnaire (Steger, Frazier, Oishi, & Kaler, 2006) measures meaning in life in terms of two dimensions, namely presence of meaning and search for meaning. The Presence of Meaning subscale (MLQ-P) measures the respondent's subjective experience of how meaningful his or her life is, while the Search for Meaning subscale (MLQ-S) measures a person's motivation and approach to find meaning or to obtain a better understanding of meaning in his or her life. Presence of and search for meaning are each measured in terms of 5 items on a Likert-type scale ranging from 1 (*absolutely untrue*) to 7 (*absolutely true*), constituting a total of 10 items in the MLQ. Examples of items from the subscales are the following: "I understand my life's meaning" (MLQ-P) and "I am looking for something that makes my life feel meaningful" (MLQ-S). Except for one MLQ-P item (item 9) that is negatively worded and also inversely scored, all other items are positively worded and positively scored. The MLQ-P and the MLQ-S were designed to be relatively independent subscales with scale items selected such that items loading highly on the MLQ-P would have minimal loading on the MLQ-S and *vice versa* (Steger et al., 2006). Each subscale is therefore independently scored as each subscale measures a different aspect of meaning, i.e. the presence of meaning or the search for meaning. Steger et al. (2006) report Cronbach's alpha values between .82 and .86 for the MLQ-P and between .86 and .87 for the MLQ-S on American student samples, and a two-factor structure as well as convergent and discriminant validity of both subscales were supported by the data. In South Africa Temane, Khumalo, and Wissing (2014) found support for the two-factor structure of the MLQ, and reported satisfactory internal

consistency reliability scores with α = .85 for the MLQ-P and α = .84 for the MLQ-S. The Cronbach's alpha values of the MLQ for our sample were .85 (MLQ-P) and .85 (MLQ-S).

The Questionnaire for Eudaimonic Well-being (QEWB). The Questionnaire for Eudaimonic Well-being (Waterman et al., 2010) is a 21-item questionnaire that measures eudaimonic well-being as conceptualised by Waterman et al. (2010) on a 7-point Likert-type scale, ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). An example of an item from the scale is "I find I get intensely involved in many of the things I do each day". Seven items are reverse-scored. The items are then summed to obtain a total score. Using parcelling, Waterman et al. (2010) found support for the unifactorial structure of the QEWB and reported sufficient reliability scores with α = .86, as well as convergent, discriminant, construct, and incremental validity. In South Africa Schutte, Wissing, and Khumalo (2013) did not find support for the unidimensional structure of the measure and instead found the measure to be multi-dimensional with good convergent and divergent validity. They questioned the parcelling approach used by Waterman et al. (2010) to show the scale's unidimensionality, and argued that the crucial assumption of unidimensionality within parcels may not have held. Schutte et al. (2013) found support for a three-factor solution of the QEWB, with the factors labeled as Sense of Purpose (α =.77), Purposeful Personal Expressiveness (α = .73), and Effortful Engagement (α = .61), as well as for a four-factor solution, with the factors labelled as Sense of Purpose (α = .77), Engagement in Rewarding Activities (α = .51), Living from Beliefs (α = .71), and Effortful Engagement (α = .61). Schutte et al. (2013) suggested that although more variance was explained by the four-factor solution, the three-factor solution should be used for the sake of parsimony. The three factors obtained by Schutte et al. (2013) will be used as subscales in the present study and subscale as well as total scores will be calculated. The Cronbach's alpha values of the QEWB for

our sample are .77 (QEWB – Sense of Purpose), .72 (QEWB - Purposeful Personal Expressiveness), and .62 (QEWB – Effortful Engagement).

The Patient Health Questionnaire - 9 (PHQ-9). The Patient Health Questionnaire-9 (Kroenke, Spitzer, & Williams, 2001) is used to diagnose depressive disorders in terms of the nine criteria as set out in the DSM-IV. Items 1 to 9 measure the symptoms of depressive disorders over the past two weeks on a 4-point Likert-type scale ranging from 0 (*not at all*) to 3 (*nearly every day*), and item 10 measures the level of interference of depressive symptoms with the respondent's daily functioning on a 4-point Likert-type scale with response categories 0 (*not so difficult at all*), 1 (*somewhat difficult*), 2 (*very difficult*), and 3 (*extremely difficult*). An example of an item measuring depressive symptoms is "Over the last two weeks, how often have you been bothered by any of the following problems: little interest/pleasure in doing things". Item 10 reads "if you have checked options 1 (*several days*), 2 (*more than half of the days*), or 3 (*nearly every day*) in any of the questions above, how difficult have these problems made it for you to do your work, take care of things at home or get along with other people?" Item scores for items 1 to 9 are summed to obtain a total score, which can range between 0 and 27. Kroenke et al. (2001) report internal consistency reliability scores of $\alpha = .86$ (for a patient sample in primary care) and $\alpha = .89$ (for an obstetrics-gynecology patient sample), and test-retest reliability, as well as criterion, construct, and external validity. Botha (2011) showed the validity and reliability ($\alpha = .86$) of the English version of the PHQ-9 in a multicultural South African sample. The Cronbach's alpha value of the PHQ-9 for our sample is .82.

Procedure and Ethical Considerations

This study forms part of the FORT 3 umbrella project (FORT 3 = The prevalence of psychosocial health: dynamics and relationships with biomarkers of (ill)health in South African

social contexts; Wissing, 2008, 2012) which was approved by the Ethics Committee of the North-West University, South Africa, with project number: NWU 00002-07-A2. Permission was obtained from their authors to use the questionnaires. Lecturers who were not involved as researchers in the present study acted as mediators and invited the students in their classes to participate in the study. Trained fieldworkers obtained written informed consent and collected the data under the supervision of the researchers. Participation was completely voluntary, and participants were free to withdraw from the study at any stage without any negative consequences whatsoever. All responses were handled anonymously. No incentives were offered for participation in the study. Debriefing was offered for any participant who indicated a need for it and references to relevant professionals were available if necessary.

Data Analysis

The data was analysed in four stages. In stage 1 the descriptive statistics of the items were generated. In stage 2 we investigated the construct validity and factor structure of the BPNS. In stage 3 we explored the internal consistency reliability of the BPNS, and in stage 4 we investigated the convergent and discriminant validity of the BPNS. The analyses conducted in each stage will now be introduced.

Stage 1: Descriptive statistics of individual items. The descriptive statistics (means, standard deviations, skewness, and kurtosis) for all the items of the BPNS were generated using IBM SPSS Statistics 22.

Stage 2: Construct validity and factor structure. The factor structure of the BPNS was determined using confirmatory factor analysis. The statistical program, Mplus Version 7.3 (Muthén & Muthén, 1998-2014), was used to achieve this goal. The robust maximum likelihood (MLR) estimator was used and missing data was handled by using full information maximum

likelihood estimation. Areas of local misfit was indicated by high modification indexes (MI's) and nonsignificant factor loadings.

To determine the credibility of theoretical models that may explain inter-correlations among variables, structural equation modelling was used (Hu & Bentler, 1999). Confirmatory factor analysis is a form of structural equation modelling where the measurement model, that is the proposed structure of a measure or theory, is assessed (Byrne, 2012). Various fit indices can be used to assess the fit of the data to the model. The χ^2 goodness-of-fit statistic measures the difference between the observed covariance matrix (unrestricted sample covariance matrix) and the restricted covariance matrix of the theoretical model (Byrne, 2012; Hu & Bentler, 1999). Because the result of the χ^2 is affected by sample size, other fit indexes are used in addition to the χ^2-statistic (Hu & Bentler, 1999). Absolute fit indexes measure the extent to which the a priori model replicates the sample data without comparison to a reference model to measure the increment in model fit, while incremental fit indexes indicate the proportionate improvement in fit by comparing the hypothesised or target model with a more restricted nested baseline model (Byrne, 2012; Hu & Bentler, 1999). The standardised root mean square residual (SRMR) and the root mean square error of approximation (RMSEA) are absolute fit indexes (Hu & Bentler, 1999) and have the following cut-off points: values < 0.05 are indicative of a good model fit for SRMR and RMSEA, while values < 0.08 are indicative of a reasonable model fit for RMSEA (Byrne, 2012). The Tucker-Lewis Index (TLI) and the comparative fit index (CFI) are incremental fit indexes (Hu & Bentler, 1999). Although values above 0.90 were previously regarded as representing a good fit for data, values above 0.95 are now regarded as indicative of a good model fit (Byrne, 2012; Hu & Bentler, 1999).

Stage 3: Internal consistency reliability. Internal consistency reliability indicators, i.e. Cronbach's alpha coefficients and corrected item-total correlations for the BPNS and its subscales were calculated using IBM SPSS Statistics 22. The internal consistency reliability of a measure is used to determine if all parts of the measure measures a single phenomenon or whether they measure more than one phenomenon (Moerdyk, 2009).

Cronbach's alpha is indicative of the average of all the correlations between the items of a measure (Moerdyk, 2009). Cronbach's alpha values above .70 are generally indicative of acceptable internal consistency reliability (Moerdyk, 2009). Corrected item-total correlations indicate how the score of each item is correlated with the total score (with the total score excluding score of the particular item; Moerdyk, 2009). Corrected item-total correlation values below about .40 are low and these items should be omitted or modified (Moerdyk, 2009).

Stage 4: Convergent and discriminant validity. To establish convergent and discriminant validity the correlational patterns between the BPNS and the MHC-SF, SWLS, QEWB, MLQ, and the PHQ-9 were observed using SPSS. Except for the QEWB for which the total scale, as well as the subscales as determined by Schutte et al. (2013), was used, the originally intended subscales of all measures will be used. Convergent validity means that a measure has high correlations with scores on other scales with which it should correlate theoretically, while discriminant validity means that a measure has low correlations with scores on scales with which it is not theoretically expected to correlate (Foxcroft & Roodt, 2009).

Results

Stage 1: Descriptive Statistics of Individual Items

The descriptive statistics (means, standard deviations, skewness, and kurtosis) for the items of the BPNS were calculated. For the BPNS-A (Autonomy), item-level mean scores ranged

between 3.77 (SD = 2.03 for item 4, after scores were reversed) and 5.59 (SD = 1.67 for item 1), for the BPNS-C (Competence) item level mean scores ranged between 4.21 (SD = 1.73 for item 3, after scores were reversed) and 5.27 (SD = 1.73 for item 19, after scores were reversed), and for the BPNS-R (Relatedness) item level mean scores ranged between 4.37 (SD = 1.99 for item 16, after scores were reversed) and 5.83 (SD = 1.40 for item 18, after scores were reversed). Skewness values ranged between -1.17 (item 12) and 0.14 (item 3). Kurtosis values ranged between -1.14 (item 4) and 0.91 (item 12). These values fall within the acceptable range of values (less than 2.00 in absolute value) for skewness and kurtosis (Bandalos & Finney, 2010), indicating that the deviation from normality was not significant.

Stage 2A: Confirmatory Factor Analysis (CFA)

The factor structure of the BPNS was determined using confirmatory factor analysis. Four models were tested based upon the findings of Johnston and Finney (2010), namely: a 21-item one-factor model (Model 1), a 21-item three-factor model without a negatively worded method effect (Model 2), a 21-item three factor model with a negatively worded method effect (Model 3), and the 16-item three-factor model with a negatively worded method effect (Model 4) which Johnston and Finney (2010) found to fit their data adequately. Models 1, 2, and 3 are depicted in Figure 1. The fit indices of these confirmatory factor analyses of the BPNS are presented in Table 1.

<Insert Figure 1 approximately here>

<Insert Table 1 approximately here>

Confirmatory factor analysis revealed that Model 1 did not fit the data well (RMSEA = 0.082, CFI = .628). According to RMSEA scores Model 2 (0.079), Model 3 (0.061), and Model 4 (0.054) revealed only a reasonable fit for the current data. None of the models had a good fit

according to CFI scores (CFI = .655 for Model 2, CFI = .784 for Model 3, and CFI = .869 for Model 4). However, when a negatively worded method effect was considered (Model 3 and Model 4) and problematic items were removed (Model 4) both RMSEA and CFI scores revealed that the model fit improved. Since none of the four models tested based upon the findings of Johnston and Finney (2010) fitted our data well, we decided to explore the areas of local misfit that contributed to insufficient model fit for our data.

Stage 2B: Confirmatory Factor Analysis from an Exploratory Perspective

We expected that Models 1, 2, and 3 might not exhibit good fit, as these models were also found to be problematic by Johnston and Finney (2010) in a comparable sample. Contrary to our expectation Model 4, which had a reasonable fit in the sample of Johnston and Finney (2010), did not fit our data well. We used Model 3 as the basis from which to explore why the model did not fit our data and how the fit for our data could be improved. Model 3 enabled us to determine which of the 21 items of the BPNS were problematic in our sample, while incorporating the negatively worded method effect as a latent factor that accounts for the variance caused by negatively worded items.

The first area of local misfit identified was a high correlation (modification index [MI] = 34.140) between the residuals of item 7 ("I pretty much keep to myself and don't have a lot of social contacts") and item 16 ("There are not many people that I am close to"). The content of item 7 and item 16 clearly overlaps, making one of these relatedness items redundant. Item 7 explains more of the variance (R^2 = .27) than item 16 (R^2 = .20), and have a higher factor loading (.39) on relatedness than item 16 (.34) and we therefore decided to remove item 16. The global fit indexes for Model 5 (with item 16 removed) are indicated in Table 2. The RMSEA (0.062) revealed a reasonable fit, while the CFI (.805) revealed an insufficient fit.

Based on the CFA of Model 5, the second area of local misfit identified was item 14 (MI = 30.917; “People I interact with on daily basis tend to take my feelings into consideration”). The modification index indicated that a better model fit would be obtained if item 14 would also be allowed to load on the Relatedness factor. Item 14 was intended to measure autonomy, but since the item also refers to human interaction, it makes sense that the item could also measure relatedness. We have therefore removed item 14 as it loaded on both autonomy and relatedness. The global fit indexes for Model 6 (with items 16 and 14 removed) are indicated in Table 2. The RMSEA (0.055) revealed a reasonable fit, while the CFI (.844) revealed an insufficient fit.

Based on the CFA of Model 6, the third area of local misfit identified pointed to a high correlation (MI = 25.475) between the residuals of item 4 (“I feel pressured in my life”) and item 18 (“The people I interact with regularly do not seem to like me much”). Although the association between item 4 (intended to measure autonomy) and item 18 (intended to measure relatedness) is not obvious, critical thought catalysed by the high modification index made us realise that item 4 could load on autonomy, competence, and relatedness. One could feel pressured to comply with the standards set by others (autonomy), feel pressured to attain a certain level of performance (competence), or feel pressured in one’s relationships (relatedness). Since item 4 poses the greater threat to model fit because of its potential loading on all three basic psychological needs, we decided to keep item 18 (relatedness) and to remove item 4. The global fit indexes for Model 7 (with items 16, 14, and 4 removed) are indicated in Table 2. The RMSEA (0.52) revealed a reasonable fit, while the CFI (.869) revealed an insufficient fit.

Based on the CFA of Model 7, the fourth area of local misfit identified was a high correlation (MI = 26.042) between the residuals of item 5 (“People I know tell me I am good at what I do”) and item 6 (“I get along with people I come into contact with”). Although item 5 was

designed to measure competence and item 6 was designed to measure relatedness, item 5 also refers to interaction with others. This may explain the high correlation between the residuals of item 5 and item 6. We decided to remove item 5 as it theoretically appears to be associated with both competence (as intended) and relatedness. The global fit indexes for Model 8 (with items 16, 14, 4, and 5 removed) are indicated in Table 2. The RMSEA (0.046) revealed a good fit, while the CFI (.902) revealed a reasonable fit.

Since there were no more high modification indexes that were indicative of potential problematic items, we next considered whether all items had significant factor loadings on their intended factors. Item 11 ("In my daily life, I frequently have to do what I am told") had a low factor loading and a nonsignificant *p*-value, but since removing the item did not significantly impact the global fit indexes we decided to retain item 11 in our final model.

We have thus found that a three-factor, 17-item model (with items 16, 14, 4, and 5 removed) with a negatively worded method effect (Model 8) best fitted our data. However, the fit was only marginally acceptable. Model 8 is depicted in Figure 2. The standardised pattern coefficients of the 21-item model with negatively worded method effect (Model 3) and the final 17-item model with negatively worded method effect (Model 8) are shown in Table 3.

<Insert Table 2 approximately here>

<Insert Figure 2 approximately here>

<Insert Table 3 approximately here>

Stage 3: Reliability Analysis

Internal consistency reliability of the BPNS-A, BPNS-C, and BPNS-R was determined by considering the Cronbach's alpha values for each subscale (Table 4) and corrected item-total correlations for each item. Note that these values do not take the method effect into account. The

subscale correlations of the 21-item BPNS (Model 2) showed low reliability with α = .64 (BPNS-A), α = .65 (BPNS-C), and α = .68 (BPNS-R). Corrected item-total correlations for the BPNS-A ranged between .25 (item 4) and .46 (item 1). For the BPNS-C corrected item-total correlations ranged between .25 (item 3) and .51 (item 13), and for the BPNS-R corrected item-total correlations ranged between .31 (item 6) and .44 (item 21).

The subscales of the 17-item BPNS (Model 8, but with negatively worded method effect not taken into account) also showed low reliabilities with α = .61 (BPNS-A), α = .62 (BPNS-C), and α = .64 (BPNS-R). Corrected item-total correlations for the BPNS-A ranged between .23 (item 11) and .46 (item 1), for the BPNS-C between .28 (item 3) and .47 (item 13), and for the BPNS-R between .30 (item 7) and .47 (item 2).

For the sake of completeness we calculated factor and scale total scores for the 17-item BPNS, but these scores should be interpreted with caution given the low reliabilities of the subscales. The scores on the Autonomy subscale, which now consisted of 5 items, could range between 5 and 35 and the average score was 26.19 with a standard deviation of 5.34. The scores on the Competence subscale, which also now consisted of 5 items, could range between 5 and 35 and the average score was 24.08 with standard deviation 5.40. The Relatedness subscale, which now consisted of 7 items resulting in scores that could range between 7 and 49, had a mean score of 37.75 with a standard deviation 6.25. The total scores of the 17-item scale could range between 17 and 119 and for this sample the mean score was 88.04 with a standard deviation of 13.55. The subscales were highly correlated, with correlations between .66 and .83 for the 21-item scale and between .65 and .74 for the 17-item scale (see Table 4).

<Insert Table 4 approximately here>

Stage 4: Criterion Related Validity

The total and subscale correlations between the 17-item BPNS (negatively worded method effect not taken into account) and the criterion related scales are presented in Table 5. Correlations coefficients can be considered as effect sizes, where values of ±0.1 are regarded as a small effect, values of ±0.3 are regarded as a medium effect, and values of ±0.5 are regarded as a large effect (Field, 2009).

The BPNS (total scale) had high positive correlations with the MHC-SF (PWB), the MHC-SF (total scale), the MLQ-P, the QEWB (sense of purpose), the QEWB (purposeful personal engagement) and the QEWB (total scale); relatively high positive correlations with the MHC-SF (EWB) and the SWLS; and medium positive correlations with the MHC-SF (SWB) and the QEWB (effortful engagement). The BPNS (total scale) had a small negative correlation with the MLQ-S and a relatively high negative correlation with the PHQ-9.

The BPNS-A had relatively high positive correlations with the MHC-SF (PWB), the MLQ-P, the QEWB (sense of purpose), the QEWB (purposeful personal engagement) and the QEWB (total scale); medium positive correlations with the MHC-SF (EWB), the MHC-SF (total scale), the SWLS, and the QEWB (effortful engagement); and a low positive correlation with the MHC-SF (SWB). The BPNS-A had a small negative correlation with the MLQ-S and a medium negative correlation with the PHQ-9.

The BPNS-C had high positive correlations with the MHC-SF (PWB), the MHC-SF (total scale), the MLQ-P, the QEWB (sense of purpose), the QEWB (purposeful personal engagement) and the QEWB (total scale); relatively high positive correlations with the MHC-SF (EWB) and the SWLS; and medium positive correlations with the MHC-SF (SWB) and the

QEWB (effortful engagement). The BPNS-C had a small negative correlation with the MLQ-S and a relatively high negative correlation with the PHQ-9.

The BPNS-R had a relatively high positive correlation with the MHC-SF (total scale); medium positive correlations with the MHC-SF (EWB), the MHC-SF (SWB), the MHC-SF (PWB), the SWLS, the MLQ-P, the QEWB (sense of purpose), the QEWB (purposeful personal engagement) and the QEWB (total scale); and a low positive correlation with the QEWB (effortful engagement). The BPNS-R had a small negative correlation with the MLQ-S and a medium negative correlation with the PHQ-9.

Generally, the BPNS and its subscales have medium to high positive correlations with other measures of well-being. The BPNS had medium to high negative correlations with a measure of depression and small negative correlations with a measure of search for meaning.

<Insert Table 5 approximately here>

Discussion

The aim of this study was to investigate the psychometric properties of the English version of the BPNS in a South African student sample, by exploring the validity and reliability of the scale. The results indicate that the 21-item BPNS with a negatively worded method effect had unsatisfactory psychometric properties. The measure had low reliabilities and inadequate model fit. We found that a 3-factor, 17-item measure (with items 16, 14, 4, and 5 removed) with a negatively worded method effect best fitted our data, although the fit was still only marginally acceptable and reliabilities were low. The BPNS and its subscales had satisfactory convergent and discriminant validity. The implications of the results to each of the hypotheses will now be discussed.

In line with our first hypothesis we found that neither the one nor the three-factor model of the 21-item BPNS displayed good model fit. This result is in contrast with the three-factor structure that was intended by Gagné (2003) and the way in which the scale was used in multiple previous studies. For example, in some studies the BPNS was used to obtain a total score of psychological need satisfaction (e.g., Gagné, Ryan, & Bargman, 2003; Vansteenkiste, Lens, Soenens, & Luyckx, 2006), while in other studies the three subscale scores were used to determine psychological need satisfaction (e.g., Durmus, 2015; Schiffrin et al., 2014). Although the model fit improved when a negatively worded method effect was incorporated, the fit was still unsatisfactory. Contrary to our expectation that the BPNS would exhibit a three-factor structure with 16 items (items 16, 14, 11, 20, and 4 removed) and a negatively worded method effect as found by Johnston and Finney (2010), this 16-item version of the scale displayed a poor fit for our data. This stands in contrast with the good fit reported by Johnston and Finney (2010) and the marginal fit found by Sheldon and Hilpert (2012). We therefore started with the original three-factor, 21-item scale with a negatively worded method effect and considered the modification indices to identify the areas of local misfit for our sample. We found that a three-factor, 17-item model (with items 16, 14, 4, and 5 removed) with a negatively worded method effect best fitted our data. We have removed two autonomy items (item 4 and item 14), one competence item (item 5), and one relatedness item (item 16), from the original 21-item scale, which resulted in a scale with five autonomy items, five competence items, and seven relatedness items. Items flagged by high modification indices exhibited redundancy, high correlations between the residuals of item pairs that were intended to measure different psychological needs, or were phrased in such a way that they loaded on more than one factor. Therefore the removal of these items were not only empirically, but also substantively justified.

The items that were problematic in our study correspond to a large extent to the items that were shown to be problematic in the study by Johnston and Finney (2010). More specifically, like Johnston and Finney (2010) we have found a high correlation between item 7 ("I pretty much keep to myself and don't have a lot of social contacts") and item 16 ("There are not many people that I am close to"). We have removed item 16 since item 7 explained more of the variance and had a higher factor loading on the need for relatedness, while Johnston and Finney (2010) removed item 16 because they deemed item 7 to be more representative of the need for relatedness. Item 14 ("People I interact with on a daily basis tend to take my feelings into consideration") was also problematic in both our study and the study of Johnston and Finney (2010). We have removed item 14 because it could load on both the need for autonomy (as intended) and the need for relatedness, while Johnston and Finney (2010) removed item 14 because they deemed the item to be more representative of the need for relatedness than the need for autonomy. Another item that was problematic in both our study and the study of Johnston and Finney (2010) is item 4 ("I feel pressured in my life") that was removed in both studies. Like Johnston and Finney (2010) we also found that the item could measure any of the three basic psychological needs. In both our study and that of Johnston and Finney (2010) high correlations between the residuals of item 5 ("People I know tell me I am good at what I do") and item 6 ("I get along with people I come into contact with") were found. We have removed item 5 due to the fact that, although this item was formulated to measure competence, the clear interpersonal component in the item could also tap relatedness, indicating that the item does not neatly fit with its intended category alone. Interestingly, the item was retained by Johnston and Finney (2010) who felt that there was no theoretical or practical reason to remove any of the items. Item 11 ("In my daily life, I frequently have to do what I am told") was also problematic in both studies. In

our sample item 11 had a low factor loading and nonsignificant *p*-value, but the item was retained since its removal did not significantly improve model fit, while Johnston and Finney (2010) removed this item because they were of the opinion that it had low utility. A difference between our study and the study of Johnston and Finney (2010) is the low R^2-values of item 1 ("I feel like I am free to decide for myself how to live my life") and item 20 ("There is not much opportunity for me to decide for myself how to do things in my daily life") in the sample of Johnston and Finney (2010) that are indicative of low item utility. Johnston and Finney (2010) argued that item 20 was the inverse of item 1, and therefore item 20 was removed. These items did not show any empirical problems in our sample, and were therefore retained.

Our second hypothesis was that the autonomy and competence subscales of the BPNS were expected to have insufficient internal consistency reliability, with only the relatedness subscale having sufficient reliability as found by Johnston and Finney (2010) and Sheldon and Hilpert (2012). In line with the hypothesis we found that the autonomy and competence subscales had insufficient reliabilities with Cronbach's alpha values lower than .70. However, in contrast with the hypothesis, the relatedness subscales also had insufficient reliabilities with alpha values lower than .70. This was the case for both the 21-item BPNS and the 17-item BPNS, with the 17-item scale having slightly lower reliability scores than the 21-item scale. The implication is that neither the 21-item BPNS, nor the 17-item BPNS was a reliable domain-general measure of basic need satisfaction in a South African student sample and the scale should be used with caution in this context.

In support of our third hypothesis, which concerned the criterion-related validity of the BPNS, the 17-item scale and its subscales had medium to high positive correlations with other measures of well-being, medium to relatively high negative correlations with a measure of ill-

being (PHQ-9), and negligibly small negative correlations with the Search for Meaning subscale of the Meaning in Life Questionnaire, thereby showing good convergent and discriminant validity. This extends the results of Johnston and Finney (2010) who also found that the 16- item version of the BPNS (items 16, 14, 11, 20, and 4 removed) had good convergent and discriminant validity using other criterion scales. Support for this hypothesis is indicative thereof that the BPNS measures a form of psychological well-being, as can be seen from the positive correlations with other measures of psychological well-being and the negative correlations with a measure of psychological ill-being. However, the positive correlations are not high enough to conclude that the BPNS measures exactly the same well-being constructs as those intended by the well-being criterion scales used. Instead, it may be indicative thereof that the BPNS measures a unique aspect of psychological well-being that is not measured by the other well-being measures. Specifically, basic psychological needs theory goes beyond merely giving content to well-being. It also identifies and explains the essential nutriments (i.e., basic psychological needs) necessary for growth and well-being to occur (Deci & Ryan, 2000).

In summary, although the criterion-related validity of the BPNS was promising, the scale exhibited a marginal model fit and insufficient reliability, even after removal of clearly problematic items. This may be due to a variety of factors which will now be discussed.

Problematic Item Formulation

The first possible reason for this insufficient model fit and low internal consistency reliabilities may be that the (remaining) items are not good items to tap the constructs addressed by the BPNS. On closer inspection of the items that comprise each of the subscales of the BPNS, we found that several items could potentially be problematic, resulting in insufficient psychometric properties.

With regard to the autonomy subscale of the BPNS Johnston and Finney (2010) indicated that item 20 (“There is not much opportunity for me to decide for myself how to do things in my daily life”) was an inverse duplicate of item 1 (“I feel like I am free to decide for myself how to live my live”). Item 11 (“In my daily life, I frequently have to do what I am told”) uses only different wording than item 20 to suggest that one is not allowed to make one’s own decisions. Only one of items 1, 11, or 20 is therefore needed in the scale, making the other two of these items redundant. With items 4 and 14 removed for our 17-item BPNS, only the following items are valid items to tap the need for autonomy: any one of items 1, 11, or 20, as well as item 8 (“I generally feel free to express my ideas and opinions”) and item 17 (“I feel like I can pretty much be myself in my daily situations”).

On closer inspection of the competence subscale of the BPNS we found the following items to be problematic. Item 3 (“Often, I do not feel very competent”) is a duplicate of item 19 (“I often do not feel very capable”), making one of these items redundant. Item 10 (“I have been able to learn interesting new skills recently”) refers more to the process of becoming (increasingly) competent (i.e. learning a new skill) than to feeling competent. Sheldon and Hilpert (2012) indicate that item 15 (“In my life I do not get much of a chance to show how capable I am”) is ambiguous in its meaning. While the item is intended to represent the absence of competence, the item actually implies that a person feels competent, but does not get the opportunity to demonstrate this competence (Sheldon & Hilpert, 2012). With item 5 (“People I know tell me I am good at what I do”) removed for our 17-item BPNS, it leaves us with only item 13 (“Most days I feel a sense of accomplishment from what I do”) and either item 3 or item 19 that appears to be a valid item to tap the need for competence.

With regard to the relatedness subscale, Sheldon and Hilpert (2012) indicate that item 6 ("I get along with people I come into contact with") and item 21 ("People are generally pretty friendly towards me") refer more to affiliation (i.e., pleasant social relations) than to intimacy (i.e., a deeper sense of connectedness) which is actually what the need for relatedness refers to according to SDT. The items therefore do not tap the real meaning of the need for relatedness. This same argument holds true for item 2 ("I really like the people I interact with"). Liking the people one interacts with refers more to pleasant interaction than to connectedness as intended by SDT. Item 7 ("I pretty much keep to myself and don't have a lot of social contacts") is a double-barrelled item and ambiguous in its meaning. Just because a person keeps to himself or herself, does not necessarily mean that he or she does not have many social contacts. After we have removed item 16 ("There are not many people that I am close to") for our 17-item BPNS, only item 9 ("I consider the people I regularly interact with to be my friends"), item 12 ("People in my life care about me"), and item 18 ("The people I interact with regularly do not seem to like me much") appear to be valid items to tap the need for relatedness. This leaves the autonomy subscale with three valid items, the competence subscale with two valid items and the relatedness subscale with three valid items. This is a total of eight valid items out of an original 21 items.

As can be seen from the above, on face value many items do not tap the real meaning or the full extent of the construct they are intended to measure, while other items seem to be duplications of each other. This emphasises the importance of conceptualising constructs properly before scales items are developed and to explore whether concepts have the same denotations and connotations in different cultural contexts even if the same language is used as in the case of English.

Issues when Transferring Theory or Measurement Scales from One Context to Another

The second possible reason for this insufficient model fit and low internal consistency reliabilities of the BPNS may have been its adaptation from the BNSW-S, which was developed to assess the satisfaction of basic psychological needs in the workplace. Items used to measure a construct in one context, are not necessarily appropriate to measure the same construct in another context as the nuanced meaning of items may change from context to context.

When basic need satisfaction is measured in a work context, for example, the questions are focused on the specific domain and items are answered based upon the respondent's experiences in the specific domain. When the measure is adapted to be applicable to "life in general", the respondent's answers may be based upon their "average experience" of basic need satisfaction over several domains of their lives, and the experiences of the domain that is more prominent at a specific time point may guide the response given. This may possibly explain why the psychometric properties of domain-specific measures like the Chinese and Greek versions of the Basic Psychological Needs in Exercise Scale (Liu, Chung, & Duan, 2013; Vlachopoulos & Michailidou, 2006), and the French version of the Basic Psychological Needs at Work Scale (Brien et al., 2012) show sufficient internal consistency reliabilities and adequate factor structures, as opposed to the domain-general BPNS (Johnston & Finney, 2010; Sheldon & Hilpert, 2012). This emphasises the importance of considering the contextual meaning of constructs when scale items are developed to measure constructs.

Insufficient Reflection of the Complexity and Dimensionality of Basic Psychological Needs

A third possible reason for the insufficient model fit and internal consistency reliability may be that the dimensionality and complexity of basic psychological needs as conceptualised in SDT are not tapped by the BPNS, thereby assessing different constructs as if they are one

construct. For example, Costa et al. (2015) indicated that need satisfaction, need dissatisfaction, and need thwarting are different concepts, and that each of these concepts has different outcomes with regard to (relational) well-being. This then means that, for example "autonomy satisfaction" is a different construct than "autonomy dissatisfaction" or "autonomy thwarting". When the complexity of the constructs are not considered it comes down to the same as treating autonomy items as competence items, which means that threats are posed to the internal consistency reliability and factorial validity of the measure. This can further be illustrated by the research done by Sheldon and Gunz (2009) who found that the negatively worded items, and not the positively worded items of a measure of basic need satisfaction, were responsible for the correlation found between need dissatisfaction and the corresponding desire to have more experiences related to the specific need that was dissatisfied. These studies suggest that negatively worded items are not merely opposites of positively worded items, but in fact tap a different dimension of basic psychological needs. One must therefore, when constructing measures, carefully consider whether negatively worded items are merely opposites of positively worded items, or whether they tap a different dimension of a construct.

Cultural Differences

The fourth possible reason for this insufficient model fit and low internal consistency reliabilities may be that basic psychological needs theory does not merely transfer cross-culturally. Constructs may differ in meaning cross-culturally or may be unknown to some cultures. For example, autonomy as conceptualised in SDT may have a different meaning in individualistic cultures than in collectivist cultures. In addition, on an operational level, items used to measure a construct in one culture, may not be appropriate to measure the same construct in another culture. Scale items aimed at measuring a construct in different cultural groupings

should reflect the cultural meaning of the concept. If not, scale items may operate differentially across the groups, thus affecting the psychometric properties of the measure.

When comparing the results obtained in our mainly African (relatively collectivistic) sample with the results obtained by Johnston and Finney (2010) in their mainly Caucasian (relatively individualistic) samples, we found that some of the results obtained by Johnston and Finney (2010) replicated in our sample, while there were also results that did not replicate. Specifically, in both studies the 21-item BPNS showed inadequate model fit and we found similar scale items (items 16, 14, and 4) to be problematic. Although the similarities found may suggest that the problematic psychometric properties are rather due to problematic item wording and scale construction than accounted for by cultural differences, there were also differences in our results which may be suggestive of cultural influences on the results. Also, our final 17-item BPNS only marginally fitted the data in our mainly African sample, while the final 16-item BPNS of Johnston and Finney (2010) revealed adequate fit for their mainly Caucasian sample, again suggesting a possible cultural influence on the results.

At this point it is difficult to say which of these results are accounted for by cultural differences and which are accounted for by problematic item wording and scale construction, and further research in this regard is needed. When measures are applied cross-culturally, it is important that the scale items tap the cultural meaning of the concepts being measured. An emic approach to understanding basic psychological needs in an African context from a bottom-up perspective will contribute to our understanding of the constructs in diverse settings.

Problems with the Underlying Theory

A fifth possible reason for insufficient model fit and low internal consistency reliability may be that the underlying theory is not well constructed. SDT, and specifically basic

psychological needs theory, is a strong and well-researched theory which has been found to have application across cultures (Chen et al., 2015) and over a variety of contexts, for example education (Niemiec & Ryan, 2009), sport (Curran, Hill, Niemiec, 2013; Gagné et al., 2003), and in work contexts (Trépanier, Fernet, & Austin, 2013). Also, other measures that aim to measure autonomy, competence, and relatedness in various other specific contexts revealed three-factor structures with adequate model fit, thereby supporting the underlying theory. Some examples are the Chinese and Greek versions of the Basic Psychological Needs in Exercise Scale (BPNES; Liu, Chung, & Duan, 2013; Vlachopoulos & Michailidou, 2006) that measures the extent to which basic psychological needs are satisfied in an exercise context, and the French version of the Basic Psychological Needs at Work Scale (BPNWS; Brien et al., 2012), that measures the satisfaction of the basic psychological needs in a work context.

In response to the findings of Johnston and Finney (2010) regarding the psychometric properties of the 21-item BPNS, Sheldon & Hilpert (2012) developed the Balanced Measure of Psychological Needs (BMPN), a domain-general measure of basic need satisfaction. The BMPN measures autonomy, competence, and relatedness in terms of need satisfaction and need dissatisfaction. The BMPN had a three-factor structure and adequate model fit, thereby supporting the underlying theory, suggesting that the problematic psychometric properties of the domain-general BPNS may not be accounted for by the underlying theory, but rather by problematic item wording and scale construction.

The BPNS clearly has many problems with the formulation of the items in this scale and the extent to which they tap the complexity and nuances of basic psychological needs theory. These problems stretch over different cultural contexts. Since the theory is well-developed and widely supported in the literature, we suggest that the first line of investigation should be to

address the construction of the scale. If the obvious issues involved in the scale construction have been eliminated and the scale still exhibits problematic psychometric properties, the underlying theory should be questioned. However, in parallel, a bottom-up study of basic psychological needs in an African context will further a nuanced understanding of the constructs in diverse contexts.

Conclusion

With the increasing interest in what constitutes well-being it is important that there are validated measures to measure the various aspects of well-being. The purpose of the current study was to investigate the psychometric properties of the English version of the BPNS in a South African student context, by investigating the factorial validity, the internal consistency reliability, and the criterion-related validity of the BPNS.

Although the scale exhibited good criterion-related validity, we found only marginal support for the three-factor structure of the BPNS. Internal consistency reliabilities remained low, despite the removal of problematic scale items. This may be due to problematic item wording and scale construction. For example, upon closer inspection of the subscales of the 17-item BPNS we found that some of the remaining items did not tap the real meaning, or the full extent, of the construct they were intended to measure. Other items had ambiguous meanings, while there was also a duplication of certain items. It is also possible that negatively worded items may have tapped a different dimension of each construct than the positively worded items, instead of tapping the same construct in a reversed fashion. The nuanced meaning of items adapted from a domain-specific BNSW-S to a domain-general BPNS could have been understood differently in the different contexts. Cultural differences could also influence how constructs and scale items operated. Due to the insufficient model fit and low internal

consistency reliabilities, the BPNS in its current form is of limited use in the current context as a domain-general measure of basic psychological needs. The viability and psychometric properties of alternative domain-general measures of basic psychological needs should be explored. In addition, the need for a bottom-up study of basic psychological needs in an African context is indicated.

Limitations, Recommendations, and Future Research

Despite the value of this study, it did not come without limitations. One limitation of this study is the use of a student sample. Although a student sample was used in line with Johnston and Finney (2010) so that we could determine if the results would replicate in a comparable South African sample, the results cannot be generalised to other age groups and populations. Future research may focus on investigating whether the psychometric properties of the BPNS and other measures of basic psychological needs will replicate in different populations, as well as cross-culturally.

The results obtained by Johnston and Finney (2010) in their mainly Caucasian samples replicated to a large extent in our mainly African sample, although there were differences in our findings. Although the similarities between our findings may suggest that problematic item wording and scale construction are responsible for the insufficient psychometric properties, the differences between our findings may suggest that the insufficient psychometric properties may also be accounted for by cultural differences. Future research may focus on which of these findings are due to cultural differences and which are due to problematic item wording and scale construction. An emic approach to understanding basic psychological needs in an African context is indicated.

Future research may also focus on improving the BPNS as a domain-general measure of basic psychological need satisfaction by removing or rewriting problematic scale items, and/or by constructing new scale items. In the construction of new scale items care should be taken that constructs are properly operationalised to ensure that the true meaning, and the full extent, of constructs are captured by the scale items. This includes a consideration of the cultural meaning of constructs, as well as a consideration of the meaning of the constructs in the specific context in which they are measured. It is also important that the complexity and dimensionality of items are captured. This means that future measures of basic psychological need satisfaction should consider the dimensionality of autonomy, competence, and relatedness in terms of need satisfaction, need dissatisfaction, and need thwarting in line with research that indicated that these three dimensions are different concepts (Bartholomew, Ntoumanis, Ryan, & Thogersen-Ntoumani, 2011; Costa et al., 2015). This step may include the investigation of the functioning of other domain-general measures of basic psychological needs, such as the Balanced Measure of Psychological Needs (BPMN; Sheldon & Hilpert, 2012) in the present context.

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Table 1

Summary of the Fit Indices for the Confirmatory Factor Analysis of the BPNS Based on Models from Johnston and Finney (2010)

Latent Model	X^2	*df*	*P*	CFI	TLI	RMSEA	90% CI	SRMR
Model 1	593.909	189	<.001	.628	0.586	0.082	(0.074; 0.089)	0.083
Model 2	560.875	186	<.001	.655	0.611	0.079	(0.072; 0.087)	0.080
Model 3	411.982	177	<.001	.784	0.744	0.064	(0.056; 0.072)	0.065
Model 4	187.156	96	<.001	.869	0.837	0.054	(0.043; 0.066)	0.065

Note. Model 1 = unidimensional, 21 items; Model 2 = three factors, 21 items; Model 3 = 3 factors, negatively worded method effect, 21 items; Model 4 = three factors, negatively worded method effect, 16 items (items 16, 14, 11, 20, and 4 removed); χ^2 = Chi square; *df* = degrees of freedom; *p* = probability value; CFI = Comparative fit index; TLI = Tucker-Lewis Index; RMSEA = Root mean square of approximation; 90% CI = 90% confidence interval of the RMSEA; SRMR = Standardized root-mean square residual.

Table 2

Summary of the Fit Indexes for the Confirmatory Factor Analysis of the Three-Factor BPNS with a Negatively-worded Method Effect After Items Have Been Removed to Improve Model Fit

Latent Model	X^2	*df*	*P*	CFI	TLI	RMSEA	90% CI	SRMR
Model 5	355.076	159	<.001	.805	0.767	0.062	(0.053; 0.071)	0.063
Model 6	280.026	141	<.001	.844	0.810	0.055	(0.046; 0.065)	0.059
Model 7	232.500	125	<.001	.869	0.840	0.052	(0.041; 0.062)	0.058
Model 8	181.729	109	<.001	.902	0.878	0.046	(0.034; 0.057)	0.055

Note. Model 5= three factors, negatively worded method effect, item 16 removed; Model 6= three factors, negatively worded method effect, items 16 and 14 removed; Model 7= three factors, negatively worded method effect, items 16, 14 and 4 removed; Model 8= three factors, negatively worded method effect, items 16, 14, 4, and 5 removed; X^2= Chi square; *df* = degrees of freedom; *p* = probability value; CFI = Comparative fit index; TLI = Tucker-Lewis Index; RMSEA = Root mean square of approximation; 90% CI = 90% confidence interval of the RMSEA; SRMR = standardized root-mean square residual.

Table 3

Standardized Pattern Coefficients for Model 3 and Model 8

		Model 3[a]		Model 8[b]	
		SF	NME	SF	NME
Autonomy items					
(1)	I feel like I am free to decide for myself how to live my life.	.495		.540	
(4)	I feel pressured in my life. (*R*)	.153	.350		
(8)	I generally feel free to express my ideas and opinions.	.664		.713	
(11)	In my daily life, I frequently have to do what I am told. (*R*)	.090	.478	.103	.481
(14)	People I interact with on a daily basis tend to take my feelings into consideration.	.532			
(17)	I feel like I can pretty much be myself in my daily situations.	.467		.498	
(20)	There is not much opportunity for me to decide for myself how to do things in my daily life. (*R*)	.388	.431	.380	.451
Competence items					
(3)	Often, I do not feel very competent. (*R*)	.215	.319	.237	.280
(5)	People I know tell me I am good at what I do.	.509			

(10)	I have been able to learn interesting new skills recently.	.538		.587	
(13)	Most days I feel a sense of accomplishment from what I do.	.695		.731	
(15)	In my life I do not get much of a chance to show how capable I am. (*R*)	.351	.461	.367	.452
(19)	I often do not feel very capable. (*R*)	.462	.508	.436	.494
Relatedness items					
(2)	I really like the people I interact with.	.590		.588	
(6)	I get along with people I come into contact with.	.463		.465	
(7)	I pretty much keep to myself and don't have a lot of social contacts. (*R*)	.392	.334	.344	.273
(9)	I consider the people I regularly interact with to be my friends.	.467		.464	
(12)	People in my life care about me.	.523		.519	
(16)	There are not many people that I am close to. (*R*)	.339	.293		
(18)	The people I interact with regularly do not seem to like me much. (*R*)	.381	.409	.372	.490
(21)	People are generally pretty friendly towards me.	.521		.521	

Note. BPNS = Basic Psychological Needs Scale; *(R)* = reverse scored item; SF = substantive factor; NME = negatively worded method effect.

[a]3-factor, 21-item BPNS, with a NME; [b]3-factor, 17-item BPNS (items 16, 14, 4 and 5 removed), with a NME.

Table 4

Cronbach's Alpha Values and Subscale Correlations of the 21-Item and 17-Item BPNS

Measure	Autonomy	Competence	Relatedness
Autonomy	$\alpha = .64^{a}$; $\alpha = .61^{b}$	$r = .83^{a}$	$r = .78^{a}$
Competence	$r = .74^{b}$	$\alpha = .65^{a}$; $\alpha = .62^{b}$	$r = .66^{a}$
Relatedness	$r = .67^{b}$	$r = .65^{b}$	$\alpha = .68^{a}$; $\alpha = .64^{b}$

Note. In the main diagonal cells the Cronbach's alpha values of the subscales are presented. In the off-diagonal cells the correlations between the subscales are reported. a = For the 21-item scale with the negatively worded method effect not taken into account; b = For the 17-item scale with items 16, 14, 4, and 5 removed with the negatively worded method effect not taken into account.

Table 5

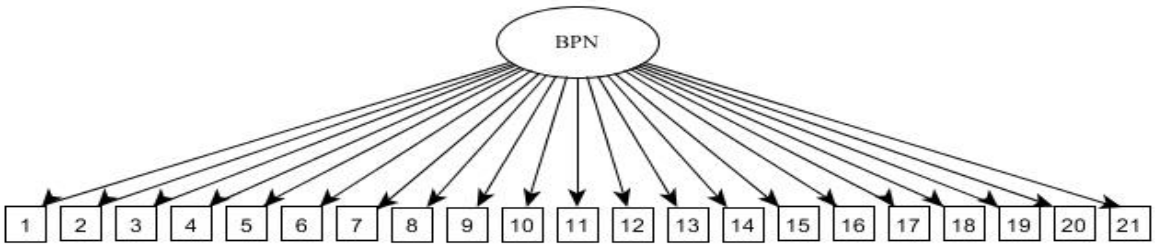
The Total and Subscale Correlations Between the 17-item BPNS and the Criterion Related Scales

Criterion-scale	BPNS-A	BPNS-C	BPNS-R	BPNS-total
MHC-SF (EWB)	.352**	.456**	.374**	.492**
MHC-SF (SWB)	.175**	.346**	.334**	.361**
MHC-SF (PWB)	.425**	.519**	.364**	.542**
MHC-SF (Total)	.373**	.521**	.423**	.550**
SWLS (Total)	.337**	.441**	.317**	.453**
MLQ-P	.424**	.504**	.290**	.503**
MLQ-S	-.053	-.103	-.009	-.063
QEWB (Sense of purpose)	.427**	.544**	.305**	.526**
QEWB (Purposeful personal engagement)	.427**	.544**	.305**	.526**
QEWB (Effortful engagement)	.371**	.347**	.191**	.371**
QEWB (Total)	.471**	.516**	.311**	.534**
PHQ-9 (Total)	-.370**	-.441**	-.318**	-.467**

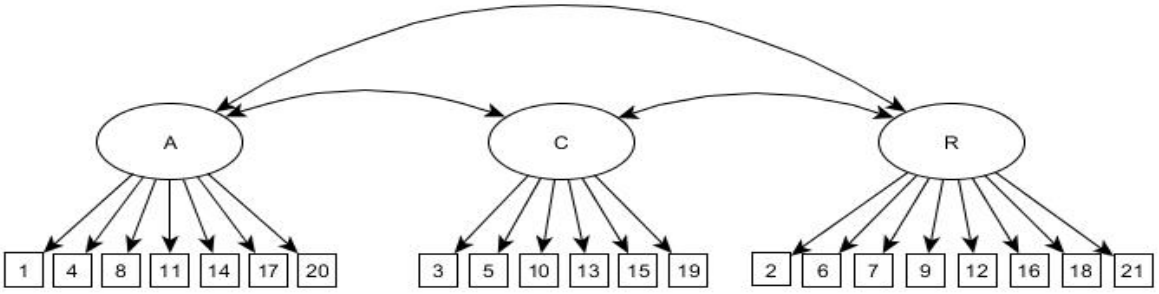
Note: BPNS = 17-item Basic Psychological Needs Scale; BPNS-A = BPNS (Autonomy); BPNS-C = BPNS (Competence); BPNS-R = BPNS (Relatedness); MHC-SF = Mental Health Continuum – Short Form; MHC-SF (EWB) = MHC-SF (emotional well-being); MHC-SF (SWB) = MHC-SF (social well-being); MHC-SF (PWB) = MHC-SF (psychological well-being); SWLS = Satisfaction with Life Scale; MLQ-P = Meaning in Life Questionnaire (Presence); MLQ-S = Meaning in Life Questionnaire (Search); QEWB = Questionnaire for Eudaimonic Well-being; PHQ-9 = Patient Health Questionnaire – 9.

** $p < 0.01$.

Model 1



Model 2



Model 3

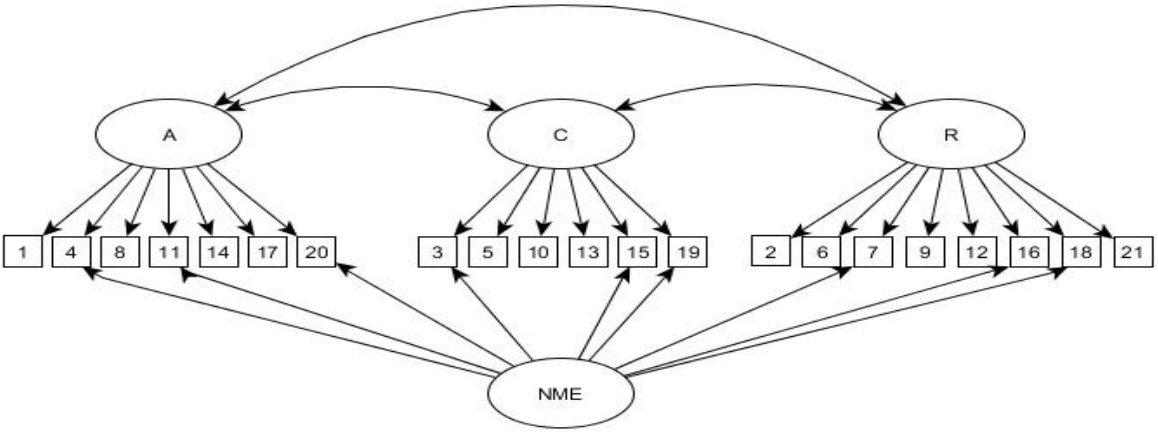


Figure 1. The factor structure of the 21-item BPNS represented by different models. BPNS = Basic Psychological Needs Scale; A = Autonomy; C = Competence; R = Relatedness; NME = negatively worded method effect. Model 1 = Single factor model; Model 2 = Three-factor model, without NME; Model 3 = Three-factor model with NME.

Model 8

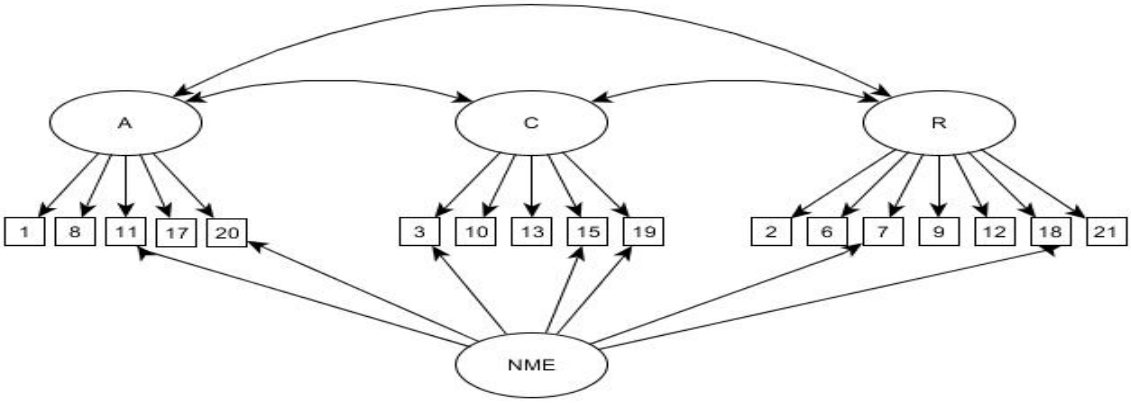


Figure 2. The factor structure of the 17-item BPNS. BPNS = Basic Psychological Needs Scale; A = Autonomy; C = Competence; R = Relatedness; NME = negatively worded method effect. Model 8 = Three-factor model with NME.

Chapter 3

Conclusion, Recommendations, and Reflection

Chapter 3: Conclusion, Recommendations, and Reflection

Conclusion

The purpose of this study was to validate the English version of the Basic Psychological Needs Scale (BPNS) in a South African student sample. We investigated the factorial validity, internal consistency reliability, and the criterion-related validity of the BPNS.

With regard to the factorial validity, the original 21-item BPNS, consisting of three subscales namely, Autonomy, Competence, and Relatedness, did not fit the data well. Allowing a negatively worded method effect improved model fit. We therefore decided to use the 21-item BPNS with a negatively worded method effect as basis from which to explore the factor structure of the BPNS. This model allowed us to determine which items were problematic in our sample, while the negatively worded method effect as a latent factor accounted for the variance caused by negatively worded items. We used high modification indexes and nonsignificant factor loadings to identify areas of local misfit. Problematic items (items 16, 14, 4, and 5) were removed because of redundancy and item phrasing that were such that they could measure more than one construct.

After all clearly problematic items were removed we found that a three-factor, 17-item model best fitted our data, but that the fit was still only marginal. The BPNS and its subscales had low internal consistency reliability with Cronbach's alpha values below .70 for both the 21-item BPNS and the 17-item BPNS. With regard to criterion related validity, the 17-item BPNS had good convergent and discriminant validity. Specifically, the 17-item BPNS and its subscales had medium to high positive correlations with measures of well-being (the Mental Health Continuum – Short Form; the Satisfaction with Life Scale; the Questionnaire for Eudaimonic Well-Being; and the Meaning in Life Questionnaire – Presence subscale), medium to relatively

high negative correlations with the Patient Health Questionnaire - 9, a measure of ill-being, and small negative correlations with the Search for Meaning subscale of the Meaning in Life Questionnaire. This means that, although the BPNS indeed measures an aspect of well-being, it does not measure exactly the same construct as the criterion scales. The scale can make a unique contribution to the measurement of being mentally well. However, despite the good criterion-related validity, the inadequate model fit and insufficient internal consistency reliability imply that the BPNS should be used with caution in the present context.

In the light of the inadequate model fit and low internal consistency reliability, despite the removal of problematic items, we inspected the remaining items and found some theoretical difficulties. Specifically, some items did not tap the real meaning, or the full extent, of the specific construct they were designed to measure. We noted a duplication of certain items, while other items were ambiguous. Negatively worded items potentially measured a different dimension of the constructs instead of measuring the constructs in a reversed fashion. The meaning of items which are adapted from a domain-specific measure (e.g., the Basic Needs Satisfaction at Work Scale) for use in a domain-general measure (e.g., the BPNS) may change from context to context and operate differently. In addition, the meaning of items may also differ from culture to culture and items may operate in a different way in diverse cultures.

Recommendations and Future Research

Future research may focus on investigating whether the psychometric properties of the BPNS found in this study will replicate in nonstudent samples, as well as cross-culturally. Should the inadequate psychometric properties replicate, the BPNS may be improved as a domain-general measure of basic psychological need satisfaction by removing or rewriting problematic scale items, as well as constructing new scale items. In the construction of new scale

items special attention should be paid to the conceptualisation and operationalisation of constructs to ensure that the real meaning, and the full extent, of the constructs are captured. This includes a consideration of both the contextual and cultural meanings of the constructs. Attention should also be paid that the dimensionality (need satisfaction, need dissatisfaction, and need thwarting) of each construct (autonomy, competence, and relatedness) is captured when scale items are constructed, in line with research in this regard (Bartholomew, Ntoumanis, & Thogerson-Ntoumani, 2011; Costa, Ntoumanis, & Bartholomew, 2015). The functioning of other domain-general measures of basic psychological needs, such as the Balanced Measure of Psychological Needs (BMPN; Sheldon & Hilpert, 2012) may also be considered.

Reflection

The research process was challenging, informative, and enriching. On an academic level, I could add to my existing knowledge about basic psychological needs theory, a subtheory of self-determination theory (SDT). Specifically, I learned how basic psychological needs theory applies in a variety of contexts and also cross-culturally, making it a very useful theory to explain aspects of an individual's well-being or ill-being. I also became more aware of the importance of having all three basic psychological needs (autonomy, competence, and relatedness) satisfied in order for growth and well-being to occur, as well as the consequences associated with need dissatisfaction and need thwarting. I found it interesting that basic psychological need satisfaction, need dissatisfaction, and need thwarting are independent concepts, each with its own association with different levels of well-being or ill-being.

One does not learn about a theory in isolation from the theory it forms part of. As such, I also learned more about the different types of motivation as discerned by SDT (autonomous motivation, controlled motivation, and amotivation), and how each of these motivational types,

as well as long term life goals that individuals pursue, are associated with different levels of basic psychological need (dis)satisfaction.

The statistical aspect of this research project posed a welcome challenge and made for a very enriching experience as I gained a better understanding of the processes, as well as the statistics involved in scale validation. This research project also emphasised aspects such as the importance of properly conceptualising constructs and considering the contextual and cultural meaning of the contructs, before scale items are developed. Since scale development and scale validation are areas of interest, the research process was interesting and enjoyable.

There were also some challenges related to the research process. Initially, while I was still exploring the topic, I often found information that seemed relevant, but which turned out to be irrelevant to the study, resulting in some frustration, especially when time is a factor. As I got to know the topic better and the study became more focused I found it easier to find relevant information. Although the time spent on "irrelevant information" initially felt like time wasted, it had value in that I became aware of how SDT operates in various contexts and how it links with various other constructs.

Another challenge was the time factor. Despite having had a well-planned time schedule, things do not always work out as planned. Allowing for flexibility is imperative. I worked on the dissertation at times that I knew I would be more productive.

On a more personal level, SDT is one of my favourite theories, as it explains so much of why people act the way they do. In my own life, I can see how basic psychological needs theory applied in various areas of my life. For example, it explains why some of my current relationships are more satisfying than others. The most satisfying relationships are the ones in which I experience the highest levels of basic psychological need satisfaction. I can also relate

basic psychological need (dis)satisfaction to the frustration I experienced at a previous workplace. Although I was good with what I was doing, I never felt fulfilled in my work because my work environment did not allow for self-expression (the need for autonomy) and optimal use of my talents and abilities (the need for competence). Although my need for relatedness was satisfied at my previous workplace, I still felt unfulfilled and frustrated in my job. This clearly indicates how, in line with basic psychological needs theory, the dissatisfaction or thwarting of one or more basic psychological needs results in reduced levels of well-being. I also experienced the motivational force of basic psychological needs as the need dissatisfaction that I experienced motivated me to make a career change. SDT also played a role in how I view people. I have a richer understanding of people's behaviour and the driving force or motivation behind the behaviour.

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