

THE RELIABILITY AND FACTOR STRUCTURE OF THREE MEASURES OF SALUTOGENIC FUNCTIONING

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ABSTRACT

The aim of this research was to investigate the reliability and factor structure of three salutogenic functioning constructs, namely sense of coherence, self-efficacy and locus of control, as measured by the instruments constructed by Antonovsky, Tipton / Worthington and Rotter respectively. The results indicated that these three measuring instruments show acceptable reliability, that meaningful relationships are evident between all three of these salutogenic functioning constructs and that a meaningful salutogenic functioning factor structure exists. It was recommended that industrial psychologists make use of these measuring instruments when assessing employee and managerial wellness and level of salutogenic functioning during employee and manager development and career counselling.

1 INTRODUCTION

Over the past decade the focus on individual salutogenic functioning has spread from the field of growth psychology to include its application in the work environment (see Viviers, 1996; Cilliers & Coetzee, 2003; Coetzee & Cilliers, 2001). Consequently, we have a clearer idea of the guidelines for the conceptualisation, measurement and operationalisation of psychological growth and wellness of employees and managers, which are known to facilitate their coping with change and transformation.

The salutogenic paradigm and its constructs developed from various personality theories emphasising personality growth, wellness and optimal psychological functioning (Cilliers, 1988). Around 2000, the evolution of these theories became grounded in what has become known as positive psychology (Lopez & Snyder, 2003; Sheldon & King, 2001; Snyder & Lopez, 2002), defined as the

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scientific study of ordinary, positive, subjective human strengths, virtues, experience and functioning (Seligman & Csikszentmihalyi, 2000; Sheldon & King, 2001). In this context, substantial South African research has been reported that focuses on salutogenesis (Strümpfer, 1990), fortogenesis (Strümpfer, 1995) and psychofortology (Coetzee & Cilliers, 2001).

Positive psychology includes many behavioural constructs such as self-actualisation, a sense of coherence, hardiness, potency, self-efficacy, learned resourcefulness, internal locus of control (Strümpfer, 1990), coping (Somerfield & McCrae, 2000), well-being (Lyubomirsky, 2001), creativity (Nakamura & Csikszentmihalyi, 2001; Simonton, 2000), resilience (Masten, 2001), emotional intelligence (Lopez & Snyder, 2003), engagement (Rothmann, 2002), happiness (Buss, 2000; Diener, 2000), flow, humour (Fredrickson, 2001), positive affect (Folkman & Moskowitz, 2000), courage, gratitude (Lopez & Snyder, 2003), faith and optimism (Peterson, 2000; Schneider, 2001). In the last six years many of these constructs have been measured and applied in South African organisational scenarios such as counselling, and individual and organisational development (Breed, 1997; Cilliers, 2001; Cilliers, 2002; Cilliers & Coetzee, 2003; Cilliers & Kossuth, 2002; Coetzee & Cilliers, 2001; Kossuth, 1998; Kossuth & Cilliers, 2002; Rothmann, 2000; Viviers, 1996).

The measurement of these constructs is used increasingly to explain the way in which individual employees function and develop, in the fields of management development, labour relations and performance management (Kossuth, 1998). Within these applications, the focus is on how individuals cope with change and transformation, and how they adapt to the new world of work and its demands on labour and employee relations. Although most of the existing instruments for the measurement of these constructs (as suggested for example by Lopez & Snyder, 2003; Strümpfer, 1990) exhibit the necessary psychometric qualities of reliability and validity, it is not clear whether their operationalisation confirms the relatively newly formulated underlying theoretical models used in explaining behaviour in the various organisational settings in which they are used. This poses a challenge to I/O psychologists and HR practitioners to clear up this uncertainty for the purposes of future research and practice (Wissing, 2000), and to explicate this new paradigm and its constructs further (Strümpfer & Wissing, 1999), especially in the unique South African working environment (see Strümpfer, 1990; 1995; Wissing & Van Eeden, 1994; 1997a; 1997b).

Antonovsky (1987) supports the notion that work has a significant role to play in shaping a person's salutogenic functioning, and specifically his or her sense of coherence. A working environment which is predictable, manageable and where the employee can participate in decision making and has a voice in regulating his or her work enhances the sense of coherence of the worker because work is experienced as meaningful. Strümpfer (1995) supports Antonovsky's (1987) finding that work experiences strengthen the sense of

coherence. Strümpfer and Wissing (1999) cite examples of organisational behaviour such as job involvement, organisational commitment, organisational change and job satisfaction which have been correlated with the construct of sense of coherence.

2 SALUTOGENIC FUNCTIONING

The salutogenic paradigm as described and defined by Antonovsky (1979; 1987) has subsequently been confirmed as a separate paradigm by Breed (1997), within positive psychology. Its emphasis is on the origins of psychological health and wellness, and it is derived from *salus* (meaning health in Latin) and *genesis* (meaning origins in Greek). The paradigm focuses on normal behaviour and the locating and developing of personal and social resources and adaptive tendencies which result in coping and growth (Strümpfer, 1990; 1995).

An important research question is, what are important constructs in the salutogenic paradigm and are there significant relationships that establish the existence of the salutogenic profile? In this regard Antonovsky (in Cooper & Payne, 1991) suggests using the sense of coherence, self-efficacy (Bandura, 1989) and locus of control (Rotter, 1990) as significant constructs in salutogenic thinking for developing this profile. This research sets out to establish the relationships between these three important salutogenic constructs.

- **Sense of coherence**

Antonovsky (1984; 1987) defines sense of coherence as a global orientation that expresses the extent to which one has a pervasive, enduring, though dynamic feeling of coherence that (1) the stimuli deriving from one's internal and external environments in the course of living are structured, predictable, and explicable, that (2) the resources are available to one to meet the demands posed by these stimuli, and that (3) these demands are challenges worthy of investment and engagement. Furthermore, according to Antonovsky (1979), the sense of coherence predicts the extent to which one feels that there is a probability that things will work out well. Each portion of the definition describes one of three core personality characteristics, which he describes as comprehensibility (making sense of the stimuli in the environment), manageability (coping with the stimuli with the available resources) and meaningfulness (identifying emotionally with events in the environment). Antonovsky (1979) notes that the strength of the sense of coherence is connected to a variety of coping mechanisms which he refers to as generalised resistance resources (GRRs) and he defines these as any characteristic of the person, the group, or the environment that can facilitate effective tension management. The significant GRRs which are also present in the workplace, as defined by Antonovsky (1979), are artifactual-material resources such as money and

wealth, cognitive-emotional-intrapersonal and emotional resources (knowledge, intelligence and ego identity), value-attitudinal resources, such as rationality, flexibility and farsightedness, interpersonal-relational resources (social support systems), and macro-socio-cultural resources - the cultural norms and rules which control society's behaviour.

- **Self-efficacy**

The theoretical basis of self-efficacy falls within the broad framework of social learning theory. This explains how a person learns and develops within his or her social context (Kirsch, 1986) and the importance of one's own skills, capabilities and behaviour in determining performance (Bandura, 1989; 1997). Kirsch (1986) points out that being successful at executing a self-initiated task is a reflection of self-efficacy.

Gist and Mitchell (1992) maintain that self-efficacy is a construct derived from social cognitive theory - a theory positing a triadic reciprocal causation relationship in which behaviour, cognition and the environment all influence each other in a dynamic fashion. From an organisational perspective, the interactions of the above three variables are very important for the development of a person's social, cognitive and behavioural competencies and the cultivation of a person's beliefs in his or her capabilities. Furthermore, these enhance the individual's motivation through goal systems, where the person is using his or her skills and capabilities in interaction with the environment. Wood and Bandura (1989) state that self-efficacy refers to the belief in one's capabilities to mobilise the motivation, cognitive resources and courses of action needed to meet the demands of given situations. Self-efficacy is related to task-specific capability. It has been found to influence the level at which a person sets his or her goals, the extent to which a person is committed to achieving the goals and the choice of activities employed to attain the goals (Gist & Mitchell, 1992).

According to Bandura (1997), a high sense of personal efficacy develops in a responsive environment that rewards valued accomplishments, fosters aspirations and encourages productive engagement in activities. These conditions enable a person to exercise control over events in his or her life. He suggests that there is a causal (linking relationship) between beliefs of self-efficacy and outcome expectations. Outcomes anticipated by the individual will come from the environment in response to performance, and will determine the individual's judgments of how well he or she will be able and permitted to perform in given situations (Bandura, 1997). The working environment, where goals are experienced as challenging and achievable, plays an important role in determining an individual's self-efficacy.

Lee (1988) found in research conducted with university fundraisers that there are significant relationships between self-efficacy, goal setting and perfor-

mance. This is supported in research carried out on levels of self-efficacy and sales achievements of insurance salesmen by Barling and Beattie (1983), who found that self-efficacy perceptions were strongly correlated to sales performance among life insurance agents. Taylor, Locke, Lee and Gist (1984) noted that self-efficacy was directly related to research productivity of university faculty members.

- **Locus of control**

This construct is one that has probably received the most attention in the study of individual behaviour in organisations (Erwee & Pottas, 1982). The development of an individual's internal or external locus of control is based on the person's objective situation (Cooper & Payne, 1991) and the behavioural consequences of action taken by the individual (Erwee & Pottas, 1982). An important aspect determining the characteristics of internal / external control of reinforcement is the effect that the situation reinforcement has upon the behaviour of the person (Rotter, 1966). Antonovsky (Cooper & Payne, 1991) suggested that where the individual perceives a degree of freedom for effective action then such a person develops an internal locus of control, called an "internal". If the person views the reinforcement as being outside of his or her own control, that is depending on fate, chance or powerful others, then the individual is likely to develop an orientation of external locus of control, called an "external". Research conducted by Garson and Stanwyck (1997) in relation to the motivational effects of incentives at work found that for the internal who sees his or her own skill and judgement as a means to solving problems, success is not entirely dependent on the existence or nonexistence of incentives. For the external, performance is dependent on incentives, and the withdrawal of these will lead to loss in production. Locus of control also has an effect on one's performance and relationships at work (Erwee & Pottas, 1982, Foley & Clifton, 1990, Payne & Manning, 1988). The internal is likely to be more enterprising, show more initiative and achieve better results than an external. The internal develops more constructive relationships with subordinates, is more participative and attends more thoroughly to his or her own self-development.

3 THE SALUTOGENIC PROFILE

The high correlation between the salutogenic constructs (Strümpfer, 1995) determines the salutogenic profile (Viviers, 1996), with its emphasis on psychological optimal functioning at both the intrapersonal and interpersonal levels. At a cognitive level, the individual is able to view information from the environment in a positive and constructive manner, and to use the information towards mature decision making. At the affective level, the individual is at one with himself or herself, is confident, self-fulfilled, and views issues in an emotionally mature manner. At the motivational level, the individual is able to make use of his or her inner resources to cope, solve problems and achieve

results. The interpersonal characteristics reflect an individual who is able to form meaningful relationships with others at work and in society. The problem statement being investigated in this research is whether these characteristics can be confirmed in terms of a personality profile, specifically in the relationship between sense of coherence, self-efficacy and internal locus of control.

4 AIM, DESIGN AND HYPOTHESIS

The aim of this research was to determine whether there is a relationship and meaningful factor structure between the salutogenic constructs of sense of coherence, self-efficacy and internal locus of control. A survey design enabling the quantitative measurement and statistical analyses of the three constructs was used. The following hypotheses were tested:

- H1 The measuring instruments show acceptable reliability.
- H2 Meaningful relationships exist between sense of coherence, self-efficacy and locus of control.
- H3 A meaningful salutogenic functioning factor structure exists.

5 METHOD

5.1 Population and sample

The research was carried out in the South African coal mining industry. The population consists of employees from the mining, engineering, metallurgy, technical services, finance, administration, human resources and security disciplines, from which a representative sample of 245 (45%) was drawn. The sample consisted of 13 (5%) mine managers (Patterson band E), 39 (16%) senior supervisors (band D) and 193 (79%) artisans, miners, foremen and supervisors (band C).

5.2 Measuring Instruments

Three instruments were chosen because of their conceptual correspondence with the above definitions and characteristics of the three constructs. All three are seen as the most appropriate available for measuring these behaviours (Strümpfer, 1990, Viviers, 1996).

- **The Sense of Coherence (SOC) Questionnaire** (Antonovsky, 1987; 1993) measures SOC in a total score as well as for the three dimensions of comprehension, manageability and meaningfulness as defined above. Antonovsky (1993) reported reliability coefficients of 0.83 to 0.95, Kossuth (1998) 0.85 and Basson and Rothmann (2001) 0.89. Radmacher and Sheridan (1989) reported test-retest reliability coefficients of 0.91 after six weeks, 0.76 after twelve months and 0.41 after two years, Sage and Antonovsky (1990)

reported 0.54 after one year and 0.55 after two years, and Fiorentino (1986) reported 0.78 after one year. Antonovsky (1993) reported internal consistency of between 0.82 and 0.95, Kalimo and Vuori (1990) reported 0.93. Antonovsky (1987; 1993) reported construct validity of between 0.38 and 0.72 (which was confirmed by Payne, 1982), a test-retest correlation of 0.54 over a 2-year period and good content and criterion validity. Dana, Hoffman, Armstrong and Wilson (1985) reported on the instrument's concurrent validity. Strümpfer and Wissing (1999) confirmed the reliability and validity in various South African studies.

- **The Self-Efficacy Questionnaire** (Tipton & Worthington, 1984) measures the construct in a single score. Sherer and Maddux (1982) reported reliability coefficients of 0.71 to 0.86 and Kossuth (1998), 0.78.

- **The Locus of Control Questionnaire** (Rotter, 1966) measures internal locus of control. Andrisani and Nestel (1976) and Ferguson (1993) reported reliability coefficients of 0.50 to 0.83 and Kossuth (1998), 0.65.

5.3 Data collection

The measuring instruments were computerised (in English and Afrikaans) and the data were collected by inviting the sample to attend pre-arranged sessions in groups of 30. The administration was done by a psychologist who was fully trained in the appropriate computer software. Each session lasted approximately three-and-a-half hours. The computerisation ensured that each respondent answered every item.

5.4 Data processing

The following statistical analysis was done by means of the SAS (1990) and SPSS (1994) computer packages.

- **Reliability analysis**

The data for each of the measuring instruments were analysed separately, in terms of item-test reliability and Cronbach alpha coefficients. Nunnally (1978) suggested that a Cronbach alpha of between 0.5 and 0.6 is satisfactory for research purposes. Watkins and Mauer (1994) suggested items with item-test correlations of less than 0.2 should be excluded from a questionnaire.

- **Intercorrelations**

The strength of relationships between the variables (dimensions) was measured, using the Pearson-product moment correlation coefficient (Howell, 1989).

- **Factor analysis**

Firstly, exploratory factor analysis was performed (see Kerlinger, 1986) on the three variables from the sense of coherence scale and the one variable each from the self-efficacy and internal locus of control scales. The orthogonal transformation matrix rotated factor pattern method was used to determine the factor structure of the variables. The retention of the factors is based on certain rule of thumb principles. For principal component analysis, it has been argued that the Kaiser criterion of retaining factors with eigenvalues greater than one appears to be the most appropriate (Ford, MacCallum & Tait, 1986). An alternative criterion that can be adopted is observation of the Scree Plot (Cattell, 1966). With the Scree Plot the pattern of eigenvalues is examined for breaks or discontinuities. Another commonly used rule for specifying factors is that only variables with loadings greater than 0.40 on a factor should be considered significant and used in defining a factor (Comrey, 1978). Secondly, confirmatory factor analysis by means of Lisrel (Hughes, Price & Marrs, 1986) was performed to determine whether the observed data confirm the hypothetical model structure.

6 RESULTS

Table 1 indicates the Cronbach alpha coefficients of the measuring instruments and all three were proven to be reliable measurements of the three constructs.

Table 1 Cronbach Alpha's

CONSTRUCT	CRONBACH'S ALPHA
Sense of coherence	0.85
Self-efficacy	0.78
I-E locus of control	0.65

Table 2 indicates the correlations between the three salutogenic constructs. Significant correlations were evident between sense of coherence (for the three dimensions as well as for the total score), self-efficacy and locus of control.

Table 2 Correlations between the salutogenic constructs

SENSE OF COHERENCE	SELF-EFFICACY	LOCUS OF CONTROL
Total	0.44***	0.51***
Comprehension	0.38***	0.45***
Manageability	0.38***	0.46***
Meaningfulness	0.44***	0.38***
SELF-EFFICACY	-	0.21***

*** p < 0,0001

Table 3 reflects the initial principal components factor structure.

Table 3 Initial principal components factor structure

VARIABLES	FACTORS					COMM	MSA
	1	2	3	4	5		
Comprehension	0.344	0.657	0.082	0.306	0.076	0.675	0.858
Meaningfulness	0.399	0.674	0.136	-0.103	0.113	0.663	0.873
Manageability	0.507	0.576	0.123	-0.188	0.114	0.654	0.908
Self-efficacy	0.209	0.606	0.084	0.084	-0.219	0.481	0.768
Internal LOC	0.416	0.448	0.019	-0.198	0.050	0.424	0.930

COMM = Communalities (h2)

Table 4 contains the varimax rotated factor structure showing a strong relationship between the salutogenic measurements, especially in Factor 3.

Table 4 Varimax rotated factor structure

VARIABLE	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4	FACTOR 5
Comprehension	0.104	0.045	0.794	-0.028	0.095
Meaningfulness	0.012	0.040	0.765	0.200	0.148
Manageability	0.157	0.150	0.745	0.107	0.184
Self-efficacy	0.064	-0.085	0.612	0.201	-0.205
Internal LOC	0.198	0.087	0.590	0.038	0.167

Table 5 displays the confirmatory factor analysis of the five factor model of the salutogenic constructs. All the parameter estimates of the salutogenic constructs are highly significant, indicating a model of good fit.

Table 5 Confirmatory factor analysis (Lisrel Estimates)

	Parameter Estimates	Error Variance (1-R squared)	Variance explained R squared	T-value	Significance level of Parameter Estimate
Comprehension	0.73	0.46	0.54	12.31	p<0.01
Meaningfulness	0.75	0.44	0.56	12.64	p<0.01
Manageability	0.79	0.37	0.63	13.67	p<0.01
Self-efficacy	0.50	0.75	0.25	7.63	p<0.01
Internal LOC	0.57	0.68	0.32	8.90	p<0.01

T>-2.65 (p<0.01)

7 DISCUSSION

The interpretation of the results per hypotheses was as follows:

- H1 The measuring instruments were found to be reliable. This confirms findings by Antonovsky (1993), Sherer and Maddux (1982), and Andrasani and Nestel (1976) that the instruments measure their constructs reliably.
- H2 The overall findings suggested that there are meaningful relationships between sense of coherence, self-efficacy and locus of control. This supports the findings of Antonovsky (in Cooper & Payne, 1991) and Strümpfer (1990; 1995) that sense of coherence, self-efficacy and locus of control are significant constructs in salutogenic functioning.
- H3 The findings suggested that a meaningful salutogenic factor structure exists as determined by exploratory and confirmatory factor analyses. Although the theoretical descriptions and behavioural components of and measurement by these chosen instruments of the three constructs -- sense of coherence, self-efficacy and locus of control -- are individually different, they collectively link and overlap to such an extent that they describe similar salutogenic behaviour. This provides more evidence for the existence of a salutogenic profile that indicates the individual's psychological wellness.

The definition and characteristics of the sense of coherence are strongly linked to and supported by those of self-efficacy and internal locus of control, and vice versa. On the conceptual level, the so-called feeling of coherence (mentioned as part of sense of coherence) is supported by the belief system in one's own capabilities (part of self-efficacy) and experiencing freedom and being in control (part of internal locus of control). On the behaviour level the above strong relationship between the three constructs can be integrated into the following salutogenic profile, which serves as confirmation and extension of the above-mentioned theoretical profile.

- *Cognitive behaviour.* The individual is able to view information from outside the self in a positive and constructive manner, making sense out of it, understanding it and mobilising his or her intellect to make sound and mature decisions.
- *Affective behaviour.* The individual identifies with events taking place and experiences them in their relatedness as meaningful. He or she is comfortable with the self, is confident, self-fulfilled, emotionally mature and feels in control.
- *Belief system.* The individual believes that his or her internal resources and own capabilities are available to resist negativity and to meet demands, he or she trusts himself or herself, and his or her own skills and judgment to achieve success and believes that things will work out well. Demands are evaluated as worthy of investment and engagement.
- *Motivational behaviour.* The individual focuses on his or her own inner world first, and then uses internal resources to approach the demands from within. He or she experiences freedom to choose different options within his or her own control, and then take appropriate action. He or she uses his or her own initiative to mobilise experience, resources, skills and capabilities to set challenging and achievable goals. He or she copes with demands, makes effective decisions, takes appropriate action and achieves results.
- *Interpersonal behaviour.* The individual is able to form meaningful, constructive and participative relationships with others at work and in society.
- *Environmental interaction.* The individual experiences the environment as structured and predictable, and responds to its stimuli with realness, understanding and expectation. This stimulates a sense of accomplishment, reward and fulfilled aspirations, which all encourage further engagement.

- *Work behaviour.* The individual experiences the self as being cognitively and socially prepared, competent and having the freedom to set his or her own goals, plan and perform effectively and be successful. Tasks are performed with confidence in own skills and judgment, initiative, commitment and engagement with all available resources while concentrating on self-development.
- *Coherence.* All the above characteristics function in a coherent, dynamic, reciprocal and causative interaction.

8 CONCLUSIONS AND RECOMMENDATIONS

The research confirmed the relationship between and meaningful factor structure of the salutogenic constructs of sense of coherence, self-efficacy and internal locus of control. Behavioural researchers and academics should take note of the findings in terms of (firstly) the confirmation of the existing theoretical salutogenic personality profile (as described by Viviers, 1996), and (secondly) the extension thereof to include additional behavioural dynamics such as personal, social and work characteristics. This can be seen as a contribution towards empirical certainty about salutogenic functioning in organisations as well as the explication of the new positive psychology paradigm (as suggested by Wissing, 2000).

Human resource practitioners and industrial psychologists should take note of the findings in terms of its behavioural significance. The research findings add to existing knowledge about organisational and individual wellness, and specifically the role of individual personal growth in organisational and managerial development. More concretely, the individual employee's coherence, efficacy and locus of control (and its various dimensions as explained above) all act 'in concert', describing the depth of the behaviour which is seen as the focus and task of (on the macro level) organisational development as well as (on the micro level) individual interventions such as counselling, mentoring and coaching. In practical terms this means that the individual's level of salutogenic functioning during these interventions can be monitored by a pre and post measurement as an indication of his or her personal growth towards coping more optimally with job, change, transformation and career demands, as well as experiencing more effective interpersonal relationships .

It is recommended that this psychometric research design and method be repeated in other industries and at different organisational levels, to give an even broader validity to the usage of these constructs in individual and group interventions. These research projects could then also include other positive psychology constructs (as mentioned above), especially coping, meaningfulness, resilience and engagement.

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