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AN EVALUATION OF RESPONSE SCALE FORMATS OF THE CULTURE ASSESSMENT INSTRUMENT

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ABSTRACT

The aim of the study was to investigate which response scale, of the four, five, or six-point response scales would yield the best metric properties on the Culture Assessment Instrument. This was achieved by utilising data sets where the respective scales were used. The subjects included participants of various organisations, ages, educational levels, language and gender groups. No one scale could be identified as having the better metric properties. The lack of conclusive results is attributed to differences in education, aggregation effect, possibility of different units of measurement being measured and the manner in which Cronbach Alpha is calculated

OPSOMMING

Die doel van die studie was om vas te stel watter responsskaal, van 'n vier-, vyf-, of sespuntskaal die beste metriese eienskappe sou oplewer op die Kultuurtakseringinstrument. Dit is bereik, deur gebruik te maak van datastelle waar die skale toegepas is. Deelnemers was afkomstig uit verskeie organsisasies, ouderdomsgroepe, opvoedkundige agtergronde, taalgroepe en geslagte. Geen skaal kon gëidentifiseer word met onderskeidende metriese eienskappe nie. Die gebrek aan beduidende resultate word toegeskryf aan die verskille in die opvoedkundige agtergronde van deelnemers, samevoegingseffek, die moonlikheid van verskillende eenhede van meting en die wyse waarop Cronbach Alpha bereken is.

Contemporary research (Cummings, 2001; Denison, 2001; Dove, 2001; Flamholtz, 2001; Nadler, Thies & Nadler, 2001) has shown that organisational culture is perhaps the single best predictor of organisational performance. However, poor measurement instruments of culture, would yield poor data that renders best management interventions useless. Common pitfalls in this regard are the choice of response scale formats (Nunnally & Bernstein, 1994; Schepers, 1992; Swart, Roodt & Schepers, 1999), and wording of items (Petty, Rennier & Cacioppa, 1987; Schepers, 1992).

Little research has been conducted on the metrics of different response scales in the field of organisational culture instruments. The five-point response Likert scale is used in the organisational culture instruments by many authors (Ashkanasy, Broadfoot & Falkus, 2000; Church & Waclawski, 1998; Van der Post, de Coning & Smit, 1997a). In the South African context there appears to be little appreciation for the limitations posed by the design of the Likert scale, in the context of organisational culture instrumentation.

The aim of the study was to identify which response scale from the four, five or six-point scale response format is the most effective for assessing organisational culture. This research also aimed to establish which response scale format would yield the best metric characteristics for use in organisational survey instruments.

The following postulates for the investigation were proposed:
- Postulate 1: Four-point response scales would yield the poorest metric properties, compared to the five and six-point response scales.
- Postulate 2: Six point response scales would yield the best metric properties, compared to the four and five-point response scales.
- Postulate 3: Five point response scales would yield better metric properties that the four-point response scale, but worse that the six-point response scale.

Culture
The earliest references to culture in the literature go back as far as 1887. The concept culture represents in broad holistic terms that, are passed from successive generations (Kotter & Heskett, 1992).

The following definition indicates the universality of the concept culture: "*the total of inherited ideas, beliefs, values and knowledge, which constitute the shared bases of social action*" (Collins Dictionary and Thesaurus, 1988, p. 237).

The above definition emphasises the broad nature of the concept culture and the manner in which culture is passed to members by social rewards and sanctions. The totality of the process is emphasised by the social nature of the transmission of everything that is important to a group.

Social anthropology has provided the framework for the development what we currently understand to be organisational culture (Denison, 1990; Hatch, 1997; Kotter & Heskett, 1992; Ott, 1989). Kroeber and Kluckhohn (1952) have reviewed the concept culture and associated definitions. The work attests to the difficulties in defining culture. While considering over 100 definitions, none of the definitions were evaluated as acceptable. Common denominators among the definitions are learning and the transmission of culture.

National culture
Hofstede (2001) has done the most significant work on national culture and its influence in multi-national organisations. He described national culture using a systems approach where those who belong to a particular group share a value system. The norms of the grouping or society have resulted in the development of institutions with particular functions.

Hofstede's view of national culture presents a strong case for influence on organisational culture. The society is a social entity that has specific values, rituals, heroes and symbols peculiar to a group. Similar influences act on the culture of an organisation.

Organisational culture
Since the early 1980's, organisational culture has received much attention in the literature (Peters & Waterman, 1982). Many books appeared, focussing on the performance of organisations (Alvesson, 2002; Kotter & Heskett, 1992; Peters & Waterman,

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1982). Other books have attempted to explain the competitiveness of Japanese organisations (Alvesson, 2002; Denison, 1990; Hatch, 1997; Ouchi, 1981).

The definition of Schein has received the most attention in the literature (Hatch, 1997; Ott, 1989):

"*A pattern of basic assumptions-invented, discovered, or developed by a given group as it learns to cope with its problems of external adaptation and internal integration – that has worked well enough to be considered valid and therefore, to be taught to new members as the correct way to perceive, think, and feel in relation to those problems*" (Schein, 1985, p. 9).

Schein's levels of organisational culture
Schein (1985) identified three levels of culture; artefacts and creations; values and basic assumptions. (See figure 1).

Level one, according to Schein (1985) relates to artefacts. Artefacts are conscious, obvious expressions of culture. Artefacts are a visible, tangible and audible demonstration of behaviour supported by organisational norms, values and assumptions. Artefacts range from physical aspects such as architecture to forms of language and rituals. Organisational members could be less aware of organisational culture, but it is observable to the outsider (Schein, 1985).

Level two, according to Schein (1985) relates to values and norms. Values represent the principles and standards valued by organisational members. Values are the foundation as to what is acceptable and what is not acceptable. Values, though not obvious, operate uppermost in members' minds. Organisational members are able to recognise their values when challenged by others (Schein, 1985).

Norms are related to values. Norms provide the unwritten rules that indicate expectations in terms of actions applicable in a number of situations. Norms within the business environment include appropriate dress codes (Schein, 1985).

Values indicate what is important to organisational members and norms help to indicate what the expectations are among organisational members. The relationship between norms and values is that which is considered acceptable and can be traced to what is valued in a particular culture. Therefore, organisational members share values and conform to norms because the foundational assumptions support the norms and values. Norms and values support the manifestation of more obvious observable behaviours.

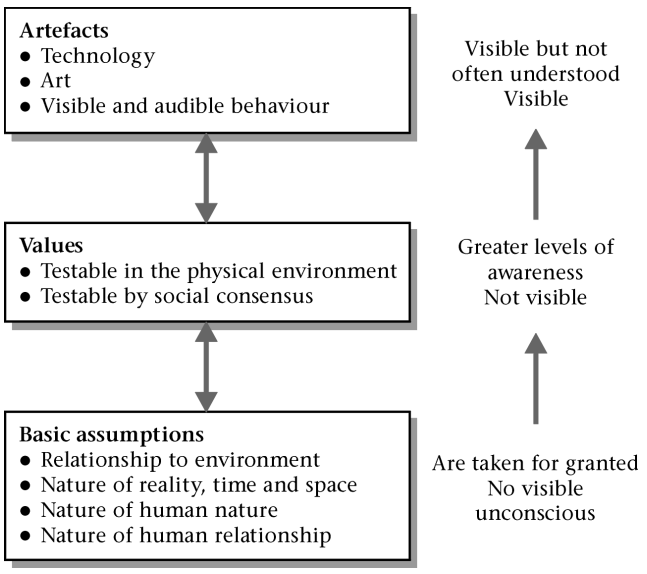

Figure 1: Schein's model of organisational culture

Level three, according to Schein (1985) relates to beliefs and assumptions. Assumptions are the basis of an organisation's culture. Where solutions to a problem work continuously, the solution is used unconsciously and becomes the way things are done by the group. The beliefs and assumptions are the foundation of an organisation's culture. Assumptions are the basis for the manner in which organisational members think and feel. Assumptions are unconscious and are taken for granted. Assumptions are complex in the variety of assumptions that apply in a culture at a time (Schein, 1985).

Domains of organisational culture
Organisational culture manifests on a continuum, from being concrete and visible to being subtle and invisible. At the one end of the continuum are artefacts and at the others are basic underlying assumptions.

Artefacts
Artefacts include any materials, patterns that communicate information about an organisation's technology, beliefs, values, assumptions and practices (Ott, 1989; Schein, 1999). Artefacts are not easily understood, although visible within the organisation. Artefacts inevitably provide an "image" of the organisation and its culture (Shultz, 1995; Schein, 1999). Artefacts include symbols, language, metaphors, myths, stories, legends, heroes and ceremonies.

Symbols are representations of the meanings that express more than their extrinsic content. Symbols lead to represent wider patterns of meaning causing organisational members to associate consciously or unconsciously at different levels of meaning. Symbols could include anything from a flag, to a picture of the chief executive officer or leader (Ott, 1989).

Language is a part of organisational culture. Language must be learnt so that organisational members can communicate effectively. Language includes words, phrases and acronyms not comprehensible to outsiders. Language serves to identify members of a group and those who do speak the language (Ott, 1989; Shultz, 1995).

Metaphors are powerful representations of organisational language because of the communication of meaning beyond the obvious context of words (Alvesson, 2002; Ott, 1989). Myths are extended metaphors. The story, as part of the myth has a part that is factually correct and focuses on the origins of beliefs (Ott, 1989).

Stories relate to anecdotal events that have occurred in the past. While similar to myths, the contents of stories tend to be accurate. Often, stories communicate morals metaphorically and can be related to the core values of the organisation. Stories communicate core messages implicitly or metaphorically. Stories have a major influence on the attitudes that members have (Ott, 1989; Wilson, 2001).

Sagas and legends are the stories told that relate to the history of the organisation. Sagas and legends have the capability to illustrate the distinctiveness of the organisation. Legends provide information about allegiances, commitment and emotional investment (Ott, 1989).

Heroes are the leading actors in organisational life. Heroes are the embodiment of the values of the organisation and provide a mechanism to relate the strengths of the organisation. Hero's behaviour set standards and serve as role models (Ott, 1989; Schein, 1999).

Ceremonies and commemorations are celebrations of the values and basic assumptions held by organisations. Ceremonies celebrate the achievement of heroes (Ott, 1989). Rites and ceremonies are characterised by elaborate planned activities, involving social interaction. They usually benefit

an audience and have social consequences for organisational members involved (Trice & Beyer, 1984).

Beliefs and values
Beliefs and values are at the next level on the continuum of organisational culture. In the context of organisational culture, they represent beliefs, values, ethical codes, moral codes and ideologies. Shared beliefs and values are functional for the organisational members in that choices and decisions are based on the values held. Beliefs are consciously held (Ott, 1989; Schein 1999).

Values are affective desires or wants and are important to people and can be associated with almost anything. Beliefs are what people believe to be true or real. Beliefs are also what is important to people. The importance of beliefs and values can be related to the influence on the patterns of behaviour and the resultant artefacts (Ott, 1989; Schein, 1999).

Espoused values represent practical applications of values, or a theoretical view of values. Beliefs and values are what people admit to and are able to articulate what the values are. Basic assumptions are what people actually believe and feel which informs their actual behaviour (Ott, 1989; Schein, 1999).

Norms are the prescriptions for behaviour and serve as blueprints for organisational members in general. Norms are useful for those organisational members who perform specific functions and enact roles in the organisation. Norms have the effect of providing structure and coherence. Norms stabilise organisational behaviour and provide a framework for common expectations and attitudes (Ott, 1989; Wilson, 2001).

Basic underlying assumptions
Organisational assumptions are conceptually at the higher level of the organisational culture continuum. Basic assumptions are those acts and behaviours that proved to be useful so often that the behaviour is no longer conscious behaviour (Ott, 1989: Schein 1985; 1999).

Time
Time is not included in the previous levels of culture as conceptualised by Schein (1985). Time is related to the values and beliefs that organisational members hold in terms of activities. Time relates to the complexities of the tasks that organisational members need to complete. Tasks may be completed in a linear manner (monochronic time) or simultaneously (polychronic time) and would depend on the abilities of organisational members or the requirements of the task. Organisational culture practices would require ether polychronic or monochronic time approaches in the work environment (Bluedorn, 2000).

Conceptually culture has common characteristics irrespective of the context wherein culture is described. Culture, in broad anthropological terms share similar components at national and in the organisational fields. The differences are evident only in the manner in which the components manifest at different levels in organisations.

The organisational culture model aims to accommodate the components at the implicit and explicit levels in their relationship to organisational outcomes.

A model of organisational culture is indicated in Figure 2.

Response scales and measurement
The nature of response scales used in survey instruments has an impact on the statistical analysis of the data obtained (Babbie & Mouton, 2001; Welman & Kruger, 2001).

Most of what has been called measurement in organisational research involves scaling. The way scales work is not that obvious on their own. For that reason, some rules are required. Rules are important in the arena of standardisation (Nunnally & Bernstein, 1994). A measure is standardised when the rules are clear, are practical to apply, does not demand exceptional skills from users, and the results do not depend on the skills of particular user (Cronbach, 1990; Nunnally & Bernstein, 1994).

The features that distinguish the levels of measurement are indicated in Table 1. The higher levels of measurement accommodate characteristics of lower levels of measurement.

When designing scales, the issues of having equal intervals and absolute zero points remain problematic. Where the attribute to be measured fails to comply with the basic conditions of measurement, there are limited mathematical operations available to the practitioner. The practitioners needs to consider the assumptions made about the attribute measured and thus the choice of level of measurement, and the construction of the scale (Nunnally & Bernstein, 1994; Van der Post et al., 1997).

Many response scales are available to the practitioner, though, there are only a few that are not complex, expensive, and labour intensive to develop. Some formats have been more popular than others. Others have been highly regarded, but are not often used like the Thurstone and Guttman scales (Rubin & Babbie, 1997). The Likert scale and semantic differential scale have been the more popular of the scales (Rubin & Babbie, 1997). Schepers (1992) suggested the intensity scale. The metric properties of instruments are partially dependent on the scale format used (Kerlinger & Lee, 2001; Nunnally & Bernstein, 1994).

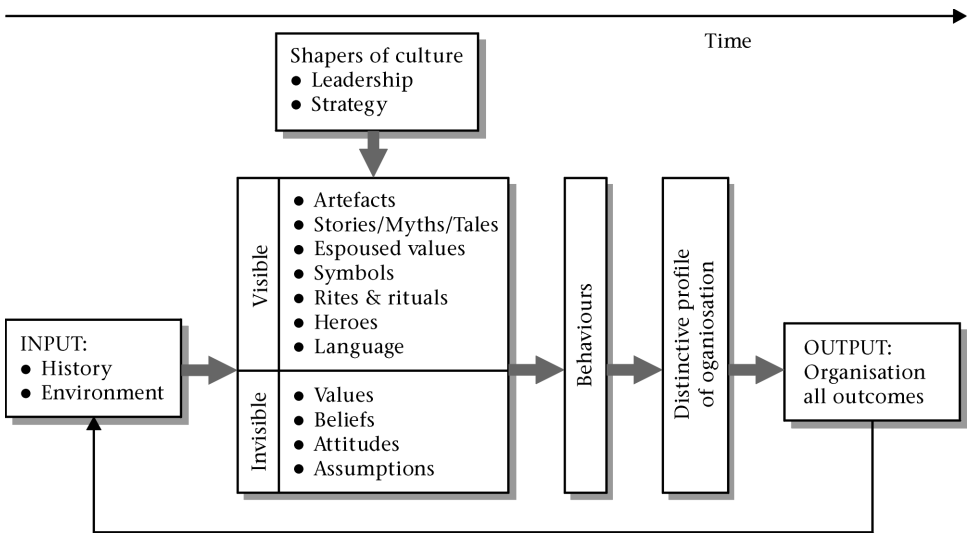

Figure 2: Model of organisational culture

Table 1
Levels of measurement

Classification of scale	Level of measurement	Basic operation	Description	Determining measurement level	Permissible statistics	Response scale application
Categorial scales	**Nominal level measurement**	Equality versus inequality Classification/ distinctness	Use of numerals to identify objects, individuals, events or groups.	Unique numbers are assigned to objects or events. Numbers may be changes as long as the numbers assigned to objects are different.	– Frequencies, mode.	Respondents categorise or sort objects or events into mutually exclusive and exhaustive sets. Sets of data are mutually exclusive for each object and are sorted into one set only.
	Ordinal level measurement	Greater than versus less than Ordering of objects	In addition to identification of, numerals describe relative characteristics posed by the event, individual.	Larger numbers are assigned with more that one property measured. When scale value is assigned, the scale may be changed as long as the ordering of the scales maintained.	**Including statistics from the previous level** – Median, percentiles, order statistics, correlation.	Respondents rank-order object or events in terms of some property. Objects or events are ranked higher or lower by assigned values according to the property. Rating scales usually involve people by asking to indicate opinions, beliefs, feelings or attitudes.
Continuous scales	**Interval level measurement**	Determination of equality of interval or differences. Equal intervals	Includes the properties of nominal and ordinal scales. Including intervals between consecutive points that are equal.	Interval level have numbers that allow calculation and interpretation of ratio interval/ intervals between scales.	**Including statistics from the previous level.** – Arithmetic mean, variance. Pearson correlation.	**Respondents to assign numbers to stimuli or differences to stimuli through direct estimation, produces interval scales. The scale values produced often take the mean or median of the values obtained from many respondents. Direct estimation methods assume respondents are skilled enough to make interval judgements.**
	Ratio level measurement	Determination of equality of ratios. Absolute zero	Includes the properties of nominal, ordinal and interval scales. Has an absolute zero point.	Ratio level scales have numbers that allow calculation and interpretation of ratios of scale values	**Including statistics from the previous level.** – Geometric mean.	Ratio scales are produced using the method of direct estimation. Respondents are required to assign numbers to stimuli or ratio stimuli.

(Adapted from: Allen & Yen, 1979; Babbie & Mouton, 2001; Gregory, 1996; McDaniel & Gates, 2001; Nunnally & Bernstein, 1994; Welman & Kruger, 2001),

The Likert scale is one of the more popular formats used in surveys and questionnaires. An example of a more popular response format is set out in Figure 3. Likert scales offer ordinal response categories where respondents are able to provide responses indicating the intensity of their responses (Swart et al., 1999). Newstead and Arnold (1989) have found that when comparing labelled and unlabelled Likert response scales, higher means were obtained on the unlabeled scales.

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1	2	3	4	5

Figure 3: Likert scale
(Adapted from Church & Waclawski, 1998; Fink, 1995)

Intensity scales are similar to Likert scales, though the anchoring of the scale is limited to the extreme poles of the scale. The interval qualities of the scale become redundant as soon as more than two of the interval points are anchored (Schepers, 1992: Torgerson, 1958). The intensity scale thus provides for the advantages of the interval level of measurement and continuous scales. Refer to Figure 4 for an example of an intensity scale response format.

In practice, most measurement instruments are assumed to use interval-level measurements. The absolute equality of intervals of such instruments is difficult to prove (Gregory, 1996). The controversies on the usefulness of some measures have yet to be resolved (Nunnally & Bernstein, 1994).

Strongly agree	1	2	3	4	5	6	7	Strongly disagree

Figure 4: Intensity scale
(Adapted from Schepers, 1992)

In the design of instruments a logical process needs to be followed. Table 2 provides a useful framework for the design of instruments.

Essential metrics of instruments
Of the various forms of reliability in the context of culture instrument development, the Kuder-Richardson Formula 20 is useful for discrete or dichotomous scores (Ghiselli et al., 1981; McIntire & Miller, 2000). For continuous scores the Cronbach Alpha formula is the appropriate formula (Cortina, 1993; Ghiselli et al., 1981; McIntire & Miller, 2000).

Of the various forms of validity, important to the practitioner developing instruments, construct validity is important as it measures the theoretical construct the instrument is designed to measure (Allen & Yen, 1979; Hair, Anderson, Tatham & Black, 1998).

TABLE 2
DESIGN PROCESS STEPS

Feigl 1970, p.9	Swart et al, 1999 p.34	Rust & Golombok, 1999 pp,196-217,	Organisational culture instrumentation development summary
Postulates	Define theoretical foundations of construct.	Define the purpose of the instrument.	Identify the construct – culture.
Primitive concepts	Identify the domains within the construct.	Develop blue print/ specifications for instrument.	Define organisational culture model.
Defined concepts	Identify the sub-domains	Identify and define content areas.	Identify the sub-domains of culture.
Empirical concepts	Identify/develop behavioural indicators.	Identify how the construct would be manifested (that is the behavioural affective areas).	Operationalise the sub-domains in behavioural terms.
Observations/ experiences	Develop item format taking care of the technical requirements of instruments and metrics.	Develop the items.	Develop the item format taking care of technical details as indicated by Schepers, 1992, pp.2-7.

Response styles

No rational explanation can be found for the choices of respondents in terms of the choices respondents make on response scales. The choices made could be ascribed to realistic responses, ambiguity, meaninglessness or difficulty of items. Under these conditions the respondent will respond according to a particular response style (Brown, 1983). The controversy regarding response sets combined with other diffuse factors have yet to be resolved. The responses on self-report instruments are a combination of self-deception, impression management and realistic self-portrayal (Anatasi & Urbani, 1997). The practitioner needs to take cognisance of the response bias discussed below when interpreting results of instruments.

Halo effect, which is characterised by a favourable or unfavourable attribute of the person, tends to rate the characteristics of the attribute in favourable or unfavourable terms of the attributes that have little relation to the attribute rated (Welman & Kruger, 2001).

Leniency or stringency error refers to the respondent who rates all individual or attributes either too strictly or too leniently (Guilford, 1954; Welman & Kruger, 2001). Blacks, when compared to whites, tend to focus their responses at one end of the response scale (Bachman & O'Malley, 1984). Greenleaf (1992) reported conflicting findings in research on extreme response style. He indicated that there is evidence to suggest that the response styles are not stable and that response styles are not necessarily related to personality or demographic variables. He did report that income, education and age were associated with increased extreme response style.

Logical error is similar to the halo effect (Guilford, 1954). Logical error is the tendency to rate attributes that are considered logically related in a similar way (Guilford, 1954; Welman & Kruger, 2001).

Central tendency bias occurs where respondents are reluctant to rate attributes at the extremes of the scale, thus tending to rate most attributes at the centre of the scale (Guilford, 1954; Welman & Kruger, 2001). The challenge of dealing with central tendency or "*don't know*" responses continues to be a problem for practitioners and the associated interpretations of the response (Fleick, 1989; Poe, Seeman, Mclaughlin, Mehl & Dietz, 1988; Duncan & Stenbeck, 1988). The origins of central tendency responses are multiple and could be ascribed to an error response in the sense that the respondents may have misunderstood the item. Secondly the respondent is ambivalent or ignorant to the alternatives available (Fleick, 1989; Sanchez & Morchio, 1992) and finally, the responses could be a "*non-attitude*" (Fleick, 1989; Francis & Busch, 1975; Gilljam & Granberg, 1993). Where the response options include "*no opinion*" or "*not sure*" these responses should not be interpreted as being interchangeable (Duncan & Stenbeck, 1988).

Constant error occurs where respondents tend to exaggerate the difference between themselves on an attribute or those being rated (Guilford, 1954; Welman & Kruger, 2001). Guilford (1954) reported that the phenomenon may be ascribed to respondents requiring others to be similar to them in terms of the attribute and are surprised when the opposite is true.

Proximity error introduces high covariances among construct measures. Error is attributed to the nearness in space and time of items in an instrument. Similar items spaced close to each other tend to inter-correlate higher than when items are spaced apart (Guilford, 1954).

Statement formats and question formats have their individual effects on response styles. In personality and interest instruments, use is made of questions. Use is also made of intensity scales, which are often designed as ordinal measures. At times use is also made of the Likert scale, which is also an ordinal response scale (Schepers, 1992). Where statements are used in item design, respondents are likely to respond in the affirmative without having considered the content of the item (Petty et al., 1987; Schepers, 1992) This response style is referred to an acquiescence response style (Anastasi, 1968; Jackson & Messick, 1967). To deal with the problem, questions should be asked that require the respondent to engage with the items to avoid the acquiescent response (Schepers, 1992). Questions require more thoughtful responses (Petty et al., 1987).

Prestige bias occurs with the use of prestige names or intentional words that have value which are attached to the words. The effect is to confuse attitude with the evaluation of the issue at hand. Furthermore, prestige names add to the stimuli presented, thus contributing to the variance. The interpretation of the responses becomes difficult as respondents may or may not be responding to the named symbols or issue referred to (Smith & Squire, 1990).

Brown (1983) offers some advice to control bias. He suggested obtaining the co-operation of the respondents by explaining the purpose of the instrument. The instrument should also have clear instructions and be well structured to eliminate ambiguity.

Wording effects that affect metrics of instruments

Avoid abbreviations and vaguely worded items. Only those abbreviations and terms that have commonly understood meanings should be used in instruments (Fink, 1995b; Fowler, 1992; Gaskill, O'Muircheartaigh & Wright, 1994; Sarantakos, 1998).

Avoid slang and colloquial expressions. An instrument is likely to become redundant as words go out of fashion (Fink, 1995b; Sarantakos, 1998).

Avoid technical terminology by using plain language in question wording wherever possible (Fife-Schaw, 2000).

Avoid Intensifier words. Intensifier words tend to magnify the meanings of words. Words like very, good, satisfied and really may influence respondents to respond in a particular direction on a scale. Intensifier words effects are dependent on the context in which the words are used. Intensifiers do not create consistent responses in all situations (O'Muircheartaigh, Gaskill & Wright, 1993).

Avoid value judgements in item wordings. The views of sponsors should not be mentioned in items (Fife-Schaw, 2000). Context effects cannot be divorced from the context in which instruments are used. Questions referring to issues that are current in an organisation or other questions in the instrument will influence responses to questions (Fife-Schaw, 2000).

Avoid hidden assumptions. Items should not contain assumptions where respondents are required to respond to a situation that they have not been exposed to before or are not likely to be exposed to (Fife-Schaw, 2000).

RESEARCH METHOD

Research design

The research design followed in this study was ex post facto in nature where secondary data was used for the data analysis.

The sample

The sample for the study comprised of members working in different organisations ranging from service orientated organisations to information orientated organisations. The sample described below, represents the data common to all the samples utilised in the study. From Table 3 it is clear that most respondents are male, from different language groups and between 25 – 35 years old.

TABLE 3
THE SAMPLE

Characteristics	4-points response scale	5-point response scale	6-point response scale
Gender			
Males	1485	2034	381
Females	36	1879	27
Missing values	150	153	442
Total	**1671**	**4066**	**850**
Language			
Afrikaans	330	1014	193
English	111	225	41
Ndebele	4		4
North Sotho	68		31
South Sotho	299		164
Swazi	84		32
Tsongo	134		10
Tsawa	174		86
Venda	23		3
Xhosa	264		124
Zulu	108		71
Shangaan			62
Other languages	47	21	1
Missing data	25	2806	28
Total	1671	4066	850
Age			
24 years and younger	112	436	41
25-35 years of age	672	1808	323
36-45 years of age	549	1008	346
46 years of age	306	638	108
Missing data	32	176	32
Total	**1671**	**4066**	**850**
Organisations	Information technology	Financial services Retail Postal services	Mining

The measuring instrument

Different response scale formats of the Culture Assessment Instrument (CAI) were used in this study. The instrument was originally developed to measure the organisational culture of a financial institution. The instrument has since been used to assess organisational culture in other South African organisations (Martins & Martins, 2001).

The reliability of the five-point response scale (Cronbach Alpha) is 0,933. The internal consistency of the culture dimensions measures range from 0,655 to 0,932. Test-retest reliability is between 0,933 and 0,955 (Martins, 2000). The instrument is modelled on the work of Schein (Martins, 2000).

The instrument was initially developed with five-point Likert response-scale-requiring reactions to statements in positive and negative formats. The participant must indicate whether he/she, differs or agrees. The points on the scale are marked as follows: Scale point 1, indicates **strongly disagree**, scale point 2 indicates **differ**, scale point 3 indicates **uncertain**, scale point 4 indicates **agree**, and scale point 5 indicates **strongly agree**.

In adapting the instrument for customer requirements, use was made of the four and six-point response scales. The scales marking were:

Four-point response scale were marked, 1 indicated **strongly agree**, 2 indicated **agree**, 3 indicates **disagree** and 4 indicates **strongly disagree**.

Six-point response scale were marked, 1 indicated **strongly agree**, 2, indicates **agree**, 3 indicates **slightly agree**, 4 indicates **slightly disagree**, 5, indicates **disagree** and 6, indicates **strongly disagree**.

The full questionnaire had 79 items. Only 38 items from the questionnaire were used that were generic to all the organisations where the instrument was used.

Research procedure

The steps followed in the research process are reported in Table 4.

TABLE 4
METHODOLOGY PROCESS STEPS

Phase	Action
One	A database was developed after the Culture Assessment Instrument was used in different organisational settings. The settings include the application of the three response scales formats, i.e. four, five and six-point response scale format.
Two	Questions common to all the organisations were identified, Non-generic items were removed from the data set.
Three	The data sets were checked to ensure the correctness and completeness of the data.
Four	The data were then subjected to statistical analyses using the SPSS program to: • Obtain the descriptive statistics for the respective scales. • Establish the factor structure for the respective response scales using first and second order level factor analyses. • Establish the internal reliability, (Cronbach's alpha) through iterative item analyses.
Five	The analysed information will be reported and interpreted, From the results, recommendations will be made for future research.

Statistical analysis
With the data available, the data analysis is possible. As indicated earlier, the focus is on the data obtained from the four, five and six-point response scale format on the CAI. The purpose of the approach outlined below is to reduce the data so that conclusions may be drawn.

RESULTS

Results pertaining to the four-point response scale
The data for the four-point response scale originated in an information technology organisation. More detail of the sample is reported in Table 3.

Descriptive statistics for the four-point scale are reported in Table 5.

TABLE 5
FOUR POINT RESPONSE SCALE DESCRIPTIVE STATISTICS

Item	Mean	Median	Mode	Std. deviation	Skew-ness	Std. Error of skewness	Kurtosis	Std. Error of kurtosis
Q2	2,86	3,00	3	0,909	-0,564	0,060	-0,392	0,120
Q3	2,85	3,00	3	0,902	-0,580	0,060	-0,337	0,120
Q4	2,67	3,00	3	0,962	-0,360	0,060	-0,803	0,120
Q5	2,39	2,00	3	0,980	0,016	0,060	-1,039	0,120
Q6	2,58	3,00	3	1,027	-0,171	0,060	-1,103	0,120
Q9	2,69	3,00	3	0,983	-0,308	0,060	-0,905	0,120
Q10	2,73	3,00	3	1,066	-0,347	0,060	-1,116	0,120
Q11	2,83	3,00	3	0,943	-0,450	0,060	-0,669	0,120
Q12	2,41	3,00	3	1,088	0,015	0,060	-1,313	0,120
Q14	2,52	3,00	3	1,017	-0,108	0,060	-1,102	0,120
Q15	2,77	3,00	3	0,972	-0,497	0,060	-0,694	0,120
Q16	2,39	2,00	3	1,038	0,026	0,060	-1,195	0,120
Q17	2,52	3,00	3	0,921	-0,234	0,060	-0,817	0,120
Q18	2,47	3,00	3	1,035	-0,078	0,060	-1,169	0,120
Q20	2,56	3,00	3	0,971	-0,246	0,060	-0,930	0,120
Q21	2,56	3,00	3	1,005	-0,221	0,060	-1,036	0,120
Q25	2036	2,00	3	0,915	0,024	0,060	-0,873	0,120
Q26	2,39	2,00	3	0,921	-0,041	0,060	-0,898	0,120
Q31	2,32	2,00	2	0,988	0,154	0,060	-1,033	0,120
Q30	2,45	3,00	3	0,995	-0,098	0,060	-1,078	0,120
Q32	2,38	2,00	3	0,987	0,010	0,060	-1,067	0,120
Q33	2,37	3,00	3	1,016	-0,101	0,060	-1,211	0,120
Q34	2,53	3,00	3	0,996	-0,198	0,060	-1,030	0,120
Q38	2,81	3,00	3	0,876	-0,597	0,060	-0,207	0,120
Q39	2,72	3,00	3	0,922	-0,450	0,060	-0,583	0,120
Q40	2,89	3,00	3	0,833	-0,685	0,060	0,146	0,120
Q42	2,79	3,00	3	0,958	-0,544	0,060	-0,592	0,120
Q43	2,58	3,00	3	0,929	-0,336	0,060	-0,764	0,120
Q44	1,85	1,00	1	0,998	0,791	0,060	-0,657	0,120
Q47	2,98	3,00	3	0,877	-0,730	0,060	-0,013	0,120
Q48	2,68	3,00	3	0,932	-0,455	0,060	-0,630	0,120
Q50	2,82	3,00	3	0,905	-0,548	0,060	-0,392	0,120
Q51	3,11	3,00	3	0,903	-0,890	0,060	0,071	0,120
Q52	2,58	3,00	3	0,903	-0,270	0,060	-0,704	0,120
Q53	2,74	3,00	3	0,907	-0,458	0,060	-0,518	0,120
Q54	2,89	3,00	3	0,863	-0,648	0,060	-0,064	0,120
Q55	2,93	3,00	3	0,898	-0,628	0,060	-0,274	0,120
Q56	2,73	3,00	3	0,948	-0,444	0,060	-0,676	0,120

N = 167 Missing Values = 0 Minimum Value = 1 Maximum Value = 4

The data set for the four-point response scale was factor analysed on two levels according to a procedure suggested by Schepers (1992) in order to determine the factor structure of the instrument. The data was analysed using the SPSS programme.

To determine the suitability of the inter-correlation matrix for factor analysis, the Kaiser-Meyer-Olkin (KMO) Measure of Sampling adequacy (MSA) and Bartlett's Test of Sphericity were conducted on the matrix. The KMO yielded a MSA of 0,953 and the Bartlett's Test a Chi-square of 22158 (p = 0,000). The matrix is therefore suitable for further factor analysis.

The items of the CAI were inter-correlated and the eigenvalues of the unreduced matrix calculated. Due to the limited space, the inter-correlation matrix is not reported here. The number of factors postulated according to Kaiser's (1970) criterion (eigenvalues greater that unity) are reported in Table 6. These seven factors explain about 52% of the variance in the factor space. The item loadings on the seven postulated factors are presented in Table 7. The loadings are reported in bold type for each of the factors. Only items with values greater than 0,3 were included in this sorted matrix.

TABLE 6
EIGENVALUES ON THE ITEM INTER-CORRELATION MATRIX (38 X 38)

	Initial eigenvalues		
Root	Eigenvalue	% of variance	Cumulative %
1	**11,357**	29,887	29,887
2	**1,929**	5,076	34,962
3	**1,524**	4,011	38,973
4	**1,371**	3,608	42,581
5	**1,356**	3,567	46,148
6	**1,135**	2,986	49,134
7	**1,101**	2,898	52,032
8	0,994	2,616	54,649
9	0,940	2,474	57,123
10	0,884	2,326	59,448
11	0,837	2,204	61,652
12	0,786	2,067	63,719
13	0,763	2,007	65,726
14	0,736	1,937	67,663
15	0,729	1,918	39,581
16	0,687	1,809	71,390
17	0,654	1,702	73,110
18	0,633	1,666	74,776
19	0,625	1,645	76,422
20	0,596	1,568	77,990
21	0,582	1,532	79,522
22	0,573	1,509	81,031
23	0,545	1,434	82,465
24	0,534	1,406	83,871
25	0,522	1,372	85,244
26	0,514	1,353	86,597
27	0,490	1,289	87,886
28	0,474	1,246	89,132
29	0,450	1,185	90,317
30	0,446	1,173	91,490
31	0,441	1,160	92,651
32	0,430	1,133	93,783
33	0,426	1,120	94,903
34	0,413	1,087	95,990
35	0,408	1,072	97,062
36	0,384	1,010	98,072
37	0,371	0,976	99,048
38	0,362	0,952	100,000

Trace = 38

Table 7
Item loadings on seven postulated factors

	Factor						
Items	1	2	3	4	5	6	7
48	**0,568**						
56	**0,528**						
52	**0,494**						
39	**0,494**						
55	**0,487**	0,329					
40	**0,464**	0,344					
42	**0,433**						
43	**0,407**						
53		**0,609**					
54		**0,560**					
51	0,325	**0,558**					
50		**0,523**					
47	0,411	**0,471**					
38		**0,431**					
18		**0,399**	0,393				
16			**0,654**				
12			**0,544**				
17			**0,372**				
26	0,306		**0,348**				
44			**0,328**				
15			**0,317**				
32				**0,672**			
33	0,324			**0,494**			
31				**0,480**			0,319
34	0,342			**0,432**			
30				**0,417**			
10					**0,636**		
11	0,326				**0,523**		
9					**0,489**		
21					**0,396**		
14			0,322		**0,335**		
3						**0,610**	
4						**0,505**	
5						**0,384**	0,349
2						**0,381**	
25			0,304	0,308		**0,347**	
20						**0,268**	
6							**0,515**

Sub-scores on each of the postulated factors were calculated by adding item scores. These sub-scores were again inter-correlated and the results are portrayed in Table 8.

Table 8
Inter-correlation of sub-scores on seven postulated factors

	Factors						
Sub scores	1	2	3	4	5	6	7
1	1,000	0,680	0,626	0,637	0,566	0,586	0,359
2	0,680	1,000	0,566	0,493	0,598	0,525	0,360
3	0,626	0,566	1,000	0554	0,517	0,568	0,396
4	0,637	0,493	0,554	1,000	0,478	0,546	0,406
5	0,566	0,598	0,517	0,478	1,000	0,497	0,232
6	0,586	0,525	0,568	0,46	0,497	1,000	0,448
7	0,359	0,360	0,396	0,406	0,323	0,448	1,000

All correlations are significant at the p = 0,05 level.

Eigenvalues were again calculated on this unreduced inter-correlation matrix. Only one factor was postulated according to Kaiser's (1970) criterion (eigenvalues greater that unity) that accounts for about 59% variance in factor space. The results appear in Table 9.

Table 9
Eigenvalues on the sub-score inter-correlation matrix (7 X 7)

	Initial eigenvalues		
Root	Eigenvalue	% of variance	Cumulative %
1	**4,100**	58,573	58,573
2	0,768	10,971	69,544
3	0,555	7,928	77,471
4	0,455	6,497	83,969
5	0,440	6,279	90,248
6	0,410	5,858	96,105
7	0,273	3,895	100,000

Trace = 7

One factor was extracted using principal axis factoring. The loadings of sub-scores on the single factor appear in Table 10.

Table 10
Sub-score loadings on second level factor

	Factor Loadings	Communalities
	Sub-scores	1
1	0,831	0,691
2	0,761	0,579
3	0,758	0,574
4	0,735	0,525
5	0,728	0,479
6	0,692	0,540
7	0,508	0,258

Iterative item analyses were conducted on the single obtained scale. The item-test correlations as well as the test reliabilities (Cronbach Alpha) with the respective item deleted appear in Table 11. The obtained single scale yielded a Cronbach Alpha of 0,9345.

The reliability item statistics for the four-point scale are reported in Table 11.

Results pertaining to the five-point response scale

The sample for the five-point response scale is reported in Table 3.

Descriptive statistics for the five-point scale are reported in Table 12.

The data set for the five-point response scale was factor analysed on two levels according to a procedure suggested by Schepers (1992) in order to determine the factor structure of the instrument. The data was analysed using the SPSS programme.

Table 11
Item reliability statistics for the four-point scale

Item	Scale mean if item deleted	Scale variance if item deleted	Corrected item Total correlation	Alpha if item deleted
2	96,8294	396,5332	0,4462	0,9333
3	96,8324	396,1647	0,4611	0,9332
4	97,0150	368,0076	0,4612	0,9332
5	97,2908	369,9693	0,3984	0,9338
6	97,1065	366,2485	0,4745	0,9331
9	96,9916	366,0766	0,5029	0,9328
10	96,9527	369,3337	0,3778	0,9341
11	96,8612	368,6059	0,4547	0,9333
12	97,2795	367,1883	0,4217	0,9337
14	97,1688	363,3248	0,5570	0,9323
15	96,9144	365,6615	0,5206	0,9327
16	97,2974	369,9193	0,5034	0,9328
17	97,1682	368,0046	0,4837	0,9330
18	97,2190	365,9951	0,4772	0,9331
20	97,1239	367,4284	0,4726	0,9331
21	97,1287	365,4415	0,5077	0,9328
25	97,3279	367,5451	0,5010	0,9328
26	97,2974	366,3815	0,5311	0,9326
31	97,3656	366,7051	0,4828	0,9330
30	97,2382	362,2917	0,5987	0,9319
32	97,3004	366,8654	0,4794	0,9331
33	97,3107	367,0634	0,4585	0,9333
34	97,1538	364,0955	0,5488	0,9324
38	96,8749	369,7670	0,4579	0,9332
39	96,9701	363,8817	0,6037	0,9319
40	96,7965	369,5322	0,4910	0,9330
42	96,8971	370,2409	0,4013	0,9338
43	97,1041	363,7173	0,6029	0,9319
44	97,8360	368,5192	0,4293	0,9335
47	96,7050	365,0620	0,6005	0,9320
48	97,0018	361,9862	0,6512	0,9315
50	96,8683	366,6749	0,5326	0,9326
51	96,5709	366,1852	0,5482	0,9324
52	97,1017	366,3238	0,5443	0,9325
53	96,9467	365,6073	0,5627	0,9323
54	96,7923	368,7742	0,4959	0,9329
55	96,7576	364,2939	0,6085	0,9319
56	96,9563	362,7831	0,6165	0,9318

No of cases = 1671
No of items = 38
Cronbach alpha 0,9345

To determine the suitability of the inter-correlation matrix for factor analysis, the Kaiser-Meyer-Olkin (KMO) Measure of Sampling adequacy (MSA) and Bartlett's Test of Sphericity were conducted on the matrix. The KMO yielded a MSA of 0,960 and the Bartlett's Test a Chi-square of 47436 (p = 0,000). The matrix is suitable for further factor analysis.

The items of the CAI were inter-correlated and the eigenvalues of the unreduced matrix calculated. Due to the limited space, the inter-correlation matrix is not reported here. The number of factors postulated according to Kaiser's (1970) criterion (eigenvalues greater that unity) are reported in Table 13. These six factors explain about 47% of the variance in the factor space. The item loadings on the six postulated factors are presented in Table 14. The loadings are reported in bold type for each of the factors. Only items with values greater than 0,3 were included in this sorted matrix.

Table 12
Five-point response scale descriptive statistics

Item	Mean	Median	Mode	Std. deviation	Skew-ness	Std. Error of skewness	Kurtosis	Std. Error of kurtosis
Q2	3,93	4,00	4	0,904	-1,135	0,038	1,418	0,077
Q3	3,82	4,00	4	1,092	-0,959	0,038	0,161	0,077
Q4	3,32	4,00	4	1,236	-0,443	0,038	-1,005	0,077
Q5	2,82	3,00	2	1,214	-0,114	0,038	-1,043	0,077
Q6	3,06	3,00	4	1,394	-0,148	0,038	-1,381	0,077
Q9	3,41	4,00	4	1,236	-0,462	0,038	-1,033	0,077
Q10	3,33	4,00	4	1,370	-0,375	0,038	-1,192	0,077
Q11	3,40	4,00	4	1,243	-0,430	0,038	-1,020	0,077
Q12	3,80	4,00	4	1,217	-0,988	0,038	-0,045	0,077
Q14	2,99	3,00	4	1,340	-0,084	0,038	-1,376	0,077
Q15	3,72	4,00	4	1,241	-0,899	0,038	-0,290	0,077
Q16	2,88	3,00	4	1,385	-0,011	0,038	-1,375	0,077
Q17	2,83	3,00	2	1,197	0,044	0,038	-1,045	0,077
Q18	3,01	3,00	4	1,371	-0,194	0,038	-1,307	0,077
Q20	3,58	4,00	4	1,047	-0,664	0,038	-0,160	0,077
Q21	3,03	3,00	4	1,336	-0,104	0,038	-1,257	0,077
Q25	3,14	3,00	4	1,181	-0262	0,038	-1,039	0,077
Q26	3,21	4,00	4	1,253	-0,379	0,038	-1,053	0,077
Q31	2,86	3,00	4	1,246	0,032	0,038	-1,274	0,077
Q30	2,74	2,00	4	1,323	0,123	0,038	-1,349	0,077
Q32	2,98	3,00	4	1,254	-0,137	0,038	-1,213	0,077
Q33	3,40	4,00	4	1,191	-0,625	0,038	-0,708	0,077
Q34	3,32	4,00	4	1,139	-0,450	0,038	-0,854	0,077
Q38	3,16	3,00	4	1,171	-0,272	0,038	-0,943	0,077
Q39	3,68	4,00	4	1,018	-0,827	0,038	0,035	0,077
Q40	3,30	4,00	4	1,281	-0,483	0,038	-0,985	0,077
Q42	3,23	4,00	4	1,441	-0,343	0,038	-1,322	0,077
Q43	2,81	3,00	4	1,292	-0,019	0,038	-1,291	0,077
Q44	2,59	2,00	2	1,253	0,283	0,038	-1,181	0,077
Q47	3,53	4,00	4	1,114	-0,765	0,038	-0,303	0,077
Q48	3,35	4,00	4	1,211	-0,536	0,038	-0,810	0,077
Q50	3,79	4,00	4	1,170	-0,904	0,038	-0,152	0,077
Q51	3,44	4,00	4	1,132	-0,583	0,038	-0,611	0,077
Q52	2,95	3,00	4	1,168	-0,109	0,038	-1,103	0,077
Q53	3,41	4,00	4	1,131	-0,583	0,038	-0,696	0,077
Q54	3,41	4,00	4	1,131	-0,583	0,038	-0,622	0,077
Q55	3,41	4,00	4	1,229	-0,540	0,038	-0,784	0,077
Q56	3,17	4,00	4	1,387	-0,239	0,038	-1,314	0,077

N = 4066 Missing values = 0 Minimum value = 1 Maximum value = 5

Sub-scores on each of the postulated factors were calculated by adding item scores. These scores were again inter-correlated and the results are portrayed in Table 15.

A KMO test for sampling adequacy and Bartlett's test for sphericity was performed to test the suitability of this matrix for factor analysis.

Eigenvalues were again calculated on this unreduced inter-correlation matrix. Only one factor was postulated according to Kaiser's (1970) criterion (eigenvalues greater that unity) that accounts for about 57% variance in factor space. The results appear in Table 16.

One factor was extracted using principal axis factoring. The loadings of sub-scores on the single factor appear in Table 17.

Iterative item analyses were conducted on the single obtained scale. The item-test correlations as well as the test reliabilities (Cronbach Alpha) with the respective items deleted appear in

Table 18. The obtained single scale yielded a Cronbach Alpha of 0,9248.

Table 13
Eigenvalues on the item inter-correlation matrix (38 × 38)

	Initial eigenvalues		
Root	Eigenvalue	% of variance	Cumulative %
1	10,529	27,709	27,709
2	2,013	5,297	33,006
3	1,627	4,282	37,288
4	1,313	3,454	40,742
5	1,170	3,080	43,822
6	1,134	2,985	46,808
7	0,986	2,596	49,403
8	0,929	2,445	51,849
9	0,884	2,327	54,176
10	0,853	2,245	56,421
11	0,808	2,153	58,574
12	0,788	2,125	60,699
13	0,771	2,074	62,773
14	0,745	2,029	64,802
15	0,731	1,960	66,762
16	0,718	1,923	68,685
17	0,699	1,890	70,575
18	0,693	1,839	72,414
19	0,648	1,824	74,239
20	0,624	1,706	75,945
21	0,624	1,643	77,588
22	0,615	1,618	79,206
23	0,601	1,583	80,789
24	0,593	1,560	82,345
25	0,584	1,538	83,667
26	0,573	1,507	85,393
27	0,558	1,467	86,860
28	0,529	1,391	88,252
29	0,508	1,337	89,589
30	0,507	1,334	90,923
31	0,488	1,284	92,206
32	0,471	1,239	93,446
33	0,464	1,221	94,667
34	0,431	1,134	95,801
35	0,424	1,115	96,916
36	0,412	1,085	98,001
37	0,399	1,049	99,050
38	0,361	0,950	100,00

Trace = 38

Table 14
Item loadings on six postulated factors

	Factor					
Items	1	2	3	4	5	6
16	**0,611**					
18	**0,609**					
42	**0,606**					0,332
40	**0,573**					
17	**0,565**					
26	**0,553**					
55	**0,506**					0,362
48	**0,424**	0,306				
43	**0,421**					
25	**0,419**					
14	**0,335**					
38	**0,296**					
44	0,312	**0,476**				
34		**0,458**				
50		**0,449**				
20		**0,429**				
53		**0,421**				
39		**0,412**				
21	0,362	**0,385**	0,330			
15		**0,354**				
11			**0,697**			
10	0,302		**0,631**			
9			**0,585**			
12						
6				**0,499**		
4				**0,497**		
5				**0,490**		
3				**0,461**		
2				**0,370**		
30					**0,491**	
31					**0,496**	
32					**0,447**	
47	0,307				**0,318**	
33						
51						**0,429**
54		0,339				**0,401**
52						**0,381**
56						**0,353**

Table 15
Inter correlation matrix of sub-scores on six postulated factors (6 X 6)

	Factor					
Factors	1	2	3	4	5	6
1	1,000	0,575	0,559	0,500	0,682	0,542
2	0,575	1,000	0,493	0,475	0,574	0,389
3	0,559	0,493	1,000	0,360	0,439	0,332
4	0,500	0,475	0,360	1,000	0,517	0,340
5	0,682	0,574	0,439	0,517	1,000	0,460
6	0,542	0,389	0,332	0,340	0,460	1,000

All correlations are significant at the p = 0,05 level.

Table 16
Eigenvalues on the sub-score inter-correlation matrix (6 X 6)

	Initial eigenvalues		
Root	Eigenvalue	% of variance	Cumulative %
1	3,440	57,339	57,339
2	0,694	11,566	68,905
3	0,655	10,919	79,824
4	0,488	8,139	87,963
5	0,437	7,277	95,240
6	0,286	4,760	100,00

Trace = 6

Table 17
Sub-score loadings on the second level factor

	Factor loadings	Communalites
Sub-scores	1	
1	0,858	0,736
2	0,789	0,520
3	0,721	0,379
4	0,617	0,380
5	0,615	0,623
6	0,577	0,333

Table 18
Item reliability statistics for the five-point scale

Item	Scale mean if item deleted	Scale variance if item deleted	Corrected item Total correlation	Alpha if item deleted
2	119,9764	566,1874	0,2836	0,9246
3	120,0821	562,6545	0,2964	0,9247
4	120,5831	547,7880	0,5165	0,9225
5	121,0876	553,2834	0,4282	0,9236
6	120,8689	547,5689	0,4553	0,9232
9	120,4889	547,2330	0,5116	0,9226
10	120,5780	546,8634	0,4754	0,9230
11	120,5010	548,5359	0,5000	0,9227
12	120,1008	555,9539	0,3793	0,9240
14	120,9129	549,9821	0,4363	0,9234
15	120,1840	559,3447	0,3120	0,9247
16	121,0189	539,0533	0,5947	0,9215
17	121,0760	543,4464	0,6151	0,9215
18	120,8947	540,7938	0,5728	0,9218
20	120,3232	561,1290	0,3423	0,9242
21	120,8756	542,3004	0,5642	0,9219
25	120,7641	546,0833	0,5750	0,9219
26	120,6904	538,8682	0,6662	0,9209
31	121,0401	547,6995	0,5138	0,9225
30	121,1596	540,0791	0,6080	0,9214
32	120,9225	547,0875	0,5208	0,9225
33	120,5049	555,2311	0,4018	0,9237
34	120,5856	555,4934	0,4177	0,9235
38	120,7469	554,3386	0,4262	0,9235
39	120,2226	546,5996	0,2806	0,9247
40	120,6058	539,9269	0,6322	0,9212
42	120,6242	543,6939	0,4974	0,9228
43	121,0935	548,9256	0,4727	0,9230
44	121,3180	549,6890	0,4755	0,9230
47	120,3684	548,4453	0,5656	0,9221
48	120,5553	544,0846	0,5956	0,9217
50	120,1178	551,6636	0,4763	0,9230
51	120,4678	548,7199	0,5506	0,9222
52	120,9501	555,2297	0,4108	0,9236
53	120,4338	551,1426	0,4883	0,9228
54	120,4934	552,9482	0,4696	0,9230
55	120,4899	542,4661	0,6156	0,9214
56	120,7381	570,5555	0,1015	0,9274

No of cases = 4066
No of items = 38
Cronbach alpha 0,9248

Results pertaining to the six-point scale
The sample is reported in Table 3.

The descriptive statistics are reported in Table 19.

Table 19
Six-point response scale descriptive statistics

Item	Mean	Median	Mode	Std. deviation	Skew-ness	Std. Error of skewness	Kurtosis	Std. Error of kurtosis
Q2	3,70	4,00	5	1,682	-0,402	0,084	-1,279	0,168
Q3	4,18	5,00	5	1,461	-0,780	0,084	-0,455	0,168
Q4	3,78	4,00	5	1,537	-0,530	0,084	-0,923	0,168
Q5	3,61	4,00	5	1,597	-0,315	0,084	-1,223	0,168
Q6	3,58	4,00	5	1,644	-0,251	0,084	-1,253	0,168
Q9	4,41	5,00	5	1,495	-0,663	0,084	-0,683	0,168
Q10	4,15	5,00	5	1,547	-0,647	0,084	-0,768	0,168
Q11	4,22	5,00	5	1,391	-0,726	0,084	-0,368	0,168
Q12	4,16	5,00	5	1,646	-0,652	0,084	-0,847	0,168
Q14	3,59	4,00	5	1,569	-0,223	0,084	-1,210	0,168
Q15	4,33	5,00	5	1,329	-0,885	0,084	0,054	0,168
Q16	3,61	4,00	5	1,649	-0,204	0,084	-1,286	0,168
Q17	3,38	4,00	4	1,469	-0,150	0,084	-1,105	0,168
Q18	3,53	4,00	5	1,695	-0,158	0,084	-1,344	0,168
Q20	3,77	4,00	5	1,454	-0,502	0,084	-0,894	0,168
Q21	3,26	3,00	5	1,595	0,089	0,084	-1,233	0,168
Q25	3,51	4,00	5	1,516	-0,251	0,084	-1,156	0,168
Q26	3,66	4,00	5	1,562	-0,329	0,084	-1,189	0,168
Q31	3,31	4,00	4	1,513	-0,063	0,084	-1,185	0,168
Q30	3,59	4,00	5	1,551	-0,358	0,084	-1,129	0,168
Q32	3,26	3,00	4	1,528	-0,041	0,084	-1,252	0,168
Q33	3,47	4,00	5	1,585	-0,213	0,084	-1,271	0,168
Q34	,076	4,00	5	1,534	-0,362	0,084	-1,014	0,168
Q38	4,23	5,00	5	1,340	-0,869	0,084	-0,101	0,168
Q39	4,00	4,00	5	1,365	-0,587	0,084	-0,641	0,168
Q40	4,25	5,00	5	1,317	-0,845	0,084	-0,055	0,168
Q42	4,47	5,00	5	1,551	-1,062	0,084	-0,007	0,168
Q43	3,90	4,00	5	1,301	-0,644	0,084	-0,460	0,168
Q44	2,98	3,00	1	1,614	0,226	0,084	-1,335	0,168
Q47	4,33	5,00	5	1,299	-0,932	0,084	0,183	0,168
Q48	3,91	4,00	5	1,507	-0,598	0,084	-0,777	0,168
Q50	4,13	5,00	5	1,305	-0,784	0,084	-0,241	0,168
Q51	4,62	5,00	5	1,284	-1,055	0,084	0,407	0,168
Q52	3,84	4,00	5	1,367	-0,615	0,084	-0,608	0,168
Q53	4,00	4,00	5	1,469	-0,535	0,084	-0,850	0,168
Q54	4,11	4,00	5	1,421	-0,558	0,084	-0,659	0,168
Q55	3,91	4,00	5	1,483	-0,566	0,084	-0,779	0,168
Q56	3,96	5,00	5	1,461	-0,678	0,084	-0,750	0,168

The data set for the six-point response scale was factor analysed on two levels according to a procedure suggested by Schepers (1992) in order to determine the factor structure of the instrument. The data was analysed using the SPSS programme.

To determine the suitability of the inter-correlation matrix for factor analysis, the Kaiser-Meyer-Olkin (KMO) Measure of Sampling adequacy (MSA) and Bartlett's Test of Sphericity were conducted on the matrix. The KMO yielded a MSA of 0,938 and the Barlett Test a Chi-square of 12571 (p = 0,000). The matrix is suitable for further factor analysis.

The items of the CAI were inter-correlated and the eigenvalues of the unreduced matrix calculated. Due to the limited space, the inter-correlation matrix is not reported here. The number of factors postulated according to Kaiser's (1970) criterion (eigenvalues greater that unity) are reported in Table 20. These six factors explain about 52% of the variance in the factor space. The item loadings on the six postulated factors are presented in Table 21. The loadings are reported in bold type for each of the factors. Only five factors yielded significant item loadings.

Factor five was non-determined, having only one significant loading. Only items with values greater than 0,3 were included in this unreduced matrix.

Table 20
Eigenvalaues on the item inter-correlation matrix (38 X 38)

	Initial eigenvalues		
Root	Eigenvalue	% of variance	Cumulative %
1	10,666	28,068	28,068
2	3,644	9,589	37,657
3	1,770	4,657	42,314
4	1,483	3,903	46,216
5	1,158	3,048	49,264
6	1,087	2,861	52,125
7	0,997	2,622	54,747
8	0,908	2,391	57,138
9	0,892	2,347	59,485
10	0,849	2,233	61,718
11	0,807	2,124	63,842
12	0,781	2,055	65,897
13	0,735	1,934	67,830
14	0,729	1,918	69,748
15	0,682	1,796	71,544
16	0,668	1,758	73,302
17	0,657	1,729	75,031
18	0,638	1,680	76,711
19	0,625	1,646	78,357
20	0,581	1,529	79,886
21	0,562	1,478	81,364
22	0,537	1,412	82,776
23	0,524	1,378	84,154
24	0,517	1,360	85,514
25	0,500	1,315	86,829
26	0,478	1,258	88,088
27	0,463	1,218	89,306
28	0,447	1,177	90,483
29	0,430	1,131	91,614
30	0,427	1,123	92,738
31	0,396	1,043	93,78
32	0,387	1,017	94,798
33	0,364	0,958	95,756
34	0,361	0,949	96,705
35	0,341	0,897	97,602
36	0,321	0,845	98,447
37	0,310	0,817	99,264
38	0,280	0,736	100,000

Trace = 38

Sub-scores on each of the five postulated factors were calculated by adding item scores. These sub-scores were again inter-correlated and the results are portrayed in Table 22.

A KMO test for sampling adequacy and a Bartlett's Test of sphericity was performed to test the suitability of this matrix for factor analysis. The KMO yielded a MSA of 0,662 and Bartlett's Test a Chi-square of 939,17 (p = 0,000). The matrix is suitable for further factor analysis.

Eigenvalues were again calculated on this unreduced inter-correlation matrix. Two factors were postulated according to Kaiser's (1970) criterion (eigenvalues greater that unity) that account for about 70% variance in factor space. The results appear in Table 23.

Table 21
Item loadings on six postulated factors (6X6)

Items	1	2	3	4	5	6
55	0,727					
26	0,719					
56	0,669					
17	0,662					
33	0,658					
25	0,646					
16	0,642					
32	0,611					
18	0,567					
30	0,531		0,327			
21	0,527					
48	0,464					0,419
4	0,463					
52	0,461	0,345				
42	0,444					
14	0,441					
44	0,441					
31	0,427		0,344		0,360	
20	0,336		0,302			0,087
54		0,691				
53		0,652				
50		0,607				
51		0,591				
40		0,584				
38		0,563				
47		0,533				
39	0,328	0,439				
15		0,424				
43	0,355	0,380				
9		0,380				
5			0,686			
6			0,478			
3			0,472			
10				0,645		
11		0,375		0,574		
12				0,568		
2	0,342			-0,385		
34		0,335			0,516	

Table 22
Inter-correlation matrix of sub-scores on five postulated factors (5 X 5)

	1	2	3	4	5
1	1,000	0,522	0,516	0,026	0,342
2	0,522	1,000	0,301	0,356	0,452
3	0,516	0,301	1,000	-0,30	0,194
4	0,26	0,356	-0,30	1,000	0,313
5	0,343	0,452	0,194	0,131	1,000

All correlation are significant ate the p = 0,05 level.

Two factors were extracted using principal axis factoring. The loadings on the sub-scores appear in Table 24.

Table 23
Eigenvalues on the sub-score inter-correlation matrix (5 X 5)

Initial eigenvalues			
Root	Eigenvalue	% of variance	Cumulative %
1	2,273	45,450	45,450
2	1,210	24,202	69,652
3	0,620	12,401	82,053
4	0,538	10,754	92,807
5	0,360	7,193	100,000

Trace = 5

The scores were inter-correlated and the results portrayed in Table 24. Factor 2 is non-determined. In order to create an equal base for comparison, the factor analysis was forced into a single factor solution.

Table 24
Sub-scores on the second level factor

	Factors loadings	
Sub-scores	1	2
1	0,889	0,278
2	0,582	0,113
3	0,564	0,662
4	0,002	0,646
5	0,368	0,547

One factor was extracted using principal axis factoring. The loadings of the sub-scores on a single factor appear in Table 25.

Table 25
Factor correlation matrix

	Factor	
Factor	1	2
1	1,000	0,272
2	0,272	1,000

Iterative item analyses were conducted on the single obtained scale. The item-test correlations as well as the test reliabilities (Cronbach Alpha) with the respective item deleted appear in Table 26. The obtained single scale yielded a Cronbach Alpha of 0,9273.

Table 26
Sub-score loadings on the second level factor

	Factor	Communalities
Sub scores	1	
1	0,806	0,649
2	0,686	0,470
3	0,527	0,278
4	0,493	0,243

The item reliability statistics are reported in Table 27.

Table 27
Item reliability statistics for the six-point scale

Item	Scale mean if item deleted	Scale variance if item deleted	Corrected item Total correlation	Alpha if item deleted
55	126,0412	700,8758	0,6000	0,9241
26	126,2941	694,7944	0,6428	0,9235
56	125,9918	704,6654	0,5593	0,9246
17	126,5682	699,8946	0,6190	0,9239
33	126,4800	695,5196	0,6239	0,9237
25	126,4424	701,5756	0,5763	0,9243
16	126,3512	696,2085	0,5889	0,9241
32	126,6859	699,5278	0,5975	0,9241
18	126,4235	696,9912	0,5623	0,9245
30	126,3612	695,7599	0,6357	0,9236
21	126,6929	701,3131	0,5484	0,9247
48	126,0424	702,9287	0,5630	0,9245
4	126,1718	704,1236	0,5355	0,9248
2	126,1141	704,5347	0,6032	0,9242
42	125,4812	712,8766	0,4213	0,9262
14	126,3612	707,3829	0,4832	0,9255
44	126,9694	707,1062	0,4714	0,9256
31	126,6376	705,8709	0,5227	0,9250
20	126,1776	712,0874	0,4635	0,9256
54	125,8376	718,1314	0,3943	0,9264
53	125,9471	720,3329	0,3509	0,9269
50	125,8224	713,2487	0,5054	0,9252
51	125,3341	715,6974	0,4779	0,9255
40	125,7012	722,9565	0,3597	0,9267
38	125,7165	716,3706	0,4462	0,9258
47	125,6224	715,6464	0,4723	0,9256
39	125,9541	709,2146	0,5379	0,9249
15	125,6212	718,9824	0,4128	0,9262
43	126,0541	711,4411	0,5337	0,9249
9	125,8129	716,4868	0,3930	0,9265
5	126,3376	715,0508	0,3813	0,9267
6	126,3753	708,5851	0,4440	0,9260
3	125,7694	721,1694	0,3424	0,9270
4	126,1859	713,1715	0,4230	0,9262

No of cases = 850
No of items = 34
Cronbach alpha 0,9273

A Cronbach Alpha 0,9273 was calculated. The Alpha values if an item is deleted are of the order of 0,92 for all the items. Cortina (1993) indicated that a Cronbach Alpha of 0,7 and more is significant.

DISCUSSION

Comparative findings and discussion of the four, five and six-point response scales

The study set out to identify which response scale would provide the best metric properties on the CAI.

The item statistics for the respective response scales indicate that most of the items were negatively skewed indicating that most of the respondents were in agreement with the statements posed in the CAI.

The factor structures are similar, with a single factor extracted in each of the respective scales, except for the six-point scale where a single factor solution was forced. Range ranges of the item statistics are reported in Table 28.

Table 28
Ranges of item reliability statistics for the four, five and six point scales

Response scale	Range of scale means if item deleted		Range of scale variances if item deleted		Range of corrected items – total correlation		Range of Alpha scores if item deleted		Cronbach Alpha
	Low	High	Low	High	Low	High	Low	High	
Four-point	96,5709	97,9360	361,9862	396,5332	0,3778	0,6512	0,9315	0,9338	0,9345
Five-point	119,9764	120,9501	540,7938	561,1290	0,1015	0,6662	0,9212	0,9247	0,9248
Six-point	125,3341	126,9694	695,5196	718,1314	0,3424	0,6428	0,9235	0,9269	0,9273

The Alpha values of the respective response scales all have high reliabilities that exceed 0,7. Values more than 0,7 are significant (Cortina, 1993). The literature makes no further distinction regarding the significance of values that exceed 0,7 making further interpretation difficult.

The column where the ranges have larger differences is limited to the ranges of corrected items and total correlation. Here the ranges are wider indicating larger differences between the lowest and the highest values in terms of the correlated values. The highest values for the three scales do not indicate major differences. The values for the four and six-point response scales are close, while the largest difference on the low score is for the five-point scale. The differences are attributed to the characteristics of the sample populations completing the CAI and the effects of the using ordinal scales. The differences in the sample populations include:

- Data collected in different organisations that are not comparable in terms of core business;
- Home language of most of the respondents was not English. The majority of respondents have indicated that their first language is not English. Where items are not clear or ambiguous, respondents are likely to respond in the affirmative (Greenleaf, 1992; Mda, 2000).
- Standard biographical data is not available for all the response scales. In the six-point response format there was a significant number of respondents that have lower levels of qualifications. Low levels of qualified respondents are likely to respond at the either extreme ends of response scales (Backman & O'Malley, 1984; Greenleaf, 1992).
- Ages of respondents varied across the data sets. Older respondent are likely to respond at the extremes of response scales (Greenleaf, 1992).
- Comparisons of the reliabilities of the respective scales indicate differences, but the overall differences are not significant. The lack of significant differences between the Alphas is attributed to differences in the sample populations that completed the CAI and the effects of using ordinal scales. The response format in the CAI was a combination ordinal scale with statements. Schepers (1992) reported that a combination of ordinal scale with statements affects responses.
- Another possible factor could explain the results of the Alphas. This requires a re-examination of the Cronbach Alpha formula. This formula suggests when V_X is restricted (as in the case of the four-point scale) the obtained coefficient Alpha would increase. This may explain the slightly higher coefficient for the four-point scale. The fact that ordinal scales were used with all three-scale formats may be the reason for the relative small differences in overall reliabilities.
- The items included in the instrument do not indicate any unusual practice in business. Most businesses engage in the practices reflected in the items. The nature of the items would be typical practice in most organisations, hence the affirmative responses by the respondents to most of the items in all three of the response scales.
- In the design of items the instrument employs statement-type items on a five-point, Likert type scale. Schepers (1992) indicates that there is a high likelihood for respondents to engage in acquiescence bias where items are of the statement linked to the Likert type labelled response points. Participants are less likely to engage in the items where statement type items are included (Petty et al., 1987).
- James (1982) and Glick (1985) argue that when doing organisational research that requires respondents to respond in terms of their opinion and perceptions, the perceptions relate to ambiguity autonomy influence, facilitation support and warmth (James, 1982). There also exists possibility that two levels of research result. At the one level is the organisation, while at another level is the respondent's psychological level. This creates two units of measurement (James 1982; & Glick, 1985). Glick (1985) further argues that the literature makes a distinction between organisational and psychological unit concepts. The levels should therefore be treated as different levels of measures in organisational research. Organisational culture included a variety of psychological variables. The present study may have run into the dilemma of mixing the psychological with the organisational units of measurement.

While the postulates proposed have not been confirmed, the study has again highlighted aspects that require attention in culture instrument results interpretation. Aspect that requires attention include:

- The comparison of the respective scales would only be meaningful once organisation level units and psychological level units are clearly defined and accommodated in the research design (James, 1982).
- The paucity of research relating response styles in the South African population.
- In the format used, the number of items was limited to 38 items. To justify the effort, more items need to be developed that would measures at the less obvious levels of organisational culture. The instrument should then be used where organisations are comparable in terms of core business, and sample characteristics. Once the many of the extraneous variables are controlled, the possibility exists to make meaningful comparisons of the respective scales (Klein & Kozlowski, 2000).
- Instrumentsshould be developed taking a question format combined with an intensity scale. This is likely to control biased responses and improve the metric properties of the instrument (Schepers, 1992).

Limitations of the research include

- The effects of organisation, age, education, gender language, race and income levels were not considered in the data analysis which may have allowed for more comparable data to be extracted.
- The lack of standard biographical data across all the scales did not allow for comparisons to be made or for comparisons within the samples of the respective response scales.
- The results were based on an instrument of only 38 items that measure organisational culture at a superficial level. A more robust measure with multiple levels of culture (Schein, 1985) may have produced more significant results.

Emanating from this study, the following research is suggested:

- To investigate the true effects of response formats (that is four, five and six-point response formats within similar samples and organisations.
- Investigating the wording effects on response scales on the South African population.
- Establish the effects of changes in wording on response scales, positive to negative and negative to positive and the relationship to response styles.
- Specific effects of age and education, language, gender, income and race in response sets and styles.
- The effect of changing the response positions i.e., changing the 'don't know' from the middle positions to the end of the response options where Likert type response scale are required.
- To research the racial differences, the effects of socio-economic and educational levels of respondents in relation to response bias.
- What the effect would be on the metrics of instruments by re-designing the response scale in the intensity scale and question format.
- Evaluate the Culture Assessment Instrument and the different response scales using data from similar organisations with comparable sample.

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