

**THE AUTHENTIC LEADERSHIP INVENTORY:
MEASUREMENT INVARIANCE IN SELECTED
INDUSTRIES IN SOUTH AFRICA**

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COMMENTS

The reader is reminded of the following:

- The editorial style in the first and last chapters of this mini-dissertation follows the format prescribed by the Programme in Industrial Psychology of the North-West University (Vaal Triangle Campus).
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- This mini-dissertation is submitted in the form of a research article. The editorial style specified by the South African Journal of Industrial Psychology is used in the second chapter.

DECLARATION

I, Leoni van der Vaart, hereby declare that “Authentic Leadership Inventory: Measurement invariance in selected industries in South Africa” is my own work and that both the views and the opinions expressed in this mini-dissertation are my own and those of the authors as referenced in the text and indicated in the reference lists. I furthermore declare that this work will not be submitted to any other academic institution for qualification purposes.

LEONI VAN DER VAART

OCTOBER 2015

DECLARATION OF LANGUAGE EDITING

I hereby declare that I was responsible for the language editing of the mini-dissertation **Authentic Leadership Inventory: Measurement invariance in selected industries in South Africa** submitted by **Leoni van der Vaart**.

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SUMMARY

Title: The Authentic Leadership Inventory: Measurement invariance in selected industries in South Africa.

Key terms: Authentic leadership, extreme contexts, gender, mining, public health care, trust in leader, validation

A need exists for validating the authentic leadership construct across different contexts and ensuring measurement invariance of the Authentic Leadership Inventory (ALI) in different groups. Despite this need, few attempts have been made in a South African context to evaluate the psychometric properties of this instrument and to demonstrate whether it is invariant. This is important given the fact that South Africa differs significantly from Western countries where the majority of theorising and empirical testing of the construct was performed. These differences may influence the way in which individuals interpret observed indicators. Furthermore, leadership is socially constructed and context-dependent, influencing both the interpretation of leadership behaviour as well as the effectiveness thereof in different organisational contexts.

The aim of this study was to evaluate measurement invariance of the ALI in two organisations from different industries, after the construct and concurrent validity of the instrument had been investigated. A cross-sectional survey with two convenience samples, namely mining (N = 244) and public health care (N = 633), was used. The ALI, a sub-scale of the Workplace Trust Scale (WTS), and a biographical questionnaire were administered. The results showed that a one-factor model fitted the data best in the mining organisation. This is contradictory to the original conceptualisation of authentic leadership which is considered to be a higher-order construct comprising four lower-order dimensions, namely self-awareness, balanced processing, internalised moral perspective and relational transparency. Results indicated that authentic leadership significantly predicted followers' trust in the leader; thereby establishing the concurrent validity of the instrument. The instrument was also found to be reliable (i.e. internally consistent) in the two organisations.

Measurement invariance by gender and organisational groups was evaluated and in both instances only partial (configural and scalar) invariance could be established, indicating the biasness of certain items in the measure. Finally, no significant differences existed in terms of the mean levels of authentic leadership for the respective gender and organisational groups. The results highlighted the importance of evaluating the equivalence of an instrument in different contexts, especially instruments measuring leadership behaviour.

Recommendations were made for organisations and further research.

CHAPTER 1

INTRODUCTION

The aim of this mini-dissertation was to determine whether the Authentic Leadership Inventory (ALI) is equivalent, from a measurement perspective, across two organisations from different industries. This chapter comprises the problem statement, objectives of the study and the methodology used, both for data collection and data analysis.

1.1 PROBLEM STATEMENT

Changing, dynamic and complex global business environments pose significant challenges for contemporary businesses that not only need to survive, but also to thrive (Barton, Grant, & Horn, 2012). When these businesses wish to create real change, effective leadership is needed (Satell, 2014), for effective leadership is the bridge between business strategy and optimal organisational performance (Dinwoodie, Quinn, & McGuire, 2014). During the last half of the 20th century, businesses were structured hierarchically with a top-down leadership approach. Businesses, however, need leadership in the 21st century that will create learning organisations (George, 2010). Learning organisations are organisations that are able to align employees with their strategy, empower their leaders, focus on customer service delivery, and facilitate collaboration among employees throughout the organisation (George, 2010). Organisations are also under pressure to have more open and transparent processes and systems (Avolio & Luthans, 2006). Openness and transparency are evident in the popularity of websites such as WikiLeaks and glassdoor.com (Avolio & Walumbwa, 2014). In the context of the current emphasis on ethical business practices and positive forms of leadership, authentic leadership is considered to be important for organisations (Algera & Lips-Wiersma, 2012; Onorato & Zhu, 2014).

Through leading with integrity and values, authentic leaders enable employees to create meaning (Algera & Lips-Wiersma, 2012) with suitable follower outcomes (Pues, Wesche, Streicher, Braun, & Frey, 2012) such as increased organisational commitment (Walumbwa, Avolio, Gardner, Wernsing, & Peterson, 2008); job satisfaction (Amunkete & Rothmann, 2015; Giallonardo, Wong, & Iwasiw, 2010; Walumbwa et al., 2008); work engagement (Du Plessis, 2014; Roux, 2010; Wang & Hsieh, 2013); psychological safety (Walumbwa &

Schaubroeck, 2009); well-being (Illies, Morgeson, & Nahrgang, 2005); employee performance (Clapp-Smith, Vogelsang, & Avey, 2009; Walumbwa et al., 2008); extra effort (Walumbwa et al., 2008); voice (speaking up to share ideas) behaviour (Wong, Laschinger, & Cummings, 2010); lower burnout (Laschinger & Fida, 2014; Read & Laschinger, 2013); workplace bullying (Laschinger & Fida, 2014); and psychological capital (Amunkete & Rothmann, 2015). Authentic leadership has also been linked to ensuring long-term sustainability for organisations (Maldonado, 2013; Neider & Schriesheim, 2011).

Avolio (2007), Avolio and Walumbwa (2014), and Haddon, Loughlin, and McNally (2015) postulate that leadership should not be taken out of the context in which it operates. According to these authors, leadership may influence the context, but in turn, the effectiveness of the leader also depends on the context (Avolio, 2007; Avolio & Walumbwa, 2014; Haddon et al., 2015). Besides being context-dependent, leadership is also socially constructed, making the measurement thereof challenging (Haddon et al., 2015). Although authentic leadership, as a construct, has been used in a variety of contexts and with a variety of groups (Northouse, 2013; Onorato & Zhu, 2014), the fact that the field is in its early stages of operationalisation warrants more attention to studies focusing on the validation of the construct (Gardner, Coglisier, Davis, & Dickens, 2011). Validity - the instrument measures what it intends to measure - is an important criterion to be met before instruments may be utilised (Anastasi & Urbina, 1997; Roodt, 2013).

Validation studies in non-Western contexts are even more important because development of the construct and empirical evaluation were mainly performed in Western contexts (Avolio & Walumbwa, 2014; Gardner et al., 2011). Byrne and Watkins (2003) criticise research that indiscriminately applies concepts from one context to the next. According to them, these researchers ignore the fact that managerial behaviour is conceptualised differently, individuals interpret items differently and they respond differently to the response scales of the instrument/s (Byrne & Watkins, 2003). This indicates that measures may not be invariant (or equivalent) across contexts and one cannot assume equivalence. Measurement invariance is defined by Horn and McArdle (1992) as the ability of scales to measure the same phenomena when these phenomena are studied under different conditions. According to Roodt (2013), the aim of measurement invariance is to determine if scales measure the same construct across different contexts; it is determined through a specific factor analysis procedure. Measurement invariance enables researchers to maximise the validity of the conclusions they make based on

test scores (Roodt, 2013). The elimination of measurement bias (ensuring equivalence) facilitates the achievement of this goal (Van De Vijver & Leung, 2011). Without validation in different contexts, consequent authentic leadership development risks being considered a “fad” without any long-term sustainable impact on individuals and organisations (Avolio & Walumbwa, 2014). South Africa differs significantly from Western countries in terms of economic indicators, geography, language, political perspectives and social indicators (Joshnloo, Wissing, Khumalo, & Lamers, 2013) which may potentially influence the way in which observed indicators are interpreted.

Studies utilising authentic leadership, as measured by the *Authentic Leadership Questionnaire* (ALQ), in an African context (excluding South Africa) were conducted in Kenya with working adults from eleven different American multinational companies (see Walumbwa et al., 2008); and in Namibia with employees from a state-owned enterprise (Amunkete & Rothmann, 2015). In a South African context, published research included a private sector health care organisation (Du Plessis, 2014), and two manufacturing organisations (Munyaka, 2012; Roux, 2010). The ALQ was developed by Walumbwa et al. (2008) and it was the first measuring instrument designed to measure authentic leadership based on the most current definition. Contradicting findings were reported in studies that utilised this instrument in South Africa: Munyaka (2012) reported that a two-factor model fitted the data best and Du Plessis (2014) reported that a four-factor model had a poor fit with the data, supporting the need for validation studies in different contexts.

The *Authentic Leadership Inventory* (ALI; Neider & Schriesheim, 2011) was developed by Neider and Schriesheim in reaction to some concerns they had with the ALQ (Walumbwa et al., 2008). These concerns were three-fold: (1) The instrument was not available for commercial use - future use for research purposes was going to become challenging; (2) content analysis was very subjective - rigorous procedures should be used to determine the validity and reliability of instruments in the field of leadership (Schriesheim & Coglisier, 2009), before subsequent research is conducted with these measures (Neider & Schriesheim, 2011); and (3) Walumbwa et al. (2008) found that a second-order factor model fitted the data significantly better than a first-order factor model. Their results - a better fitting higher-order model - might have been inflated by using two correlated errors or “garbage parameters” (Neider & Schriesheim, 2011). Consequently, Neider and Schriesheim developed the ALI - based on the four dimensions conceptualised and operationalised by Walumbwa et al. (2008) to address

these concerns by using more rigorous assessment procedures for content and convergent validity and to test competing models without “garbage parameters”.

Authenticity is not a new concept and dates back as early as 1966 when Sartre defined it as “being true to oneself” and “not deceiving oneself” (as cited in Avolio & Mhatre, 2012). In 1983, Henderson and Hoy first attempted to define leader authenticity, referring to leadership authenticity and inauthenticity respectively as:

the extent to which subordinates perceive their leader to demonstrate the acceptance of organizational and personal responsibility for actions, outcomes, and mistakes; to be non-manipulating of subordinates; and to exhibit salience of self over role. Leadership inauthenticity is defined as the extent to which subordinates perceive their leader to be ‘passing the buck’ and blaming others and circumstances for errors and outcomes; to be manipulative of subordinates; and to be demonstrating a salience of role over self (pp. 67-68).

In a review of literature, Gardner et al. (2011) stated that various researchers have since defined both authenticity and authentic leadership. Currently, authentic leadership is a higher-order construct - based on a description initially advanced by Kernis and Goldman (2006) - that is defined as leadership that “draws on positive psychological capacities and positive ethical climate to foster the four core dimensions of authentic leadership, enabling positive follower self-development” (Walumbwa et al., 2008, p. 94). Authentic leadership originated from positive psychology which is defined as the scientific study of the factors that enable people and institutions to flourish, such as well-being, positive traits and institutions (Seligman & Csikszentmihalyi, 2000).

Positive institutions have been studied from different disciplines such as *positive organisational scholarship* (POS; Cameron & Spreitzer, 2012) and *positive organisational behaviour* (POB; Luthans, 2002a). Luthans (2002b) defines POB as “the study and application of positively oriented human resource strengths and psychological capacities that can be measured, developed and effectively managed for performance improvement in today’s workplace” (p. 59). POB refers to individual level characteristics (Luthans, 2002a); whereas POS refers to organisational characteristics (Cameron, 2005). More recently, Zbierowski and Góra (2014) placed positive leadership on the organisational level. According to them, positive

leadership leads to positive organisations and positive behaviour. Authenticity is one of the core attributes that a positive leader should have (Mishra & Mishra, 2012).

Conceptualising the construct authentic leadership, Walumbwa et al. (2008) proposed a higher-order structure consisting of four dimensions for authentic leadership which were used in the development of the ALQ. The first dimension, *self-awareness* refers to a process of reflection which enables the leader to gain insight into various intrapersonal characteristics (i.e. values, strengths, personality) and the impact thereof on followers (Kernis, 2003). The second dimension, *internalised moral perspective* refers to strong moral convictions which guide behaviour and decision making from a self-regulation perspective (Gardner, Avolio, Luthans, May, & Walumbwa, 2005). Decision making is also influenced by *balanced processing*, the third dimension, in which the individual gathers information and reaches decisions as objectively as possible, often challenging his/her own deeply held beliefs and values (Gardner et al., 2005). Working from the inside out, it allows leaders to share their inner feelings and thoughts openly, referring to *relational transparency* (Kernis, 2003), the fourth dimension.

The ALI was developed with four items for each of the four dimensions using the two sample items - for each of the dimensions - provided by Walumbwa et al. (2008). This was done to ensure alignment with the theoretical conceptualisation of authentic leadership and yielded sixteen items in total. Both the newly constructed instruments and the original eight sample items from the ALQ were administered with the sample. The respondents had to indicate to what extent the items reflected the behaviour as defined in the four dimensions (Neider & Schriesheim, 2011). The procedure was based on a technique developed by Schriesheim, Cogliser, Scandura, Lankau, and Powers (1999) and Schriesheim, Powers, Scandura, Gardiner, & Lankau (1993). Subsequently, ANOVA and t-tests were performed in order to determine which item should be assigned to which dimension. Data was also subjected to principal component analysis to determine the number of factors (underlying dimensions) that should be extracted. After removing two problematic items, the final version of the ALI consists of 14 items: Three items measuring relational transparency and three items measuring self-awareness; four items measuring internalised moral perspective; and four items measuring balanced processing (Neider & Schriesheim, 2011).

After obtaining positive results for content validity, the ALI was subjected to reliability testing as well as tests for empirical factor structure in order to determine whether the theoretically

distinct dimensions are also perceived as distinct by the respondents, a critical step recommended by Hinkin (1998). The developers also measured the extent to which the ALI is likely to be contaminated by social desirability and or impression management. Preliminary results from their second study supported internal consistency, content, construct and discriminant validity and freedom from impression management (Neider & Schriesheim, 2011). Notable differences were detected in the factor structures for the two groups in the preliminary study. In their final assessment of the factor structure, overall support was found for a higher-order factor. The developers concluded that the appropriateness of considering authentic leadership a higher-order (global) construct depends on *who* is described (Neider & Schriesheim, 2011). In a recent study conducted by Stander, De Beer, and Stander (2015), authentic leadership as measured by the ALI was found to consist of only one factor with all fourteen items loading onto the one factor. Based on the contradictory findings within and between these two studies, findings on the construct validity of this instrument remain inconsistent and warrant further investigation. The current study added to this investigation by evaluating the construct validity of the ALI in a mining organisation. This evaluation also guided the establishment of baseline models for the separate organisations in this study; a prerequisite for invariance testing as stipulated by Wang and Wang (2012).

When assessing the validity of an instrument, attention is paid to three types of validity: Content-description, construct-identification, and criterion-prediction (Anastasi & Urbina, 1997). Content-description falls largely outside the scope of the current study. Establishing the factorial validity is one way of determining whether the measure actually measures what it says it measures and forms part of construct-identification validity (Roodt, 2013). The third type, criterion-prediction, includes concurrent validity and can be defined as the extent to which the independent variable accurately predicts a dependent variable at the specific moment. These three types of validity should be evaluated in the stated sequence in order to provide a holistic “validity picture” of the measure (Roodt, 2013).

The perceived lack of ethical decision making, discussed earlier, leads to a breakdown in trust. Trust is a core requirement for leaders to influence their followers (Beddoes-Jones, 2012; Wang & Hsieh, 2013). Theories, such as the Social Exchange Theory (Blau, 1964), suggest that leaders have a positive impact on employees through workplace trust. Trust is defined as “an individual’s willingness to act on the basis of his/her perception of a trust referent (peer, supervisor/manager or organisation) being supportive/caring, ethical, competent and cognisant

of others' performance" (Ferres, 2003, p. 8). Ferres (2003) distinguished between three referents when investigating trust. For the purpose of this study, trust in the leader (direct supervisor) was investigated. Trust in authentic leaders not only transpires from consistency between the words and actions of the leader, but also when followers perceive the leader to be morally grounded (Wang & Hsieh, 2013).

Hannah, Uhl-Bien, Avolio, and Cavaretta (2009) believe that extreme contexts entail unique circumstances creating unique challenges for leaders, furthering the argument for the investigation of the outcomes of authentic leadership in different contexts. This investigation also establishes the concurrent validity of the ALI. Even though concurrent validity has been established with other variables (trust in organisation, optimism and work engagement) in a health care organisation (Stander et al., 2015), it - to date - has not been established in the mining organisation; a research gap that has been addressed by the current study. This also sets this stage for evaluating the measurement invariance of the ALI which has not been done to date.

Roodt (2013) suggests that, in an attempt to generalise validity, validation studies should follow a sequential process where one conducts validation studies in a specific organisation and then gradually expand them to industries; ultimately including multiple countries and cultures. Therefore, the current study investigated the construct validity of authentic leadership in the mining organisation before continuing with measurement invariance testing across the two organisations from two different industries. Roodt (2013) furthermore postulated that certain variables may have an impact on the validity of a measuring instrument. Paustian-Underdahl, Walker, and Woehr (2014) included the type of organisation as one (contextual) variable that should be considered. According to Hannah et al. (2009), extreme contexts entail more risks - psychologically and physically - and require a good leader to support and guide them in facing stressors which arise before, during or after stressful events and situations (Hannah et al., 2009). The current study included two organisations which differ in terms of risks that employees face (physical versus psychological), and also regarding profit bearing versus non-profit bearing.

One such (psychologically) extreme context and non-profit organisation is the public health care sector. Insecure working (practice) environments, work overload due to understaffing and limited learning and promotional opportunities led to a significant number of workers in this

sector feeling ill-equipped to deal with the pressures flowing from dealing with a vast number of patients (George, Atujuna, & Gow, 2013). The demanding practice environment results in work-related ill-health and negatively impacts these individuals' ability to serve the community (Aiken et al., 2012). Leadership research in this context has received increasing attention in order to enhance insight into the impact on organisational outcomes (Jooste, 2004; Kumar, 2013; Mosadeghrad, 2014). The "10 Point Plan" of the South African Department of Health (DoH; 2009 – 2014) was developed with the aim to improve the quality of health care services in South Africa. This sets the stage for "National Core Standards" against which institutions providing health care services will be evaluated. These standards consist of seven dimensions, of which leadership (strategic direction through proactive leadership) is one (DoH, 2011).

Another extreme (physically and for profit) context can be found in the mining industry. According to Paul and Maiti (2005), mining in South Africa is one of the toughest and most dangerous occupations. The mining industry, in general, contributes significantly to the economy by being an important role player in developing infrastructure, ensuring economic sustainability and creating jobs (Chamber of Mines, 2014). The country relies heavily on mineral resources and mines are confronted by many challenges (Deloitte, 2013). Besides the macro-economic challenges (e.g. economic downturn) that national mines are facing, a number of micro- and meso-level challenges – labour unrest, uncertain regulatory environment, and increasing demands from government – are also being faced (Deloitte, 2013; PricewaterhouseCoopers, 2014).

Both these industries are currently being faced by challenges that require significant changes, and therefore, effective leadership. Leadership in health care might still align better with female attitudinal descriptors - explained by Appelbaum, Audet, and Miller (2003) - such as "consideration, participative, and people-orientated"; whereas leadership in mining might align better with male attitudinal descriptors explained as "structure, instruction-giving and business-orientated" (p. 48). In a meta-analysis conducted by Paustian-Underdahl et al. (2014), the type of organisation mattered in the event of it being a male-dominated industry; however, not in the event of it being a female-dominated industry.

Although these organisations can be labelled as male- and female-dominated respectively, the role that differences between these organisations play should not be ignored. Vecchio (2002) and Avolio and Walumbwa (2014) advocated considering the total context in which leaders

operate, beyond the normative gender characteristics which offer a too simplistic view. According to Balasubramanian and Krishnan (2012), gender differences in leadership styles depend on the context in which these genders work. According to the open systems theory (Boulding, 1956; Miller, 1965), subsystems exist within larger systems (Katz & Kahn, 1978). In this study the two different organisations can be considered two subsystems within the larger system, the country. Similarities within these subsystems may lead to similar preferences (Gilbert, Burnett, Phau, & Haar, 2010). The similarities shared by employees in this instance are the respective elements of their organisational cultures. The organisational culture consists of four elements: Assumptions, beliefs and values, norms, and artefacts (Armstrong & Taylor, 2014). The expression of individual values can be influenced by organisational values (Câmara & Pereira-Guizzo, 2015), even though individual values are considered to be one's most stable and enduring characteristics (Rothmann & Cooper, 2015). Previous research (Roe & Ester, 1999) has indicated that social categories (such as organisations) display similar value profiles.

Another contextual variable, that influences followers' responses to authentic leadership, is followers' characteristics (Avolio & Walumbwa, 2014; Woolley, Caza, & Levy, 2011) such as gender (Avolio, Mhatre, Norman, & Lester, 2009; McColl-Kennedy & Andersen, 2005). From a research perspective, it is important that the potential impact of gender differences when measuring unobserved constructs is understood. Gender is a biological category and males and females differ visibly from one another (Balasubramanian & Krishnan, 2012). Men and women respond differently to a number of social aspects and these responses can be categorised as agentic or communal (Bakan, 1996; Eagly, 1987; Koenig, Eagly, Mitchell, & Ristikari, 2011; Schein, 1973, 2007). The communal category – with higher mean scores for women – focuses on interpersonal relationships and caring for others. The agentic category – with higher mean scores for men – focuses on tasks, individualism and assertiveness (Eagly, 1987, 2009; Spence & Buckner, 2000). It is assumed that women would prefer leadership styles that are more democratic as opposed to males who prefer autocratic leadership styles (Eagly, Johannesen-Schmidt, & Van Engen, 2003). In general, based on the operational definition of authentic leadership, this way of leading seems to incorporate what Koenig et al. (2011) refer to as feminine interpersonal qualities such as “warmth, sensitivity and understanding” (p. 634). Du Plessis (2014) found significantly higher mean scores for males on the balanced processing dimension, ascribing it to gender stereotypes in which males value objective, rational thinking more than females and, consequently, place more value on this dimension of authentic leadership (Du Plessis, 2014).

These differences are supported by the Social Role Theory that postulates that men and women both display and value different behaviours (Eagly, 1987; Eagly & Johannesen-Schmidt, 2001). Leaders need to understand these differences in behaviours in today's diverse business world in order to be successful (Nguyen, Ermasova, Geyfman, & Mutjaba, 2014). Given the increasing number of women in leadership positions (PricewaterhouseCoopers, 2013), it would only make sense to investigate how authentic leadership is perceived by men and women and if there are any differences (Avolio & Walumbwa, 2014). This is also important considering the aim of both the Employment Equity Act 55 of 1998 and the Broad-Based Black Economic Empowerment Amendment Act 46 of 2013, namely rectifying the inequalities of the past by ensuring that both genders are equally represented in the workplace; even more so advocating for Black female leadership (Gobind, 2013). The current study also aimed at evaluating the measurement invariance of the ALI across gender groups and to compare the mean scores of males and females on the dimensions of the ALI, before proceeding with measurement invariance testing across organisations.

Paustian-Underdahl et al. (2014) state that more research should be done to understand how the expectations of followers regarding leaders' behaviour can influence (perceived) leadership effectiveness. Since leadership is considered to be "in the eye of the beholder", psychometrically sound instruments are required and data should be collected from multiple samples in order to draw firm conclusions about the factor structure of the ALI (Neider & Schriesheim, 2011). Researchers (Dimitrov, 2010; Ding, Ng, & Wang, 2014; Van De Schoot, Lugtig, & Hox, 2012) furthermore strongly advocate for measurement invariance tests in the context of comparing groups. Van De Vijver and Leung (1997) emphasised the importance of conducting tests of measurement invariance before comparisons are made between and within groups. This is especially true for the social and behavioural sciences where self-report measures are utilised to assess the dynamics of human behaviour (Van De Schoot et al., 2012; Van De Vijver & Leung, 1997). Only once measurement invariance has been established, the antecedents and outcomes of latent factor scores can be compared (Van De Schoot et al., 2012).

The aims of this study were to (a) determine construct and concurrent validity and reliability; (b) test the assumptions of invariance of the ALI in two different organisations after having tested it in the two gender groups; and (c) compare latent means of the different dimensions of authentic leadership in these different gender and organisational groups. Exploring these

differences might facilitate a better understanding of the variable under study. If measurement invariance of an instrument is not confirmed, cross-gender and cross-organisational comparisons cannot be meaningfully interpreted (Dimitrov, 2010; Van De Vijver & Leung, 1997). Hannah et al. (2009) believe that extreme contexts are unique, furthering the argument for the investigation of the outcomes (such as trust) of authentic leadership in these contexts.

1.2 RESEARCH QUESTIONS

The following research questions arise from the problem statement:

- How are authentic leadership and validation methods conceptualised in literature?
- Is authentic leadership, as measured by the ALI, a four-factor structure in the mining organisation?
- Is the internal consistency or reliability of the ALI acceptable in the mining organisation?
- Is authentic leadership, as measured by the ALI, a significant predictor of trust in the leader in the mining organisation?
- Is authentic leadership, as measured by the ALI, invariant across gender groups?
- Is authentic leadership, as measured by the ALI, invariant across two organisations?
- Do gender and organisations differ significantly across the dimensions of authentic leadership?
- What recommendations can be made for future research and practice?

1.3 RESEARCH AIMS

1.3.1 General Aim

The general aim of the study is to establish measurement invariance for the ALI across two South African organisations from two different industries.

1.3.2 Specific Aims

The specific objectives of the study are to:

- Conceptualise authentic leadership and validation methods according to literature;
- Determine whether authentic leadership, as measured by the ALI, is a four-factor construct in the mining organisation;
- Evaluate whether the internal consistency or reliability of the ALI is acceptable in the mining organisation;
- Determine whether authentic leadership, as measured by the ALI, is a significant predictor of trust in the leader in the mining organisation;
- Investigate whether authentic leadership, as measured by the ALI, is invariant across gender groups;
- Investigate whether authentic leadership, as measured by the ALI, is invariant across two organisations;
- Evaluate whether mean scores for gender and organisations differ significantly across the dimensions of authentic leadership; and
- Make recommendations for future research and practice.

1.4 RESEARCH METHOD

1.4.1 Research Approach and Design

The research was performed from a quantitative approach. De Vos, Strydom, Fouché, and Delport (2011) explain that quantitative research utilises measuring instruments which generate numerical data which is used to compare and analyse different variables. A cross-sectional survey research design was used. According to De Vos et al. (2011), a cross-sectional design entails collection of data at a specific moment and it is most often utilised when the researcher aims to describe differences in a population at that particular moment. Data was collected by means of questionnaires (surveys). The study's objectives were both descriptive and exploratory in nature. The study aimed to describe the relationship between authentic leadership and trust in the leader, but explored the factor structure and measurement invariance of the instrument. Primary (health care) and secondary data (mining) were used in this study.

1.4.2 Participants

The data generated in the health care organisation formed part of a more comprehensive research project of the North-West University, Vaal Triangle Campus, investigating the work-related well-being of health care professionals in the public sector. The research population in the health care organisation comprises approximately 2000 public health care employees in the Sedibeng region (this includes clinics and hospitals located in and around Heidelberg, Sebokeng, Vanderbijlpark, and Vereeniging). For the purpose of this study, data was obtained through non-probability sampling, being convenience sampling in accordance with the procedure described by De Vos et al. (2011). In the first stage, participants who were more easily accessible (those who were on duty at the time) were asked to complete the questionnaire. The second stage involved that a gatekeeper at each facility was asked to distribute questionnaires to those that were not on duty. This method was repeated until a representative sample of participants had completed the questionnaire. The final sample consisted of 633 employees.

Non-probability, specifically convenience sampling, was used in the mining organisation. The data was generated as part of a bigger research project of the university. The final sample included 244 employees from different departments within the Free State operations. A prerequisite for both samples was English literacy. Kline (2011) considers 200 the typical sample size in SEM studies; therefore, the current study followed this broad guideline. It is important to note that an appropriate sample size depends on a number of factors and differs from one situation to the next (Múthen & Múthen, 2002). Factors such as the size of the model, the distribution (spread) and reliability (internal consistency) of the variables, the number of missing data, the strength of the relationships between the variables, and statistical power requirements influence the sample size (Múthen & Múthen, 2002).

1.4.3 Measuring Instruments

The following measuring instruments were utilised:

Biographical Questionnaire

A biographical questionnaire was used to determine the demographics of the research participants in order to not only provide a detailed description of the study population, but also

to evaluate group differences on certain variables. These characteristics include age, gender, home language, race, level of education, tenure, position, and job level in current organisation.

Authentic Leadership Inventory (ALI; Neider & Schriesheim, 2011)

The ALI was utilised for the purpose of measuring employees' perception of their direct supervisor as "authentic leader", and was based on four first-order factors: *Self-awareness*, *balanced processing*, *internalised moral perspective* and *relational transparency*. The ALI consists of fourteen items. Example items include "My leader solicits feedback for improving his/her dealings with others" and "My leader encourages others to voice opposing points of view". The items are scored on a five-point Likert-type scale ranging from 1 (disagree strongly) to 5 (agree strongly). Cronbach's alpha coefficients indicated that the scale in general is reliable ($\alpha = .74$ to $.85$; Neider & Schriesheim, 2011). After testing competing models in different groups with different individuals rated as the leader, mixed results had been obtained. In one group, a 14-item model with four first-order factors had the best fit with the data; whilst in the other two groups, a second-order factor model fitted the data best. ALI item 9 had a mediocre loading on its assigned factor (.46), compared to the rest of the items; and had a high level of measurement error (.79; Neider & Schriesheim, 2011). In a South African context, the ALI proved to be a reliable measure ($\alpha = .93$; Stander et al., 2015).

Workplace Trust Survey (WTS: Ferres, 2003)

The WTS was used to measure trust in the leader. This subscale consists of nine items. An example item includes "I act on the basis that my manager displays integrity in his/her actions". Items are recorded on a seven-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). Ferres and Travaglione (2003) demonstrated that the internal reliability was consistently high ($\alpha = .96$).

1.4.4 Procedure

After permission had been obtained from a representative of the Department of Health in the Sedibeng district, information regarding the project and a consent letter requesting participation were attached to the questionnaires. The information letter explained the objectives and importance of the study as well as voluntary participation in the research. Participants were allowed to complete the questionnaire at a venue of their choice after which they submitted the

completed questionnaires in a secured box at each medical facility. The gatekeeper identified other suitable participants in the organisation who could participate in the study.

After permission had been obtained from management at the mining organisation, a consent form explaining the objectives of the study was attached to the questionnaire and distributed to the different managers. The managers were requested to disseminate the questionnaire among their subordinates, which took approximately 30 minutes to complete. The participants had two weeks to complete the questionnaire and reminder emails were sent one week after distribution of the questionnaires. Completed questionnaires were submitted in a secure box located at the Human Resource division. Participation in the study was voluntary and anonymity and confidentiality were ensured.

1.4.5 Statistical Analysis

Mplus 7.31 (Muthén & Muthén, 1998-2012) was used for data analyses. Kline (2011) suggests two steps to evaluate models when performing structural equation modelling (SEM) – also known as latent variable modelling. Firstly, to test the factorial validity of the measurement model, confirmatory factor analysis (CFA) was performed. The structural model was evaluated next by adding the regression relationships in line with the hypotheses (Byrne, 2012). The best fitting measurement model (indicating correlational relationships) was used as basis for the structural models. The models were validated by obtaining estimates of the parameters of the models and by determining whether the models provided good fit to the data (Byrne, 2012). According to Kline (2011), a valid measurement model is needed before one can proceed to specify the structural model and, therefore, all variables should be included in the measurement model. It is important to note that competing models were tested with a Maximum Likelihood Robust estimator (MLR), which takes into account the spread of the data (i.e. skewness and kurtosis; Wang & Wang, 2012).

The following indices were used to assess the model fit in both steps: Chi-square (χ^2); degrees of freedom (df); Root Mean Square Error of Approximation (RMSEA); the Standardised Root Mean Square Residual (SRMR); and incremental fit indices, including the Comparative Fit Index (CFI) and the Tucker-Lewis Index (TLI). CFI and TLI values higher than .95 are considered acceptable (Hu & Bentler, 1999). RMSEA values lower than .08 indicate acceptable fit between the model and the data (Hair, Black, Babin, & Andersen, 2010). SRMR values

closer to zero are ideal, but values lower than .08 are acceptable (West, Taylor, & Wu, 2012). Both the Akaike Information Criterion (AIC) and the Bayes Information Criteria (BIC) were used to compare the measurement models; the lower the value, the better the model (Hair et al., 2010). Chi-square values cannot be used directly to compare models; therefore the Satorra-Bentler chi-square difference test was performed (Satorra & Bentler, 2001, 2010). The reliabilities of the scales were calculated by means of composite reliability coefficients (ρ), a confirmatory-based estimate of scale reliability recommended by Raykov (2009). The .70 guideline was used as cut-off value for reliability (Wang & Wang, 2012).

Measurement invariance testing was used where the hypotheses determined whether an assessment instrument operated in the same way in different groups, and by determining whether the underlying construct had the same meaning for each demographic (gender and organisation) group. This is an important prerequisite for comparing groups on a certain construct (Dimitrov, 2010). Three types of invariance need to be addressed, namely configural, metric, and scalar. In the case of *configural invariance*, a baseline model for the multi-group is identified (Byrne, 2012). *Metric invariance* refers to equal factor loadings across groups which ensure the relationships between a latent factor and its items are equivalent; whereas *scalar invariance* refers to intercepts being equivalent across groups, that is, item bias is not present (Byrne, 2012; Dimitrov, 2010).

Measurement invariance is evaluated on three levels, namely weak (metric invariance is required), strong (metric- and scalar invariance are required) and strict (metric-, scalar- and invariance of item uniqueness are required) (Byrne, 2012; Dimitrov, 2010). In each case, configural invariance was determined first, followed by metric invariance (Byrne, 2012; Dimitrov, 2010). Parametrisation methods recommended by Van De Schoot et al. (2012) were used. Invariance is accepted if the chi-square difference is not statistically significant when comparing nested models (Byrne, 2012). A change of less than .01 in the CFI value is recommended (Wang & Wang, 2012). In order to assess differences between gender and organisational groups, differences in the mean scores were compared by means of t-tests. Only in the event of significant differences, Cohen's d was calculated to determine the practical significance of such differences. Cohen's d can be interpreted as follows: Trivial effect size (≤ 0.20), small effect size (> 0.20), moderate effect size (≥ 0.50), or large effect size (≥ 0.80 ; Cohen, 1988).

1.5 ETHICAL CONSIDERATIONS

An ethics application was submitted to the Ethics Committee of the North-West University for approval prior to data collection in the health care organisation as part of a larger research project (NWU-HS-2014-0146). Ethical approval was also obtained prior to data collection in the mining organisation (OPT-2014-006). An ethics application was also submitted to obtain permission for the use of primary data (health care) and secondary data (mining) for this particular study (NWU-HS-2014-0253). The data collected in both these studies was done anonymously. Ethical considerations that guided these research projects entailed that participants were informed that their participation was voluntary; they gave informed consent; and they were assured of anonymity and confidentiality of their responses. The primary investigators took care not to cause harm to participants and to respect the rights and dignity of all participants.

1.6 EXPECTED CONTRIBUTIONS OF THE STUDY

1.6.1 Expected Contributions for the Individual

In order for followers to perceive their leader as authentic (Weischer, Weibler, & Petersen, 2013), the leader's thoughts and actions should reflect all four dimensions of authentic leadership (Gardner et al., 2005; Illies et al., 2005). The value added by the four dimensions collectively is also more than the sum of the individual dimensions; thus indicating synergy (Du Plessis, 2014). It is, therefore, important to investigate whether the construct operates in the same way in different groups and whether it has the same meaning for all, since it may explain differences in the experiences and outcomes of authentic leadership. If it is found to be a valid and reliable instrument, it can become a useful tool and guide for leadership development in these organisations.

1.6.2 Expected Contributions for the Organisation

In the 2015 Human Capital Trends Report for South Africa, participants indicated that leadership is one of the top five human capital trends that they perceive as important (Deloitte, 2015). Rothmann and Cooper (2015) support this by emphasising the importance of leadership based on the number of publications on the topic. A comprehensive understanding of an

effective leadership “prototype” requires a sound understanding of the context in which leaders operate. This is becoming increasingly important in a business environment where change is inevitable (Haddon et al., 2015). Authentic leadership has been associated with a number of positive outcomes for the organisation (Pues et al., 2012), as previously mentioned. Authentic leadership development (ALD) is worth investing in for the organisation. However, Avolio and Walumbwa (2014) emphasise that evidence-based interventions (such as ALD) should be based on well-validated models and methods. Clapp-Smith et al. (2009) highlight the importance of good research by stating that organisations turn to literature when making decisions in terms of leadership development and selection. The results of the present study may subsequently facilitate the tailoring of interventions for the specific organisation and gender groups that participated.

1.6.3 Expected Contributions for I/O Psychology Research

In science, research cannot separate the “what” from the “how”. The knowledge one gains is interlinked with the method used to acquire the knowledge (Nunnally & Bernstein, 1994) and valid measurement is at the core of explaining, studying and understanding phenomena, especially leadership (Schriesheim & Coglisier, 2009). The study contributes to literature by evaluating the validity (construct and concurrent) of the ALI in a South African mine. The current study is the first study to date that establishes whether the ALI is equivalent across both gender groups. If this can be demonstrated, future studies utilising this instrument can compare the scores of gender groups on the authentic leadership construct.

Du Plessis (2014) assessed a variety of demographic differences when utilising the ALQ to test some of the theoretical assumptions proposed by Eagly (2005) and Gardiner (2011). However, a “less than perfect model fit” of the measurement model for authentic leadership in the study led to subsequent analyses being interpreted with caution. Measurement invariance was also not evaluated before the mean scores were compared. In a recent review of leadership and leadership development, Day, Fleenor, Atwater, Sturm, and McKee (2014) highlighted the unique challenges of developing female leaders. Eagly (2005) stated that it is even more challenging for females, due to their minority status, to demonstrate relational authenticity, a prerequisite for the social identification process through which followers are influenced. Cooper, Scandura, and Schriesheim (2005) cautioned against rushing authentic leadership development in practice before some of these core assumptions had been tested empirically.

The current study aims to test some of these assumptions empirically by comparing males and females on different dimensions of authentic leadership, before making recommendations for female leadership development.

Du Plessis (2014) proposed that future studies should examine measurement invariance of the authentic leadership construct across different samples and occupational levels. In line with this, the current study also paves the way for structural equivalence testing by being the first to date to evaluate measurement invariance of the ALI across two different organisations. According to Wang and Wang (2012), measurement invariance is a prerequisite for structural invariance. In line with the recommendations provided by Roodt (2013), the current study contributes to the process of generalising validity across countries and cultures by investigating it in two different organisations.

1.7 CHAPTER DIVISION

Chapter 1: Introduction

Chapter 2: Research article

Chapter 3: Conclusions, limitations and recommendations

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CHAPTER 2

RESEARCH ARTICLE

Authentic Leadership Inventory (ALI): Measurement invariance in selected industries in South Africa

Abstract

A need exists for validating the authentic leadership construct across different contexts and ensuring measurement invariance of the Authentic Leadership Inventory (ALI) in different groups. Despite this need, few attempts have been made in a South African context to evaluate the psychometric properties of this instrument and to demonstrate its invariance. The aim of this study was to evaluate measurement invariance of the ALI in two organisations from different industries, after the construct and concurrent validity of the instrument had been investigated. A cross-sectional survey with two convenience samples, namely mining (N = 244) and public health care (N = 633) was used. The ALI, a sub-scale of the Workplace Trust Scale (WTS), and a biographical questionnaire were administered. The results showed that a one-factor model fitted the data best in the mining organisation and that authentic leadership significantly predicted followers' trust in the leader. Measurement invariance was evaluated by gender and organisational groups and in both instances only partial invariance could be established. Finally, no significant differences existed in terms of the mean levels of authentic leadership for the respective gender and organisational groups. This has important implications for both researchers and practitioners utilising the ALI.

Keywords

Authentic leadership, extreme contexts, gender, mining, public health care, trust in leader, validation

Introduction

Organisations are continuously reviewing leadership research in search of empirical support that will inform their decisions when they select and develop leaders (Clapp-Smith, Vogelgesang, & Avey, 2009). These evidence-based decisions enable organisations to achieve strategic goals by creating a convincing vision and influencing followers (House, Dorfman, Javidan, Hanges, & Sully De Luque, 2013). In science, the way in which one gains knowledge cannot be separated from the manner in which knowledge has been obtained (Nunnally & Bernstein, 1994). This emphasises the importance of valid measurement when explaining, studying and understanding phenomena (Liden et al., 2015; Schriesheim & Cogliser, 2009) - authentic leadership in this case. Valid measurement is complicated by (a) the fact that leadership behaviour is defined differently, individuals understand items differently and respond differently to instrument response scales in different contexts (Byrne & Watkins, 2003); and (b) unobservable constructs - such as authentic leadership - are then hypothesised to be related to other constructs (Nunnally & Bernstein, 1994), for example trust. Despite previous research confirming the ability of authentic leaders to create trust, a one-size-fits-all approach in applying these findings is not recommended because leadership is in the “eye of the beholder” (Avolio & Walumbwa, 2014; Paustian-Underdahl, Walker, & Woehr, 2014).

Organisations too often assume that a leadership approach that is effective in one organisation will automatically be effective in another organisation and continued research should be done to examine leadership models across different contexts (Haddon, Loughlin, & McNally, 2015). In line with this, the current study endeavours to investigate invariance (equivalence) of the authentic leadership construct in two extreme contexts. During times of prolonged stress, such as in these contexts, trust in the leader is a determining factor for follower persistence and performance (Sweeney, Thompson, & Blanton, 2009) and authentic leadership has the potential to make a difference in these contexts.

Measurement invariance (equivalence) would mean that individuals interpret both the observed indicators (items) and the underlying latent factor in the same manner (Van De Schoot, Lugtig, & Hox, 2012). One needs to investigate the factor structure (factorial validity) in different groups before one can proceed to measurement invariance testing (Byrne, 2012; Wang & Wang, 2012). The validity of a measurement is concerned with *what* the test measures and *how well* it measures what it says it measures (Anastasi & Urbina, 1997). The investigation

of validity usually starts with a theoretical definition of the construct, thereafter determining its relationship with other constructs (Ghiselli, Campbell, & Zedeck, 1981; Roodt, 2013). Specifically, construct validity is considered to be a fundamental validity concept, as it reflects the operationalisation of a theoretical construct and the degree to which directly observable indicators reflect the underlying theory (Anastasi & Urbina, 1997). Although three major subtypes of validity – content-description, construct-identification and criterion-prediction – can be distinguished, construct validity seems to be the most fundamental in leadership research (Schriesheim & Cogliser, 2009).

The conceptualisation of authentic leadership has been challenged by a variety of perspectives on the construct, leading to fragmentation (Gardner, Cogliser, Davis, & Dickens, 2011; Khilji, Keilson, Shakir, & Shrestha, 2015); with empirical data supporting the well-known model of authentic leadership (see Walumbwa, Avolio, Gardner, Wernsing, & Peterson, 2008) being subjected to negative criticism (Beddoes-Jones & Swailes, 2015; Neider & Schriesheim, 2011). Given that the construct is fairly under-researched, Gardner et al. (2011) argued that more internal and external validation studies should be conducted. The present study, subsequently, investigated the construct validity of authentic leadership as operationalised by the Authentic Leadership Inventory (ALI), as well as the concurrent validity by means of its relationship with trust.

The present study focuses on two organisations from different industries, namely mining and public health care. These two industries differ in terms of the risks that they pose, physical versus psychological, but they can also be contrasted as male- versus female-dominated. Liu, Cutcher, and Grant (2015) advocate that leadership is not gender neutral and leaders need to understand gender differences in order to be successful in the contemporary business environment (Nguyen, Ermasova, Geyfman, & Mujtaba, 2014). Differences in the value that males and females attach to certain leadership behaviours may influence the extent to which leaders are perceived as being effective (Avolio, Mhatre, Norman, & Lester, 2009; McColl-Kennedy & Anderson, 2005). Other researchers (Avolio & Walumbwa, 2014; Vecchio, 2002), however, are of the opinion that consideration of normative gender characteristics offers a too simplistic view and the context should also be taken into account. Paustian-Underdahl et al. (2014) included the type of organisation as one such contextual variable. Once measurement invariance has been established, latent means of multiple groups can be compared (Byrne, 2012; Wang & Wang, 2012). The current study subsequently attempted to demonstrate if ALI

is invariant across gender groups and if significant differences exist between the two gender groups on the dimensions of authentic leadership. If invariant and no gender differences exist, differences may be ascribed to the organisational (extreme) context.

Hannah, Uhl-Bien, Avolio, and Cavarretta (2009) define extreme contexts as:

...an environment where one or more extreme events are occurring or are likely to occur that may exceed the organisation's capacity to prevent and result in an extensive and intolerable magnitude of physical, psychological, or material consequences to - or in close physical or psycho-social proximity to - organisation members (p. 898).

The aforementioned authors are of the opinion that extreme contexts, contexts which pose significant risks, require good leadership to guide and support employees in dealing with these risks (Hannah et al., 2009). Effective leaders who have authentic relationships with followers would display care for both the physical and psychological well-being of their employees (Birkeland Nielsen, Eid, Mearns, & Larsson, 2013); well-being that is significantly at risk in these contexts. Leadership theory cannot be loosely applied due to the inherent differences between these contexts (Hannah et al., 2009). This is supported by research stating that organisational values differ, depending on the sphere of activity (public versus private sector, as cited in Diskienė & Goštautas, 2010) which in turn forms an important element of the culture of the organisation (Schein, 1985). The main aim of the present study was to investigate measurement invariance and mean differences between these contexts in terms of authentic leadership. As required, the researcher started off with the investigation of construct and concurrent validity of the instrument as well as accounting for the possible impact of gender non-equivalence and mean differences.

Literature review

Internal consistency, construct and concurrent validity of the ALI

The concept of authentic leadership has its origin in positive psychology (Seligman & Csikszentmihalyi, 2000) and, more recently, is considered a characteristic of positive leaders (Mishra & Mishra, 2012; Zbierowski & Góra, 2014). Authentic leadership is defined as leadership that “draws on positive psychological capacities and positive ethical climate to

foster the four core dimensions of authentic leadership, enabling positive follower self-development” (Walumbwa et al., 2008, p. 94).

In order to understand what the authentic leadership definition should entail, Walumbwa et al. (2008) used earlier conceptualisations by Avolio and Gardner (2005); Gardner, Avolio, Luthans, May, and Walumbwa (2005); Kernis and Goldman (2006); and Ilies, Morgeson, and Nahrgang (2005), which, after both theoretical and empirical refinement, culminated into four dimensions. The first dimension, *self-awareness*, refers to a process of reflection which enables the leader to gain insight into various intrapersonal characteristics (i.e. values, strengths, personality) and the impact thereof on followers (Kernis, 2003). The second dimension, *internalised moral perspective*, refers to strong moral convictions which guide behaviour and decision making from a self-regulation perspective (Gardner et al., 2005). Decision making is also influenced by *balanced processing*, the third dimension, in which the individual gathers information and reaches decisions as objectively as possible, often challenging his/her own deeply held beliefs and values (Gardner et al., 2005). Working from the inside out, it allows leaders to share their inner feelings and thoughts openly, referring to *relational transparency* (Kernis, 2003), the fourth dimension. These four latent factors form the lower-order factors measured by the ALQ (Walumbwa et al., 2008).

Owusu-Bempah, Addison, and Fairweather (2014) illustrate that “authenticity” is a title given to the leader when there is alignment between the leader’s behaviour and values, also between the expectations of the leader and followers, and when the integrity of the leader leads to positive outcomes for both followers and the organisation. These three conditions can only be met when there is interaction between the leaders and followers and the interaction is construed based on the followers’ understanding of authenticity and authentic leadership (Owusu-Bempah et al., 2014). Gardner et al. (2005) and Ilies et al. (2005) state that authentic leaders’ actions and thoughts should reflect all four dimensions in order to be considered authentic. According to Neider and Schriesheim (2011), theoretically distinct dimensions are not always perceived as distinct and separate by the respondents. This has important implications if one considers the fact that our knowledge regarding abstract concepts is restricted by the extent to which the observed indicators are an accurate reflection of the underlying theory (Schriesheim & Cogliser, 2009).

The creation of the well-known model of authentic leadership was followed by the development of the widely used Authentic Leadership Questionnaire (ALQ) by Walumbwa and his colleagues to operationalise the construct (Walumbwa et al., 2008). Neider and Schriesheim (2011) developed the ALI in response to three major critiques on the ALQ: The analysis of the content was too subjective, the parameters used may have possibly inflated model fit, and access to the instrument may be limited. Subsequently, they developed four items for each of the dimensions based on the two example items for each dimension provided of the ALQ, yielding sixteen items in total. The researchers proceeded with content validation in Study 1, and concluded theoretical content validity for the new scale with the suggested exclusion of items 1 and 6 in the final version. Study 2 tested reliability as well as construct and divergent validity, as well as freedom from impression management. Results confirmed internal consistency, freedom from impression management and divergent validity (Neider & Schriesheim, 2011). Construct validity yielded mixed findings between the two participating groups. The third study focused on formally testing convergent, discriminant and concurrent validity. Study 3 confirmed the higher-order factor structure of authentic leadership. The final version of the ALI contains fourteen items (Neider & Schriesheim, 2011). A number of concerns were highlighted in their study. Several measurement models were tested with differential results depending on the leader that was described, with authentic leadership being a lower-order four-factor model as well as a high-order global variable consisting of four lower-order factors (Neider & Schriesheim, 2011).

The present study adds to previous research by investigating the validity of the ALI in a South African context. South Africa differs significantly from Western countries on a variety of aspects impacting the way in which observable indicators may be interpreted (Joshnloo, Wissing, Khumalo, & Lamers, 2013). The majority of authentic leadership validation studies so far have been conducted in Western contexts with the ALQ (Avolio & Walumbwa, 2014; Owusu-Bempah et al., 2014). Limited studies conducted in the South African context (see Du Plessis, 2014; Munyaka, 2012; Roux, 2010) have also utilised the ALQ. Mixed findings (Neider & Schriesheim, 2011), and poor (Du Plessis, 2014) or no model fit (Munyaka, 2012) also necessitate more research on the construct validity of authentic leadership, especially in multicultural contexts.

In a study conducted by Stander, De Beer, and Stander (2015) in a health care organisation, authentic leadership, as measured by the ALI, was estimated as one factor and significantly

predicted trust in the organisation. These authors also found the ALI to be a reliable measure within this organisation (Stander et al., 2015). Based on the original theoretical and operational definition of authentic leadership, the current study will evaluate the factorial validity, concurrent validity and reliability of the ALI in the mining industry. In line with this, the first and second hypotheses of the study are as follows:

Hypothesis 1: Authentic leadership, as measured by the ALI, comprises four latent variables, namely balanced processing, internalised moral perspective, relational transparency and self-awareness which all load onto a higher-order latent variable in the mining organisation.

Hypothesis 2: Authentic leadership, as measured by the ALI, has acceptable internal consistency, i.e. reliability in the mining organisation.

Concurrent validity of the ALI will show promise for future use to predict consequences of authentic leadership such as trust. Trust is defined as “an individual’s willingness to act on the basis of his/her perception of a trust referent (peer, supervisor/manager or organisation) being supportive/caring, ethical, competent and cognisant of others’ performance” (Ferres, 2003, p. 8). For the purpose of this study, the focus is on trust in the leader (manager). Gaining trust is challenging during turbulent times (Norman, Avolio, & Luthans, 2010), yet important for the process of influencing followers (Wang & Hsieh, 2013). The actions and words of leaders determine whether trust will be created, both now and in future (Kasper-Fuehrer & Ashkanasy, 2001) and authentic leaders influence followers’ behaviours through trust in the leader (Clapp-Smith et al., 2009; Hassan & Ahmed, 2011; Wang & Hsieh, 2013). The Social Exchange Theory posits that reciprocal relationships cannot exist without trust (Blau, 1964). If there is consistency between leaders’ actions and thoughts and if leaders act with integrity, followers will more likely trust their leaders (Wang & Hsieh, 2013). The third hypothesis of this study is as follows:

Hypothesis 3: Authentic leadership, as measured by the ALI, is a significant predictor of trust in the leader in the mining organisation.

Authentic leadership and gender

Despite more research on authentic leadership, Liu et al. (2015) state that research on gender and authenticity is at infancy stage. Luthans and Avolio (2003) explained that leader-follower interactions are influenced by both leaders' and followers' expectations, perceptions, and the values with which they enter the organisation. During these interactions, followers specifically evaluate whether the behaviour displayed by the leader reflects the leader's values, subsequently judging whether the leader is authentic. This judgement, however, is influenced by followers' characteristics (Owusu-Bempah et al., 2014).

This is in line with the recognition-based approach to distinguish leaders from non-leaders which postulates that follower characteristics influence the evaluation of a central person (Keller, 1999). One such characteristic is gender (Avolio et al., 2009; McColl-Kennedy & Anderson, 2005). Previous research on gender and social interaction has focused on the communalities between male and female responses respectively, which can then be categorised as agentic and communal (Eagly, 1987; Haddon et al., 2015; Koenig, Eagly, Mitchell, & Ristikari, 2011). Females have higher mean scores on the communal category, whereas males score higher on the agentic category (Eagly, 1987, 2009; Spence & Buckner, 2000). Typical communal characteristics are mainly concerned with the welfare of others (i.e. being helpful, kind, and interpersonally sensitive), as opposed to agentic characteristics that are mainly concerned with the welfare of the self (i.e. assertiveness, confidence, and control; Eagly & Karau, 2002). These differences are supported by the Social Role Theory which postulate that men and women display and value different behaviours in social situations in accordance with existing stereotypes (Eagly, 1987). Sex trait stereotypes refer to both the psychological characteristics and the behavioural traits which are more (or less) characteristic of one gender as opposed to the other (Rudman & Goodwin, 2004; Williams & Best, 1990), and stereotypes are broadly accepted and pervasive (Broverman, Vogel, Broverman, Clarkson, & Rosenkrantz, 1972; Hyde, 2014; Merchant, 2012; Williams & Best, 1990) from a very young age (Merchant, 2012; Mulvey & Killen, 2015).

Authentic leaders are characterised by being true to themselves, being transparent regardless of the costs to themselves and having the interests of others at heart (Avolio, Gardner, Walumbwa, Luthans, & May, 2004; Gardner et al., 2005; Kernis, 2003; Luthans & Avolio, 2003). Based on the characteristics identified as communal, one would expect authentic leaders

to conform more toward what one would describe as “feminine” characteristics - being valued more by females. Eagly and Karau (2002) described this as similarity between perceivers’ stereotypes of a certain gender and their prototypes of leaders. Bellou (2011) concluded that there are differences in leadership preferences for male and female followers, with females valuing communal behaviours such as interdependence and openness to change.

In a study on leadership empowerment behaviour, Zikalala (2014) found no significant differences in males and females’ overall interpretation of the construct. Mitonga-Monga, Coetzee, and Cilliers (2012) found statistically significant mean differences between males and females on perceived leadership style. Specifically relating to authentic leadership, Du Plessis (2014) only found significant mean differences between genders on the balanced processing dimension of the authentic leadership construct. Before one can compare the latent means of different groups, measurement invariance needs to be established (Dimitrov, 2010; Van De Schoot et al., 2012) to indicate that males and females interpret the items and construct of authentic leadership the same. It is important to note that neither Mitonga-Monga and his colleagues nor Du Plessis established measurement invariance before comparing mean scores. Therefore, the fourth and fifth hypotheses of this study are:

Hypothesis 4: Authentic leadership, as measured by the ALI, is equivalent across gender groups.

Hypothesis 5: There are significant mean differences on the dimensions of the ALI for males and females.

Authentic leadership and organisational context

Avolio and Walumbwa (2014) and Paustian-Underdahl et al. (2014) argue that it is important to consider leadership in context. Compared to the mining industry which is male-dominated, the health care industry is more female-dominated. Liu et al. (2015) criticise gendered leadership research as being similar to research on authentic leadership in that it considers both gender and authentic leadership as a characteristic - something that one has, as opposed to something that one does. From a performativity perspective (Butler, 1988, 1999), social norms and conventions influence the development of gender identity and also prescribe how different genders should behave (Butler, 1993). This means that men and women can adopt “masculine”

or “feminine” traits irrespective of their biological gender (Billing & Alvesson, 2000), depending on the dominating norms and conventions in any given context.

Balasubramanian and Krishnan (2012) support this by saying that the type of organisation in which males or females work determine differences in leadership styles. This gives rise to the notion that leaders can be identified and evaluated not only from a gender perspective, but also from an organisational (context) perspective as proposed by Baumgardner, Lord, and Maher (1991). Roe and Ester (1999) are of the opinion that people’s activities in the work domain are in fact more strongly determined by work values than personal values; thus influenced by the work context. This is in line with research on values that indicate that individual values guide the selection and evaluation of actions, people and events (Rokeach, 1979; Schwartz, 2005); yet organisational values can also influence the expression of individual values (Câmara & Pereira-Guizzo, 2015; Rokeach, 1979).

In line with this, extreme contexts contain unique dynamics in terms of causations, constraints and incidents and therefore leadership requirements may be unique (Hannah et al., 2009). These contexts and their requirements subsequently have the potential to influence leadership effectiveness (Avolio, 2007; Avolio & Walumbwa, 2014). Just as extreme contexts differ from non-extreme contexts, extreme contexts also differ from one another. Hannah et al. (2009) are of the opinion that leadership theory cannot be loosely generalised in these contexts. They form this opinion based on the fact that these contexts differ on dimensions such as (a) time (levels of extremity escalate as threats escalate); (b) the chance of consequences occurring; (c) the extent of the consequences when they do occur; (d) proximity (physical, psychological and social); and (e) form of threat (Hannah et al., 2009). Specifically relating to this last dimension, the mining industry is considered to contain more physical risks such as death, injury or exhaustion, as opposed to psychological risks such as post-traumatic stress which employees in the health care industry are confronted with.

Research in extreme contexts (Gartzia, Ryan, Balluerka, & Aritzeta, 2012; Gladstein & Reilly, 1985; Hannah et al., 2009; Van Wart & Kapucu, 2011) found that individuals want leaders to take charge in times of overwhelming threats and to take action on their behalf. Burgess, Riddle, Hall, and Salas (1992) found that leaders were more effective in these situations if they considered followers’ efforts and input; were open and less intimidating; communicated more; and explained their decisions. Haddon et al. (2015) found that both

communal and agentic traits are preferred when people are led through difficult times. Although beyond the scope of this study, before structural equivalence (i.e. the degree to which the impact of authentic leadership on individual and organisational outcomes is the same for different groups) can be evaluated, measurement invariance has to be demonstrated (Byrne, 2012; Wang & Wang, 2012). This may provide more clarity on differences in the value attached to authentic leadership or the effectiveness thereof in current organisations, perhaps eliminating further contradictory empirical findings.

Due to the inherent differences between the two organisations in the current study and the proposed impact of these differences on both the interpretation of observed indicators and the construct as a whole, measurement invariance of the instrument has to be established. Once measurement invariance has been established, mean scores can be compared which can provide an indication of followers' perceptions of the degree to which leaders are being perceived as being authentic. This has important implications for development of interventions in these two organisations. The sixth and seventh hypotheses of this study are as follows:

Hypothesis 6: Authentic leadership, as measured by the ALI, is equivalent across the public health care and mining organisations.

Hypothesis 7: There are significant mean differences on the dimensions of the ALI for the different organisations.

Method

Participants

A convenience sample of 244 employees from a mine in the Free State province and 633 employees from various institutions in the public health care sector in the Gauteng province was drawn from an existing database at an accredited university. The data obtained in the public health care sector formed part of a more comprehensive research project. The characteristics of the participants are provided in Table 1. Approximately half of the participants in the mining organisation are in possession of at least a Grade 12 certificate (50.4%), and the majority have been working in the organisation for up to ten years (56.6%). In the public health care facilities, 29.8% of participants are in possession of a Grade 12 certificate, 70.2% are in possession of a

diploma or higher qualification, and the majority (60.2%) of participants have been working in the organisation for less than ten years.

Table 1

Characteristics of the Participants (N = 877)

Item		Frequency	Percentage	Frequency	Percentage
		Mine (N = 244)		Health (N = 633)	
Gender	Male	212	86.9	121	19.12
	Female	32	13.1	473	74.72
	Missing	-	-	39	6.16
Cultural group	Black	133	54.41	522	82.46
	White	104	42.62	49	7.74
	Coloured	4	1.64	8	1.26
	Indian	2	0.82	10	1.58
	Other	1	0.41	5	0.79
	Missing	-	-	39	6.16
Age	18 – 25	24	9.84	40	6.32
	26 – 35	78	31.97	161	25.43
	36 – 45	73	29.92	108	17.06
	46 – 55	52	21.31	148	23.38
	56 – 65	16	6.56	95	15.01
	66+	-	-	10	1.58
	Missing	1	0.41	71	11.22
Home language	English	23	9.43	39	6.16
	Afrikaans	87	35.66	42	6.64
	Setswana	11	4.51	43	6.79
	isiXhosa	18	7.38	40	6.32
	Xitsonga	5	2.05	6	0.95
	isiZulu	17	6.97	113	17.85
	Sesotho	71	29.10	263	41.55
	isiNdebele	1	0.41	3	0.47
	Tshivenda	1	0.41	3	0.47
	SiSwati	3	1.23	7	1.11
	Sepedi	5	2.05	21	3.32
	Other	2	0.82	9	1.42
	Missing	-	-	43	6.79

Procedure and ethical considerations

In order to obtain the initial data, the purpose and objectives of the study were stipulated on an information letter accompanying the self-report questionnaires which were distributed to the participants together with the informed consent letters. Participants were also informed regarding the procedure, anticipated risks and benefits of the studies as well as the intended usage of the data. The project complied with the ethical requirements as stipulated by the Health and Human Research Ethics Committee (HHREC) from the North-West University. Participants who agreed to participate in the study completed and submitted the questionnaires.

Measuring instruments

The *Authentic Leadership Inventory* (ALI; Neider & Schriesheim, 2011) was utilised for the purpose of measuring employees' perception of their immediate manager as "authentic leader", based on four first order factors: *Self-awareness*, *balanced processing*, *internalised moral perspective* and *relational transparency*. The ALI comprises fourteen items. Example items include "My leader solicits feedback for improving his/her dealings with others" and "My leader encourages others to voice opposing points of view". The items are scored on a five-point Likert-type scale ranging from 1 (*disagree strongly*) to 5 (*agree strongly*).

The *Workplace Trust Survey* (WTS; Ferres, 2003) was used to measure *trust in the leader*. This subscale consists of nine items. An example item includes "I act on the basis that my manager displays integrity in his/her actions". Items are recorded on a seven-point Likert-type scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*).

Data analysis

Mplus 7.31 (Múthen & Múthen, 1998-2012) was used to perform latent variable modelling analyses in line with the two-step approach proposed by Kline (2011). The robust maximum likelihood estimator (MLR) was used which takes the spread of the data into account (i.e. skewness and kurtosis) (Wang & Wang, 2012). The following indices were used to assess the model fit in both steps: Chi-square (χ^2), degrees of freedom (df), Root Mean Square Error of Approximation (RMSEA), the Standardised Root Mean Square Residual (SRMR), and incremental fit indices, including the Comparative Fit Index (CFI) and the Tucker-Lewis Index

(TLI). CFI and TLI values higher than .95 are considered acceptable (Hu & Bentler, 1999); however, values higher than .90 are commonly accepted in practice (Wang & Wang, 2012). RMSEA values lower than .08 indicate acceptable fit between the model and the data (Hair, Black, Babin, & Anderson, 2010). SRMR values closer to 0 are ideal, although values smaller or equal to .08 are acceptable (West, Taylor, & Wu, 2012). Both the Akaike Information Criterion (AIC) and the Bayes Information Criteria (BIC) were used to compare the goodness-of-fit of the measurement models. The lower the value, the better the model (Hair et al., 2010), as the AIC and BIC values serve as an index for model parsimony (Kline, 2011). Chi-square values cannot be used to directly compare models, therefore the Satorra-Bentler chi-square difference test was performed (Satorra & Bentler, 2001, 2010). The reliabilities of the scales were calculated by means of composite reliability coefficients (ρ ; Raykov, 2009). The .70 guideline was used as cut-off value for reliability (Wang & Wang, 2012).

Measurement invariance testing was used in instances where the hypotheses involved determined whether an assessment instrument operated in the same way in different groups, also when trying to determine whether the underlying construct had the same meaning for each group (gender and organisation). This is an important prerequisite for comparing groups on a certain construct (Dimitrov, 2010). Three types of invariance need to be addressed: *Configural*, *metric*, and *scalar*. In the case of *configural invariance*, a baseline model for each group is identified (Byrne, 2012) separately; thereafter a combined configural model is tested (Wang & Wang, 2012). *Metric invariance* refers to equal factor loadings across groups which ensure an equivalent relationship between a latent factor and its items; whereas *scalar invariance* refers to equal intercepts across groups - item bias is not present (Byrne, 2012; Dimitrov, 2010).

Measurement invariance is evaluated based on three levels – *weak* (metric invariance is required), *strong* (metric- and scalar invariance are required) and *strict* (metric-, scalar- and invariance of item uniqueness are required). In each case, configural invariance is determined first, after which metric invariance is determined (Byrne, 2012; Dimitrov, 2010). Invariance is accepted if the chi-square difference is not statistically significant when comparing nested models (Byrne, 2012). Based on the guidelines provided by Wang and Wang (2012), a change of less than .01 in the CFI is also recommended. In order to assess differences between gender and industry groups, differences in the mean scores were evaluated by means of t-tests. Only in the event of significant differences, Cohen's *d* is calculated to determine the practical significance of such differences. Cohen's *d* can be interpreted as follows: Trivial effect size ($\leq$

0.20), small effect size (> 0.20), medium effect size (≥ 0.50), or large effect size (≥ 0.80 ; Cohen, 1988).

Results

Evaluating construct and concurrent validity

For the purposes of evaluating the construct and concurrent validity of the ALI, analyses were only performed on the mining sample. These two types of validity have already been established in the health care organisation by Stander et al. (2015). Using the full set of items of 14 ALI items and nine WTS items, three alternative measurement models were tested (see fit statistics in Table 2):

1. Model 1: One-factor model of authentic leadership with all 14 items loading onto the same factor and a one-factor model of trust in the leader with all nine items loading onto the same factor.
2. Model 2: A four-factor model of authentic leadership, namely self-awareness, internalised moral perspective, balanced processing and relational transparency and a one-factor model of trust in the leader.
3. Model 3: A second-order factor model of authentic leadership, with four first-order factors, namely self-awareness, internalised moral perspective, balanced processing and relational transparency and a one-factor model of trust in the leader.

Table 2

Fit Statistics for the Competing Measurement Models of the ALI and WTS (N = 244)

Model	χ^2	df	p	$\Delta \chi^2_{SB}$	CFI	TLI	RMSEA 90% CI p > .05	SRMR	AIC	BIC
Model 1	411.62	229	.00	-	.93	.92	.06 .05-.07 .09	.05	14841.63	15086.40
Model 2	398.22	220	.00	13.22	.93	.92	.06 .05-.07 .08	.05	14841.31	15117.60
Model 3	407.71	225	.00	3.84	.93	.92	.06 .05-.07 .08	.05	14844.11	15102.90

The fit statistics show that Model 1 is the best fitting model. Although the AIC values of Model 1 are higher than the AIC values of Model 2, the BIC values of Model 1 were significantly lower than for Models 2 and 3. The BIC takes into account whether the model has a good fit to the data statistically, but additionally it also imposes penalties when one has to increase the number of parameters to improve model fit (Byrne, 2012; Wang & Wang, 2012). The Satorra-Bentler chi-square difference test also indicated that the changes in chi-square values between Models 1 and 2 and Models 1 and 3 in Table 2 were not statistically significant.

Given the CFI and TLI values lower than .95, the model was further developed (see Table 3), guided by the modification indices as illustrated in Table 3. In Model 1a, the error variances of Trust2 (“I proceed on the basis that my manager will act in good faith”) and Trust3 (“I act on the basis that my manager displays integrity in his/her actions”) were allowed to correlate based on the MIs (MI = 52.06). In Model 1b, the error variances of both Trust2 and Trust3 as well as AL4 (“My leader describes accurately the way that others view his/her abilities”) and AL5 (“My leader uses his/her core beliefs to make decisions”) were allowed to correlate based on the MIs (MI = 12.69). Correlated errors may occur due to overlap in item content. The Satorra-Bentler chi-square difference test also indicated that the change in chi-square values between Models 1a and 1b was significant. Model 1b was subsequently used as basis for the structural model. Hypothesis 1 - stating that authentic leadership as measured by the ALI comprising four latent variables, namely balanced processing, internalised moral perspective, relational transparency and self-awareness which all load onto a higher-order latent variable in the mining organisation - is rejected.

Table 3

Post-hoc Analyses on the One-Factor Model: Fit Statistics

Model	χ^2	df	p	$\Delta \chi^2_{sb}$	CFI	TLI	RMSEA 90% CI p > .05	SRMR	AIC	BIC
Model 1a	359.14	228	.00	-	.95	.94	.05 0.04-0.06 .60	.05	14764.84	15013.10
Model 1b	346.55	227	.00	11.11	.95	.95	.05 0.04-0.04 .70	.05	14748.04	14999.80

Both instruments demonstrated good internal consistency, ALI ($\rho = .94$) and WTS ($\rho = .94$), confirming Hypothesis 2 that authentic leadership, as measured by the ALI, has acceptable

internal consistency, i.e. reliability in the mining organisation. A structural model including the hypothesised relationship between authentic leadership and trust in the leader was specified on the basis of the best fitting measurement model. According to Kline (2011), a valid measurement model is needed before one can proceed to specify the structural model and therefore all variables should be included in the measurement model. Results indicated a good model fit: χ^2 (227, $N = 244$), 346.55, $p < .001$; CFI = .95; TLI = .95; RMSEA = .05; SRMR = .05. The regression path from authentic leadership to trust in the leader was statistically significant ($\beta = .73$, $p < .001$). This means that leaders who are perceived as authentic will influence followers' trust in the leader, supporting concurrent validity. Hypothesis 3 - stating authentic leadership, as measured by the ALI, is a significant predictor of trust in the leader in the mining organisation - was accepted.

Testing measurement invariance for gender

The first step was to test a first-order CFA measurement model. Based on the findings from the analyses in the previous section in the mining organisation, it was decided to use the one-factor structure for the baseline models. The data used for modelling was the mining sample ($N = 244$) and a random sample selected from the public health care sector ($N = 313$). Similar sample sizes eliminate the possibility of encountering dilemmas with statistical power that is linked to sample size (Field, 2013). The two samples were combined and genders from both groups were combined to form two gender groups: Females ($n = 264$) and males ($n = 272$). Twenty-one individuals in the public health care facilities did not indicate their gender and were excluded from further analyses.

CFA models were used to fit the female and male samples separately. The parsimonious and meaningful model for each group was defined as the baseline model as recommended by Wang and Wang (2012). Similar, but not completely identical, baseline models have been identified. According to Wang and Wang (2012), the two baseline models should have the same number of factors with the same pattern of fixed and free factor loadings. For females, Model 1 - with all fourteen items of the ALI loading onto one factor - did not fit the data well: RMSEA = .10, 90% CI = [.09, .12], close-fit test p -value = .00, CFI = .86, TLI = .83, SRMR = .06, AIC = 9432.73 and BIC = 9582.44. For males, Model 1 - with all fourteen items of the ALI loading onto one factor - fitted the data well: RMSEA = .08, 90% CI = [.04, .07], close-fit test p -value = .21, CFI = .95, TLI = .94, SRMR = .04, AIC = 12118.93 and BIC = 12270.38. To improve

model fit, AL3 (“My leader asks for ideas that challenge his/her core beliefs”) and AL5 (“My leader uses his/her core beliefs to make decisions”) had to be removed from the female group and AL3 had to be removed from the male group, based on the z-scores for covariances. Múthen and Múthen (1998-2012) define z-scores as “standardised errors which are computed as the difference between the value of the observed sample statistic and its model estimated value divided by the standard deviation of the difference between the value of the observed sample statistic and its model estimated value” (p. 724). In this instance, the statistic refers to the model-implied correlation/covariance and is compared to the observed covariance. In a normally distributed sample, 99% of z-scores should lie between ($\pm$) 2.58 and 99.9% between ($\pm$) 3.29. Standardised residuals of higher than 3 are reason for concern due to the fact that chances of this happening are highly unlikely to occur in the average sample (Field, 2013). Large values indicate local dependency, which means that responses on these items are linked and that the items are therefore redundant (Kim, Chung, Amtmann, Revicki, & Cook, 2013).

In both groups, the error variances of AL1 and AL2 were allowed to correlate (MI = 24.7 in the female group) in order to obtain similar baseline models. The results of the two baseline models show that the items of the ALI are highly loaded onto their underlying factor in the two samples, and model fit to data is acceptable for females and very good for males. The model fit indices for females are: RMSEA = .07, 90% CI = [.06, .09], close-fit test p -value = .01, CFI = .93, TLI = .92, SRMR = .05, AIC = 8048.10 and BIC = 8180.41. The corresponding model fit indices for males are: RMSEA = .03, 90% CI = [.00, .05], close-fit test p -value = .93, CFI = .99, TLI = .98, SRMR = .03, AIC = 8623.67 and BIC = 8767.90.

After the baseline models had been determined for each gender group, the models were combined into one multi-group (gender) model to form a configural model. The same number of factors and the same pattern of fixed and free factor loadings are specified in each of the groups, but no equality restrictions are imposed on the parameters (Wang & Wang, 2012). Due to the non-invariance of items 3 and 5 in the baseline models of the separate groups, equivalence tests were further conducted without these items. *Partial configural invariance* is accepted for the total instrument, meaning that the same pattern of factor loadings exists only partially. Fit indices in Table 4 indicate the model fits the data well. In order to identify models, one factor loading must be fixed. Usually it is the first item of each factor, referred to as the marker item, but in order to ensure that the marker item is also invariant across groups, another item should be fixed (Wang & Wang, 2012). The second (fixing AL2 to 1 and all other factor

loadings to be freely estimated) and third (fixing equality constraints on the factor loadings of AL1) phases of the configural model demonstrate invariance of marker items as stipulated by Wang and Wang (2012). A difference test was conducted in each of these two phases to evaluate whether there was a meaningful difference in the χ^2_{SB} statistic between these two marker item models and the configural model (Wang & Wang, 2012). There was no statistically significant change in the χ^2_{SB} statistic and the change in CFI is smaller than .01.

Next, measurement invariance was investigated (see Table 4 for the fit indices), according to a series of hierarchical steps as recommended by Wang and Wang (2012). In the first step, called *metric* (or weak) *invariance*, a model with factor loadings constrained to be equal across groups is specified, but the intercepts are allowed to differ. Since the metric model is nested in the configural model, the difference test is used to test model difference. There was no significant change in the χ^2_{SB} statistic between the configural model and the current model ($\Delta\chi^2_{\text{SB}} = 8.23$, $\Delta df = 11$, $p = .69$). In addition, there was no change in CFI. Thus, the null hypothesis of metric invariance cannot be rejected, meaning factor loadings are invariant across the two groups. It can be concluded that responses to the ALI items and their underlying factor are not significantly different across the two groups.

In the next step, called *scalar* (or strong) *invariance*, both factor loadings and intercepts are constrained to be equal across groups. There was a significant change in the χ^2_{SB} statistic between the configural model and the current model ($\Delta\chi^2_{\text{SB}} = 43.30$, $\Delta df = 23$, $p = .01$). In addition, there is a .01 change in the CFI. Thus, only partially strong (scalar) invariance could be established between the two groups. The result indicates that females and males differ on the intercepts of item 8 (“My leader openly shares information with others”), with males having a higher starting point than females. Due to the inability to demonstrate strong (scalar) invariance, strict invariance testing is not feasible. In practice, error invariance testing is of little interest and is often not performed (Wang & Wang, 2012). Hypothesis 4, stating authentic leadership as measured by the ALI, is equivalent across gender groups is only partially supported.

Table 4

Fit Indices for Invariance Tests (Gender)

Model	χ^2 (df)	$\Delta\chi^2_{SB}$ (Δdf)	CFI (ΔCFI)	TLI	RMSEA ($p \leq .05$)	RMSEA (90% CI)	SRMR
Configural model	201.77 (106)	-	.96	.95	.06 (.14)	.05-.07	.04
Testing invariance of marker item factor loadings (phase 2)	201.77 (106)	-	.96 -	.95	.06 (.14)	.05-.07	.04
Testing invariance of marker item factor loadings (phase 3)	204.43 (107)	2.66 (1)	.96 -	.95	.06 (.13)	.05-.07	.04
Metric (weak) invariance	212.91 (117)	8.23 (11)	.96 -	.95	.06 (.22)	.04-.07	.05
Scalar (strong) invariance	245.19 (129)	43.30* (23)	.95 (-.01)	.95	.06 (.12)	.05-.07	.05
Revised scalar (strong) invariance (Intercept of item 8 non-invariant)	235.89 (128)	31.54 (23)	.95 (-.01)	.95	.06 (.18)	.05-.07	.05

* $p < .01$

The standardised factor loadings for the final model are displayed in Table 5.

Table 5

Standardised Loadings of the Revised Scalar Model (Gender)

Group 1: Females					Group 2: Males			
	Estimate	S.E	EST/S.E	P	Estimate	S.E	EST/S.E	p
Authentic leadership								
AL1	.70	.04	16.15	.00	.69	.03	20.13	.00
AL2	.69	.04	19.06	.00	.74	.04	19.60	.00
AL4	.67	.04	18.72	.00	.71	.03	22.08	.00
AL6	.80	.03	27.00	.00	.79	.03	32.05	.00
AL7	.76	.04	20.73	.00	.75	.04	20.15	.00
AL8	.81	.03	30.87	.00	.79	.03	27.50	.00
AL9	.49	.05	10.46	.00	.54	.05	10.44	.00
AL10	.82	.03	30.72	.00	.81	.03	32.03	.00
AL11	.70	.04	16.08	.00	.71	.04	19.08	.00
AL12	.78	.04	22.45	.00	.80	.03	27.61	.00
AL13	.71	.04	20.09	.00	.72	.03	22.55	.00
AL14	.72	.04	20.19	.00	.74	.03	21.87	.00

Note: All p -values were significant ($p < .01$)

Testing gender group differences

Given the fact that at least two items (AL3 and AL5) are invariant at configural level and one item (AL8) on scalar level, these three items were excluded from the analysis as recommended by Cheung (2008). Also, given the fact that all items loaded onto one factor, mean differences between the gender groups can only be compared on the total ALI score. A revision of the descriptive statistics of the ALI data revealed that the ALI scores are normally distributed. Therefore, the researcher proceeded with the independent-samples t-test in IBM SPSS 22 to compare the mean authentic leadership scores for females and males. The significance value for Levene's test is larger than .05, meaning that the assumption of equal variances has not been violated (Pallant, 2013). Further inspection of the significance (two-tailed) value revealed that this value is above the cut-off of .05. This means that the difference between the authentic leadership scores for female followers ($M = 3.48$, $SD = 0.86$) and male followers ($M = 3.41$, $SD = 0.82$) is not significant [$t(502) = .92$, $p = .36$, two-tailed]. No support was found for Hypothesis 5 which states that there are significant mean differences on the dimensions of the ALI for males and females.

Testing measurement invariance for industry

The first step was to test a first-order CFA measurement model. Based on the results from this study and that of Stander et al. (2015), it was decided to use the one-factor structure of authentic leadership for the baseline models. The data used for modelling included both the public health care sector ($N = 633$) and the mining ($N = 244$) industry.

CFA models were used to fit the health care and mining samples separately. The parsimonious and meaningful model for each group was defined as the baseline model for each group as recommended by Wang and Wang (2012). Similar, yet not identical baseline models have been identified. According to Wang and Wang (2012), the two baseline models should have the same factor with the same pattern of fixed and free factor loadings. For health, Model 1 - with all fourteen items of the ALI loading onto one factor - did not fit the data well: RMSEA = .09, 90% CI = (.08, .10), close-fit test p -value = .00, CFI = .88, TLI = .86, SRMR = .05, AIC = 22558.93 and BIC = 22744.98. For mining, Model 1 - with all fourteen items of the ALI loading onto one factor - fitted the data well: RMSEA = .04, 90% CI = (.03, .06), close-fit test p -value = .69, CFI = .97, TLI = .97, SRMR = .04, AIC = 8109.15 and BIC = 8256.03. To

improve model fit, AL2 (“My leader shows consistency between his/her beliefs and actions”), AL3 (“My leader asks for ideas that challenge his/her core beliefs”), AL5 (“My leader uses his/her core beliefs to make decisions”), AL6 (“My leader carefully listens to alternative perspectives before reaching a conclusion”) and AL14 (“My leader expresses his/her ideas and thoughts clearly to others”) had to be removed from the health group, based on the z-scores. Large values indicate local dependency, which means that responses on these items are linked and that the items are therefore redundant (Kim et al., 2013). The results of the two baseline models show that the items of the ALI are highly loaded onto their underlying factor in the two samples, and model fit to the data of the revised model is acceptable for health. The model fit indices for health are: RMSEA = .04, 90% CI = (.02, .05), close-fit test p -value = .92, CFI = .99, TLI = .98, SRMR = .08, AIC = 14646.23 and BIC = 1456.83.

After the baseline models had been determined for each organisational group, the models were combined into one multi-group (organisational) model to form a configural model. The same number of factors and the same pattern of fixed and free factor loadings were specified in each of the groups, but no equality restrictions were imposed on the parameters (Wang & Wang, 2012). Due to the non-invariance of items 2, 3, 5, 6 and 14 in the baseline models of the separate groups, equivalence tests were further conducted without these items. *Partial configural invariance* was accepted for the total instrument. Fit indices in Table 6 indicate the model fitted the data well. Once again, in order to identify models, one factor loading had to be fixed. The second (fixing AL4 to 1 and all other factor loadings to be freely estimated) and third (fixing equality constraints on the factor loadings of AL1) phases of configural model demonstrated invariance of marker items. A difference test was conducted in each of these two phases to evaluate if there was a meaningful difference in the χ^2_{sb} statistic between these two marker item models and the configural model (Wang & Wang, 2012). There was no statistically significant change in the χ^2_{sb} statistic and the change in CFI was smaller than .01. Therefore, item 1 was accepted as an invariant marker item.

Next, measurement invariance was investigated (see Table 6 for the fit indices). The same steps were followed as explained in the gender group invariance testing section. In the first step, *metric* (or weak) *invariance* was tested. There was no significant change in the χ^2_{sb} statistic between the configural model and the current model ($\Delta\chi^2_{sb} = 12.01$, $\Delta df = 8$, $p = .15$). In addition, there was no change in CFI. Thus, the null hypothesis of metric invariance cannot be rejected, meaning that factor loadings are invariant across the two groups. It can be

concluded that responses to the ALI items and their underlying factor are not significantly different across the two groups. In the next step, *scalar* (or strong) *invariance* was tested. There was a significant change in the χ^2_{SB} statistic between the configural model and the current model ($\Delta\chi^2_{SB} = 66.39$, $\Delta df = 17$, $p = .00$). In addition, there was a .02 change in the CFI. Thus, strong (scalar) invariance could not be established between the two groups. The result indicates that employees of the two organisations differ on the intercepts of items 1 (“My leader clearly states what he/she means”), 4 (“My leader describes accurately the way that others view his/her abilities”) and 12 (“My leader expresses his/her ideas and thoughts clearly to others”), with employees from the health care organisation having higher starting points than those in the mining organisation on item 1. Employees from the mining organisation have higher starting points than those in the health care organisation on items 4 and 12. Findings suggest that respondents from the different groups may be using different conceptual frames of reference when responding to items 1, 4 and 12. Due to the inability to demonstrate strong (scalar) invariance, strict invariance testing is not feasible. In practice, error invariance testing is of little interest and many times not performed (Wang & Wang, 2012). Only partial support was found for Hypothesis 6 stating that authentic leadership, as measured by the ALI, is equivalent across the public health care and mining industries.

Table 6
Fit Indices for Invariance Tests (Organisations)

Model	χ^2 (df)	$\Delta\chi^2_{SB}$ (Δdf)	CFI (ΔCFI)	TLI	RMSEA ($p \leq .05$)	RMSEA (90% CI)	SRMR
Configural model	77.08 (54)	-	.99 (-)	.99	.03 (.98)	.01-.05	.02
Testing invariance of marker item factor loadings (phase 2)	77.08 (54)	(-)	.99 (-)	.99	.03 (.98)	.01-.05	.02
Testing invariance of marker item factor loadings (phase 3)	78.23 (55)	.95 (1)	.99 (-)	.99	.03 (.98)	.01-.05	.03
Metric (weak) invariance	88.97 (62)	12 (8)	.99	.99	.03 (.99)	.02-.05	.04
Scalar (strong) invariance	133.56 (71)	66.39* (17)	.97 (.02)	.97	.05 (.74)	.03-.06	.06
Revised scalar (strong) invariance (Intercept of item 12 non-invariant)	128.98 (70)	60.67* (16)	.97 (.02)	.97	.04 (.78)	.03-.06	.06
Revised scalar (strong) invariance (Intercept of items 4 and 12 non-invariant)	117.73 (69)	46.51* (15)	.98 (.01)	.98	.04 (.90)	.03-.05	.06
Revised scalar (strong) invariance (Intercept of items 1, 4 and 12 non-invariant)	104.13 (68)	29.22 (14)	.98 (.01)	.98	.04 (.97)	.02-.05	.04

* $p < .01$

The standardised factor loadings for the final model are displayed in Table 7.

Table 7

Standardised Loadings of the Revised Scalar Model (Organisations)

Group 1: Health					Group 2: Mining			
	Estimate	S.E	EST/S.E	<i>p</i>	Estimate	S.E	EST/S.E	<i>p</i>
Authentic leadership								
AL1	.68	.03	23.45	.00	.72	.03	22.15	.00
AL4	.67	.03	25.28	.00	.70	.03	22.69	.00
AL7	.76	.03	29.43	.00	.76	.03	22.65	.00
AL8	.79	.02	38.33	.00	.77	.03	26.00	.00
AL9	.52	.04	14.98	.00	.55	.04	12.48	.00
AL10	.81	.02	41.36	.00	.80	.03	27.50	.00
AL11	.71	.03	24.90	.00	.69	.04	19.64	.00
AL12	.81	.02	39.25	.00	.81	.03	26.20	.00
AL13	.66	.03	26.19	.00	.71	.03	20.84	.00

Testing industry group differences

Given the fact that at least five items are invariant (AL2, AL3, AL5, AL6 and AL14) at configural level and three items (AL1, AL4 and AL12) on scalar level, these eight items were excluded from the analysis. This is a pre-requisite for testing mean differences across groups (Cheung, 2008). All items loaded onto one factor which means that group means can only be compared on the total ALI score. A revision of the descriptive statistics of the ALI data revealed that the ALI scores are normally distributed. Therefore, the researcher proceeded with the independent-samples t-test in IBM SPSS 22 to compare the authentic leadership scores for health care and mining. The significance value for Levene's test is larger than .05, meaning that the assumption of equal variances has not been violated (Pallant, 2013). Further inspection of the significance (two-tailed) value revealed that this value is above the cut-off point of .05. This means that the difference between the authentic leadership scores for health care followers ($M = 3.42$, $SD = 0.87$) and mining followers ($M = 3.48$, $SD = 0.82$) is not significant [$t(829) = -.97$, $p = .33$, two-tailed]. No support was found for Hypothesis 7 stating that there are

significant differences in the evaluation of leaders in terms of their authenticity in the two different organisations.

Discussion

The main aim of this study was to investigate the measurement invariance of the ALI for employees from different organisations. It is assumed that questionnaires and self-report instruments measure some latent variable, and these tools are used to compare groups or to perform longitudinal measurements on phenomena which are not directly observable (Dimitrov, 2010; Van De Schoot et al., 2012). For meaningful and valid comparisons, a questionnaire should measure identical constructs with the same factor structure across different groups. The aim of measurement invariance is to demonstrate that the participants interpret the observed indicators and the underlying latent factor in the same way (Dimitrov, 2010; Van De Schoot et al., 2012). Conversely, if one cannot prove measurement invariance, it indicates that groups or individuals interpret the items differently and as a consequence mean scores cannot be compared (Jöreskog, 1971; Vandenberg & Lance, 2000). According to Ding, Ng, and Wang (2014), comparing groups without proving measurement invariance is just as detrimental as not being able to demonstrate reliability and validity.

Contrary to previous research (Neider & Schriesheim, 2011) and in line with South African research (Stander et al., 2015) on authentic leadership, the findings supported a one-factor construct of the ALI in the mining organisation. This means that employees in the mining organisation interpreted the observed indicators differently from what was theoretically proposed. Instead of items being interpreted as indicators of balanced processing, internalised moral perspective, self-awareness, and relational transparency respectively, the items were indicators of authentic leadership. Apart from the validity studies conducted by Neider and Schriesheim (2011) - the original developers of the ALI - only Stander and his colleagues have investigated the factor structure of this instrument to date. Other studies utilising the ALQ in South Africa found support for a two-factor construct (Munyaka, 2012) or poor model fit for the higher-order construct of authentic leadership (Du Plessis, 2014). The findings of the current study reiterate the importance of evaluating the construct validity of measuring instruments in different contexts. The ALI was found to be reliable, as was the case in the studies of Neider and Schriesheim (2011) and Stander et al. (2015). Authentic leadership was also a significant predictor of trust in the leader supporting the ALI's concurrent validity.

Previous international studies have also found a significant relationship between authentic leadership and trust in the leader (Clapp-Smith et al., 2009; Hassan & Ahmed, 2011; Wong & Cummings, 2009).

It was important to investigate the impact of gender since the mining and health care organisations also differ in terms of being more female as opposed to more male-dominated. Previous research (Du Plessis, 2014) indicated differences on one of the authentic leadership dimensions. Items 3 (“My leader asks for ideas that challenge his/her core beliefs”) and 5 (“My leader uses his/her core beliefs to make decisions”) were configurally non-invariant across genders. This indicates that males and females attach different meanings when evaluating the use of core beliefs by leaders in their leadership approach, since these two items both contain the concept of belief. Consequently, comparing male and female responses on these items may lead to misinterpretations. Merchant (2012) stated that females communicate differently and attempt to influence others differently than their male counterparts. Females tend to be more hesitant to share in distant interpersonal relationships and will only share personally meaningful information - such as core beliefs - but only when they feel they have formed a close bond with others (Heyns & Rothmann, 2015; Payne, 2001). These differences may impact on the way in which the different genders perceive others when they have to share beliefs. The results of this study also suggest that items 3 and 5 may be locally dependent, meaning that responses on these items are linked as explained by Kim et al. (2013), resulting in biased parameters (Steinberg & Thissen, 1996; Yen, 1993).

No differences were found on the factor loadings or intercepts of the remaining items, with the exception of item 8 (“My leader openly shares information with others”), which had a higher intercept for males than for females. This finding suggests that males and females use different conceptual frames of reference when they evaluate the sharing of information by their leader. Heyns and Rothmann (2015) are of the opinion that males and females attach different connotations to the meaning of “sharing”. This might be due to the fact that females have higher expectations in terms of sharing feelings, emphasising the fact that sharing is more than just the sharing of information (Costa, Terracciano, & McCrae, 2001) or the cognitive aspect of sharing (Heyns & Rothmann, 2015). Even though only partial measurement invariance could be established, this is most often the case in reality (Wang & Wang, 2012).

Depending on the aims of a particular study, different levels of measurement invariance are required (Crocetti et al., 2015). If the aim is to compare the structure of constructs across groups, configural- and metric invariance are sufficient. Scalar invariance, on the other hand, is required when comparing latent means because item means and intercepts are involved (Cheung, 2008). Byrne, Shavelson, and Muthén (1989) and Van De Schoot et al. (2012) maintain that when at least two indicators of a latent variable are invariant on scalar level, latent means can be compared across groups. In future, when utilising the ALI to compare gender groups in terms of latent means in these two organisations, items 3 and 5 should be excluded from analyses comparing construct equivalence, and item 8 should be excluded when group means are compared.

The fact that both genders rated their leaders as equally authentic after biased items had been removed is partly in line with Du Plessis' (2014) findings. In her study, no significant differences on the mean scores were found on three of the dimensions of the authentic leadership construct. The findings of the current study support gender similarity, rather than differences, when evaluating their leaders' authenticity. This means that the organisations in the current study do not need to differentiate, based on gender, when leaders are being developed to be more authentic overall. As long as the leader is perceived to be authentic, gender has little impact. This is in line with the argument of Hyde (2014) who postulates that there are more similarities than differences between males and females. These differences hold little practical value for leaders (Gilbert, Burnett, Phau, & Haar, 2010).

Items 2 ("My leader shows consistency between his/her beliefs and actions"), 3 ("My leader asks for ideas that challenge his/her core beliefs"), 5 ("My leader uses his/her core beliefs to make decisions"), 6 ("My leader carefully listens to alternative perspectives before reaching a conclusion"), and 14 ("My leader encourages others to voice opposing points of view) were configurally non-invariant across industries. Once again, future studies that wish to compare construct equivalence should be cautious when including these five items. This indicates that mining and health care employees attach different meanings when evaluating the role of beliefs (self-regulation) as well as objective decision making (and the inclusion of alternative opinions).

Drawing on the open systems theory (Boulding, 1956; Miller, 1965), one can speculate as to some of the reasons why organisations differ in the evaluation of their leaders. This theory

holds that subsystems exist within larger systems and are unique from the larger system (Katz & Kahn, 1978). Applying this theory to the current study, the subsystems would refer to the respective organisations and these subsystems differ from the larger system - which is the country as a whole - and therefore there are more similarities than differences within the subsystems. Employees working for the mining organisation show more similarity, but are different from those working in the health care sector. It is these similarities that may lead to similar preferences (Gilbert et al., 2010) and evaluations of the leader.

The main differences between these two organisations may be ascribed to the differences in organisational culture. According to Armstrong and Taylor (2014), culture consists of four components: Assumptions, values and beliefs, behavioural norms, and artefacts. In terms of values and beliefs, Merchant (2012) states that leadership is the result of an interaction between leaders and followers and this interaction is influenced by individuals' psychological process including values (that which is important) associated with and expected from these roles. According to Câmara and Pereira-Guizzo (2015), organisational values can influence the expression of individual values. Based on difference in perceived importance, this may explain the differences between the two organisations in terms of how their employees perceive the observed indicators measuring authentic leadership and the construct as a whole.

If the relationship between a leader and follower is one of the most imperative components of the leadership style (Merchant, 2012), differences in how this relationship develops and manifests may be evident in profit versus not-for-profit types of organisations. Culture refers to the created patterns of relating in the organisation (Rothmann & Cooper, 2015) which will differ from organisation to organisation. If safety and production targets are the main focus of mines and effective service delivery to patients is the main focus of health care, these leaders may differ in terms of the emphasis they place on tasks versus relationships (assumptions and values), which may lead to differences in the expression of beliefs and the inclusion of others' opinions in decision making (assumptions and behavioural norms). This refers to both the assumptions (what is important and how problems are solved) and behavioural norms (rules governing behaviour) components of organisational culture (Armstrong & Taylor, 2014), which in turn might influence how leaders are perceived by their followers.

Differences were found in the factor loadings or intercepts of items 1, 4, and 12. Health care employees had higher intercepts on item 1 ("leaders clearly state what they mean"), but

employees from the mining organisation had higher intercepts on both items 4 (“leaders accurately describe the way that others view their abilities”), and 12 (“leaders express their ideas and thoughts clearly to others”). This finding suggests that employees from these respective organisations use different conceptual frames of reference when they evaluate how their leaders communicate. All three these items share verbs such as “state”, “describe” and “express” when referring to communication. These differences may be ascribed to the way in which the leaders communicate in these respective organisations, with communication being more direct and tasks being more predictable in the mining organisation. Work-related information can therefore be communicated with more certainty in the mining organisation as opposed to the uncertainties prevalent in the health care organisation.

An important difference between the two organisations is the representation of different cultural groups. The health care sample consisted of mainly Black, Sesotho-speaking individuals, whereas in the mining organisation, White individuals were almost equally represented when compared to Black individuals. A number of researchers have previously advocated for the investigation of how authentic leadership manifests in different cultures (Avolio & Walumbwa, 2014; Gardner et al., 2011; Khilji et al., 2015). The difference in cultural values, specifically, cannot be ignored in this study. Roe and Ester (1999) demonstrated that different social categories (e.g. nations, countries, ethnic, cultures) display different value profiles and patterns. White (Western) individuals may place more emphasis on individualistic values, such as success and achievement (Duckitt & Foster, 1991), whereas the opposite may be true for Black individuals with a focus on collectivistic values such as conformity and traditions (Smith & Bond, 1993). Van De Vijver and Leung (1997) and Vandenberg and Lance (2000) advocate that it is important to evaluate measurement invariance in cross-cultural research.

When utilising the ALI to compare mean levels in these two organisations, items 1, 2, 3, 4, 5, 6, 12 and 14 should be excluded from analyses. As previously discussed, scalar invariance is a pre-requisite for comparing means (Cheung, 2008). The fact that both organisations rated their leaders as equally authentic after biased items had been removed, means that no differentiation based on context needs to be made when developing leaders to be more authentic overall. The current study highlighted which parts of the construct are not invariant across these two groups. Given the number of items that need to be excluded, care should be taken when using this instrument to compare organisational groups for mean differences.

Practical implications

Khilji et al. (2015) distinguish between the “self” attributes - referring to the leader knowing him/herself - and the “other” attributes - referring to the follower-leader interaction. The findings in the present study support the idea that both gender and organisational context play a role in the interpretation of items measuring relational or other attributes of authentic leadership. This is even more so in the case of different organisations, where the majority of items were either non-invariant on configural or scalar level. Even though the non-invariance of items 3 and 5 could be attributed to the impact of gender differences, the majority of the other non-invariant items (items 1, 2, 4, 6, 12 and 14) could be attributed to contextual differences. This confirms the impact of organisational values above and beyond individual (gender) values. When reviewing leadership literature, organisations should take care not to apply findings from studies invariantly to their organisations.

Despite the challenges posed with the measuring instrument, authentic leadership is a significant predictor of trust in the leader. Specifically in the mining organisation, the development of authentic leaders can result in increased trust levels with resultant positive outcomes for both the organisation and individuals. Furthermore, in designing interventions towards developing authentic leaders, these two organisations can ignore the impact of gender differences. Even though some items were interpreted differently, the overall structure of authentic leadership is the same for both genders. The same is applicable when taking contextual differences into account.

Limitations and future directions

This study had several limitations. Comparison of the findings of this study is difficult because limited empirical research exists on the validation of the ALI within different contexts. The study focused on the validation of the ALI in two very specific contexts and because leadership should be investigated in context, results cannot be generalised to other contexts without first testing the validity of the ALI in the new context. Future research should focus on validating the ALI in other contexts, especially multicultural contexts such as in South Africa. Second, the gender of the leader was not controlled for. As previous research suggests, the leader’s gender may play an important role (Liu et al., 2015; Wang, Chiang, Tsai, Lin, & Cheng, 2013).

Future research should match the responses of participants with the leader-subordinate gender-pair to provide more insights into the information obtained. Third, the ALI was administered in English, and the majority of respondents did not indicate it as their home language. This has implications for the interpretation and understanding of items. Future studies should consider translating the ALI into other African languages. Fourth, the differences in sample sizes between the two organisations may have implications. Statistical power is influenced by sample size and size has the ability to influence whether or not statistically significant differences are found (Field, 2013).

Fifth, future studies could extend these analyses by using an Items Response Theory (IRT) framework to test measurement invariance and then compare the results of the two methods (CFA versus IRT). Differential item functioning (DIF) means that items function differently on item level, which is investigated using IRT (Stark, Chernyshenko, & Drasgow, 2006). Sixth, The study investigated competing measurement models to determine whether several highly related domains (self-awareness, balanced processing, relational transparency and internalised moral perspective) comprise of a general factor (authentic leadership) running through the items. These competing models represent what Reise, Moore, and Haviland (2010) label as “unidimensional”, “correlated traits”, and “second-order” models respectively. The current study did not investigate a fourth alternative, the “bifactor” model (Holzinger & Swineford, 1937; Schmid & Leiman, 1957). According to Reise et al. (2010), a bifactor model may be a useful alternative “to the more commonly used unidimensional, correlated traits, or second-order representations of a measure’s latent structure” (p. 545). In the bifactor model, each item loads onto the general factor and in addition to the general factor, two (or more) orthogonal group factors are specified that are able to explain variance in item responses not accounted for by the general factor (Reise et al., 2010). It is recommended that future studies focus on utilising this technique in validity studies pertaining to the ALI. Last, no causal inferences may be made with regard to the impact of authentic leadership on trust, due to the cross-sectional nature of the study. Future studies should employ longitudinal designs to establish causality and to determine reciprocal effects. Given the invariance challenges associated with this instrument, future research in a South African context, especially, should consider developing a model of authentic leadership which is unique to our context. Beddoes-Jones and Swailes (2015) pursued this avenue and developed a new model using “real” leaders in various British organisations. This is also important if we claim that leadership is contextually unique (Haddon et al., 2015).

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CHAPTER 3

CONCLUSIONS, LIMITATIONS AND RECOMMENDATIONS

This chapter presents the theoretical and empirical conclusions of the study, according to the objectives, concluding with the limitations of the study and recommendations made for future research and practice.

3.1 CONCLUSIONS FROM LITERATURE AND EMPIRICAL RESULTS

The general aim of this study was to establish measurement invariance for the Authentic Leadership Inventory (ALI) across two South African organisations from two different industries.

The first objective was to conceptualise authentic leadership and validation methods according to literature. In a review of the literature conducted by Gardner, Coglisier, Davis, and Dickens (2011), they elaborated on the development of both the authentic leader and authentic leadership constructs. They stated that the original conceptualisations in an organisational context dated back to 1967 (Gardner et al., 2011). Henderson and Hoy were the first to conceptualise leader authenticity in 1983 when they distinguished between leader authenticity versus leader inauthenticity. A number of years elapsed before authentic leadership, per se, was defined in the social sciences and gained momentum (Gardner et al., 2011). Several other authors are known for their contributions in defining the construct of authentic leadership (George, 2003; Ilies, Morgeson, & Nahrgang, 2005; Kernis, 2003; Kernis & Goldman, 2006; Luthans & Avolio, 2003) that eventually leads to dimensions of “self-awareness, positive self-regulation, positive self-development, and/or a positive moral perspective” (Gardner et al., 2011, p. 4). The most widely accepted definition to date is the one that was developed and operationalised by Walumbwa, Avolio, Gardner, Wernsing, and Peterson (2008) for the purposes of developing the *Authentic Leadership Questionnaire* (ALQ).

Walumbwa (2008) and his colleagues defined authentic leadership as leadership that “draws on positive psychological capacities and positive ethical climate to foster the four core dimensions of authentic leadership, enabling positive follower self-development” (p. 94).

Subsequently, they concluded that authentic leadership can be operationalised in terms of four dimensions, conceptualised by Kernis and Goldman (2006). First, *self-awareness* means that the leader knows him/herself and the impact he/she has on others, including an understanding of how one creates meaning (makes sense) of the world with implications for self-awareness (Kernis, 2003; Walumbwa et al., 2008). Second, *relational transparency* means that the leader is authentic in dealing with others by displaying their true thoughts and emotions in interpersonal interactions (Kernis, 2003; Walumbwa et al., 2008). Third, *balanced processing* means that the leader takes into account the views of others when making decisions in order to reach an objective decision, even if it challenges their beliefs and feelings (Gardner, Avolio, Luthans, May, & Walumbwa, 2005; Walumbwa et al., 2008). Last, *internalised moral perspective* means that the leader acts and makes decisions in accordance with his or her beliefs and values, regulating him/herself from the inside out instead of being controlled by the environment (Avolio & Gardner, 2005; Gardner et al., 2005; Walumbwa et al., 2008).

Neider and Schriesheim (2011) developed the *Authentic Leadership Inventory* (ALI) with these four dimensions as the basis, in response to a variety of critique on the ALQ threatening the internal and external validity of the construct. According to Anastasi and Urbina (1997) as well as Roodt (2013), three types of validity can be distinguished: Content-description, construct-identification and criterion-prediction. Content validity falls largely outside of the scope of this study, but refers to whether the content of the measuring instrument covers a sufficient part of the construct that one wishes to measure and is partly conducted by subject matter experts as opposed to statistical procedures (Roodt, 2013). Construct validity refers to a psychometric property indicating the extent to which the measuring instrument measures the construct it was designed to measure and factorial validity is one form of this (Anastasi & Urbina, 1997; Roodt, 2013). By means of factorial analysis, the interrelationships between constructs are determined and used when the measure is validated in a context in which it has never been used (Roodt, 2013). Schriesheim and Coglisier (2009) are of the opinion that construct validity plays an important role in the leadership domain. The final type of validity that can be distinguished is criterion-prediction of which concurrent validity forms part. This refers to the ability of the instrument being used to predict an outcome (Anastasi & Urbina, 1997; Roodt, 2013).

Measurement invariance is an aspect of validity and is defined as the extent to which an instrument measures the same construct when administered in different contexts (Horn & McArdle, 1992). Measurement invariance clusters with construct validation procedures as the

former is described as factorial analytic procedures that are used for the purpose of determining the equivalence (invariance) of instruments across groups (Roodt, 2013). This will mean that individuals, from different groups, interpret items and constructs the same (Dimitrov, 2010; Ding, Ng, & Wang, 2014; Van De Schoot, Lugtig, & Hox, 2012; Van De Vijver & Leung, 1997). Depending on the aims of a particular study, different levels of measurement invariance are needed (Cheung, 2008; Crocetti et al., 2015). Dimitrov (2010), Van De Schoot et al. (2012), and Wang and Wang (2012) distinguish between three levels of measurement invariance, namely *metric* (or weak), *scalar* (or strong) and *strict*. In order to compare latent means across groups, scalar invariance should be established (Cheung, 2008).

The second objective was to determine whether authentic leadership, as measured by the ALI, is a four-factor construct in the mining organisation. The results of this study indicated that a one-factor model fitted the data best. This is in line with previous research (Stander, De Beer, & Stander, 2015) on the ALI that concluded that authentic leadership, as measured by the ALI, is a one-factor construct. This contradicts the findings of Neider and Schriesheim (2011) that authentic leadership, as measured by the ALI, is a four-factor model loading onto one higher-order factor.

The third objective was to evaluate if the internal consistency of the ALI is acceptable in the mining organisation. Results confirmed the internal consistency of the ALI ($\rho = .94$) and this is in line with previous research (Neider & Schriesheim, 2011; Stander et al., 2015).

The fourth objective of the study was to determine if authentic leadership, as measured by the ALI, is a significant predictor of trust in the leader in the mining organisation. In line with previous research indicating the ability of authentic leadership to predict followers' trust in the leader (Clapp-Smith, Vogelgesang, & Avey, 2009; Hassan & Ahmed, 2011; Wong & Cummings, 2009), the results of the current study confirmed the ability of authentic leaders to influence trust ($\beta = .73, p < .001$).

The fifth objective of the study was to investigate if authentic leadership, as measured by the ALI, is invariant across gender groups. Results of the study indicated that authentic leadership is only partially configurally invariant, which means that the basic structural model is only partially invariant. This indicates differences in the way that different groups conceptualise the construct (Milfont & Fischer, 2010). Specifically, items 3 and 5 were non-invariant and had to

be excluded for further analysis. Metric invariance could be established, meaning that the factor loadings onto the construct were equivalent across the gender groups. Only partial scalar invariance could be established due to the differences in the intercepts between the two groups on item 8. The results indicated that items 3, 5 and 8 were biased. Gender differences in the interpretation of items can be traced back to the differences in information sharing which is more than just the cognitive aspect thereof for females (Costa, Terracciano, & McCrae, 2001; Heyns & Rothmann, 2015).

The sixth objective of the study was to investigate whether authentic leadership, as measured by the ALI, is invariant across two organisations. Results of the study indicated that authentic leadership is only partially configurally invariant, which means that the basic structural model is only partially invariant. Items 2, 3, 5, 6 and 14 were configurally non-invariant. Although the bias of items 3 and 5 cannot be ascribed to organisational differences, the bias of the rest of the items (items 2, 6 and 14) potentially derives from differences between the organisations. Once again, only partial scalar invariance could be established across the two organisational groups due to differences in the intercepts of items 1, 4 and 12. In total, eight of the items of the ALI were non-invariant across the two organisational groups. Differences in the interpretation of the items can be traced back to differences in the organisational cultures governing beliefs and values, and behavioural norms as explained by Armstrong and Taylor (2014).

The seventh objective of the study was to evaluate if there are significant mean differences on the dimensions of authentic leadership as measured by the ALI for different gender and organisational groups. The results indicated no significant mean differences between the two different gender groups or between the two organisational groups after biased items had been removed. The absence of gender differences is partially in line with the study of Du Plessis (2014) that only found significant differences on the balanced processing dimension of the authentic leadership construct. A meta-analysis conducted by Hyde (2014) on gender differences and similarities, indicated more similarities than differences. No previous research on differences between different organisations with the ALI has been reported to date. The current results may confirm that extreme contexts such as these organisations share risks, whether being psychological or physical, as postulated by Hannah, Uhl-Bien, Avolio, and Cavarretta (2009); therefore rating their leaders equally which hint at more similarities than differences.

3.2 LIMITATIONS

The study had several limitations which should be kept in mind when interpreting the results. The study was conducted in two specific organisations and cannot be generalised to other contexts. The study was cross-sectional in nature and no conclusions may be drawn in terms of the “cause-and-effect” of authentic leadership and trust in the leader. There were differences in the sample sizes between the two organisations, and the questionnaires were administered in English which is not the first language (mother tongue) of most of the participants. Furthermore, the impact of certain other demographic variables was not considered, such as age, race, and education. Roodt (2013) describes these as moderator variables which have the potential to influence validity. In terms of gender, only the gender of the followers was taken into account. Lastly, only self-report measures were used. According to Podsakoff, MacKenzie, Lee, and Podsakoff (2003), bias results when the sources that provide feedback on the criterion and predictor variable are the same. However, in this study the aim was to evaluate the followers’ perceptions of their leaders as being both authentic and trustworthy. Self-report measures were deemed most appropriate for this aim.

3.3 RECOMMENDATIONS

Based on the findings of this study, several recommendations can be made for future research and practice which were the last objective of this study.

3.3.1 Recommendations for Future Research

No single accepted definition of authentic leadership exists and scholarly debates are still ongoing (Beddoes-Jones & Swailes, 2015; Gardner et al., 2011; Khilji, Keilson, Shakir, & Shrestha, 2015; Kinsler, 2014), complicating consensus in construct measurement. What complicates matters even more is the fact that followers may understand both authentic leadership and authenticity differently (Owusu-Bempah, Addison, & Fairweather, 2014). Given the fact that South Africa differs significantly from other (Western) countries on a variety of aspects (Joshani, Wissing, Khumalo, & Lamers, 2013) - where leadership is in the “eye of the beholder” and is influenced by context (Avolio & Walumbwa, 2014; Neider & Schriesheim, 2011; Paustian-Underdahl, Walker, & Woehr, 2014) - the development of a unique definition of authentic leadership is important.

Future research should investigate structural invariance in these two organisations in order to resolve the debate on whether authentic leadership is equally preferred or effective. Haddon, Loughlin, and McNally (2015) are of the opinion that existing literature does not provide a clear understanding of leadership preferences in crisis versus non-crisis contexts.

Several researchers (De Hoogh, Den Hartog, & Nevicka, 2015; Heyns & Rothmann, 2015) advocate for the investigation of the interaction between the gender of the follower and the gender of the leader. Future studies should investigate this leader-subordinate dyad. The leader's gender might also have an impact on the effectiveness of leadership (Liu, Cutcher, & Grant, 2015; Wang, Chiang, Tsai, Lin, & Cheng, 2013). Future research may therefore include the leader's gender as a moderating variable between followers' perceptions of the leader and individual or organisational outcomes.

3.3.2 Recommendations for Practice

In today's business environments, trust between leaders and followers is considered to be an important relational element (Caza, Zhang, Wang, & Bai, 2015; Norman, Avolio, & Luthans, 2010). Authentic leaders can influence followers' perceptions of trust (Avolio & Walumbwa, 2014; Norman et al., 2010) with resultant desirable and positive outcomes on individual, team and organisational levels, even during turbulent times (Algera & Lips-Wiersma, 2012; Onorato & Zhu, 2014). This legitimises authentic leadership as a construct worthy of attention in research. In line with the recommendation of Avolio and Walumbwa (2014) to base leadership development on empirical evidence, the current study demonstrated the impact of authentic leadership on followers' trust in the leader, and the mining organisation in particular can invest in authentic leadership development for its leaders.

Interventions may include developing leaders' psychological capital (hope, optimism, self-efficacy and resilience) through specific interventions (Avolio, Griffith, Wernsing, & Walumbwa, 2010) as part of positive self-development (Avolio & Gardner, 2005; Luthans & Avolio, 2003). These interventions may include, but are not limited to mindfulness – being aware of the present (Brown & Ryan, 2003), adaptive self-reflection linked to narrative processing (Avolio et al., 2010), dramaturgy (Ladkin & Taylor, 2010), and triggering events (in the form of feedback, major life events and perceived failures or successes). Coaching and mentoring (Kinsler, 2014; Maldonado, 2013) and formal training events with positive

developmental interventions (“what went right?”; Avolio et al., 2010) may also facilitate the development of leader authenticity. In order for followers to be able to provide feedback to leaders, strengths-based development of followers (Avolio et al., 2010) - also known as dialogical communication (Berkovich, 2014) - may be utilised.

In the absence of significant differences between followers’ evaluation of their leaders as authentic, both across gender and organisational groups, the two respective organisations do not need to tailor interventions based on gender characteristics when training their leaders to be authentic. Similar, authentic leadership interventions designed for one organisation could work equally well in the other organisation.

3.4 CHAPTER SUMMARY

In this chapter the conclusions were provided on each of the objectives of the study from empirical and theoretical perspectives, depending on the nature of the respective objective. The chapter concluded with the limitations of the current study as well as the recommendations for future research and practice.

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