



# An exploration of women's workplace experiences in the South African mining industry

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## Synopsis

Historically, the mining industry, on a global level, was male-dominated, as many governments had prohibited women from working at mines, particularly underground. In South Africa, the government introduced the Mineral and Petroleum Resources Development Act (No. 28 of 2002) (MPRDA) and the Broad-based Socio-economic Empowerment Charter to address the imbalances and rectify previous inequalities in the mining industry. Since the inception of MPRDA, women's representation in the South African mining industry has increased, from 3% in 2002 to 15% in 2018. Although government has good intentions, gender equality in the mining industry remains a challenge. Research on women employed in South African mines revealed that women still face barriers to some extent. This research explores women's current workplace experiences in the South African mining industry. A literature review and an empirical study were conducted. The study followed a positivistic research approach, and a quantitative research design was used. Self-administered questionnaires were distributed at the 8th Annual Women in Mining Conference in February 2017. Based on the data obtained, it became evident that several aspects must still be addressed to successfully accommodate women in the mining workplace. The study offers practical recommendations that can be implemented by mining organizations to improve women's workplace experiences in order to encourage and foster transformation in the mining industry.

## Keywords

gender, mining industry, mining legislation, South Africa, women in mining.

## Introduction

Historically, the mining industry, on a global level, was male-dominated, as many governments had prohibited women from working at mines, particularly underground. The International Labour Organization (ILO) adopted Convention 45 of 1935 on 21 June 1935 in Geneva, which prohibited the employment of women for underground work in mines of all kinds (ILO, n.d.).

In South Africa, the South African Minerals Act (No. 50 of 1991) also forbade women from underground work (ILO, n.d.; South Africa, 1991). In 2002, the Mineral and Petroleum Resources Development Act (No. 28 of 2002) (MPRDA) and the Broad-based Socio-economic Empowerment Charter (signed in 2002 and published in 2004) were introduced to address the imbalances in the industry, calling for 10% of the workforce to be women by 2009 (South Africa, 2002, 2004a).

From 2002, women's representation in the South African mining industry increased from 3% to 15% in 2018 (Minerals Council South Africa, 2018, p. 41). Although considerable progress has been made in terms of women's representation in the South African mining industry, men still dominate this industry. Furthermore, research conducted on women employed in South African mines since the inception of the MPRDA in 2002 has revealed that the employment of women remains a challenge and that women still face barriers to some extent (Botha, 2016, 2017; Botha and Cronjé, 2015; Chamber of Mines of South Africa, 2017; Hancock, 2014; Kolisi and Rithaa, 2016; Mavuso, 2015; Ntombela, 2014).

## Purpose of the study

The study on which this article reports was conducted to explore women's current workplace experiences in the South African mining industry. The article begins with an overview of global and national mining legislation pertaining to female workers, followed by an outline of gender barriers in the South African mining industry since the inception of the MPRDA. Thereafter, the empirical results are presented and discussed. The article concludes with practical recommendations to improve women's workplace experiences in the mining industry.

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## Overview of mining legislation pertaining to female workers: A global and national perspective

The mining industry world-wide has been considered a masculine industry for many years. As a result, mining jobs have neither been desired as an occupation by women, nor easily awarded to women. However, significant developments in mining legislation have taken place over the past few years in many countries, including South Africa, in an attempt to address the inequalities in the industry and to bring women into the industry.

### Mining legislation: A global perspective

There is no global legislation specifically pertaining to women in the mining industry, because each country has its own legislation. However, according to the International Labour Organization (ILO, 2011, p: ix), there are continual legislative efforts, repeated institutional initiatives, and a growing awareness of the need to overcome discrimination in the workplace. Race and sex continue to be the grounds of discrimination included in most equality legislation in an attempt to remove discrimination in the workplace (ILO, 2011; SAHRC, 2017; United Nations, 2019). Worldwide, new laws were introduced and existing legislation amended to abolish discrimination based on maternity, marital status, lifestyle, and genetic predisposition, and new policies introduced for training and improving employment quotas for women in managerial positions (ILO, 2011; SAHRC, 2016; United Nations, 2003). However, the benefits for women are not enough. Although these policies have been implemented they are not functioning effectively, because many institutions suffer a shortage of financial and human resources as well as insufficient policy coherence at local and national levels. Labour authorities, such as inspectors and public officials, lack knowledge and institutional capacity when addressing discrimination cases, which deters victims of discrimination from submitting claims (ILO, 2011, p. x; SAHRC, 2016, p. 7, 69; United Nations, 2003, p. 633, 2011, p. 138).

The ILO's Convention 45 of 1935 prohibited the employment of women in underground mining work (ILO, n.d.), but many countries that initially ratified it have since denounced it (Chamber of Mines of South Africa, 2017, p. 1). These countries include Australia (1988), Canada (1978), Chile (1997), and South Africa (1996), among others (Chamber of Mines of South Africa, 2017, p. 1).

### Mining legislation: A national perspective

In 1898 the South African Republic, which ruled the Transvaal, in its Act No. 12 (XVIII:146), explicitly banned the employment of women in any mine. The relevant clause, which was written in Dutch, was transferred almost word for word into the Union of South Africa's Mines and Works Act (No. 12 of 1911) (par. 8.1). The clause read: 'No person shall employ underground on any mine a boy apparently under the age of sixteen years or any female' (Alexander, 2007, p. 214).

The Mines and Works Act (No. 27 of 1956) also forbade women to work underground. Section 11 (1) read: 'No male person under the age of sixteen years and no female shall work, and no person shall cause or permit any male person apparently under the age of sixteen years or any female to work, underground in any mine' (South Africa, 1956, p. 61).

However, Section 32 (2) of the Mines and Works Act (No. 27 of 1956) allowed women to work underground if they held management positions, if they were employed in health

and welfare services, for training purposes, and if they had to go underground in a mine for the purposes of non-manual occupations (South Africa, 1956, p. 55). The Mines and Works Act (No. 27 of 1956) was repealed by the Minerals Act (No. 50 of 1991).

The MPRDA replaced the Minerals Act (No. 50 of 1991) and came into effect on 1 May 2004. Among others, the objectives of the Act are to 'promote equitable access to the nation's mineral and petroleum resources to all the people of South Africa' and to 'substantially and meaningfully expand opportunities for historically disadvantaged persons, including women, to enter the mineral and petroleum industries and to benefit from the exploitation of the nation's mineral and petroleum resources' (South Africa, 2002, p. 18). The term 'historically disadvantaged South Africans' (HDSAs) refers to 'any person, category of persons or community, disadvantaged by unfair discrimination before the introduction of the Constitution of the Republic of South Africa (Act 200 of 1993) came into operation' (South Africa, 2004a, p. 8). To give rise to Section 100 (2) (a) of the MPRDA, the Department of Minerals and Energy introduced the Mining Charter (Fauconnier and Mathur-Helm, 2008; South Africa, 2004a). This legislation was then followed by the Scorecard (Notice 1639 of 2004), which set the framework, targets, and timetable against which mining companies needed to report and were measured (South Africa, 2004b). In terms of Section 4 of the Scorecard (Notice 1639 of 2004), mining houses were required to 'implement career paths to provide opportunities to their HDSA employees to progress in their chosen careers' and to 'ensure a higher level of inclusiveness and advancement of women' (South Africa, 2004b, p. 11). A minimum requirement of 10% female participation in the mining industry within five years (which was due in 2009) was set (South Africa, 2004b, p. 12).

In 2009 and 2015, the Department of Mineral Resources conducted impact assessments to establish the progress in the South African mining industry regarding the objectives of the Mining Charter (DMR, 2009, 2015). The findings of the reports showed that, in as much as the Mining Charter was a valuable tool for improving transformation in South Africa's mining industry, there were challenges in terms of effective implementation in order to meet its objectives. It was then recommended that the Mining Charter be reviewed and strengthened. This resulted in amendments of the Broad-based Socio-economic Empowerment Charter for the South African Mining and Minerals Industry in 2010 (South Africa, 2010) and 2015 (MHSC, 2015). New employment equity targets were set in each charter.

Although the percentage of women participating in mining improved from 3% in 2002 (Minerals Council South Africa, 2018, p. 41) to 6% in 2009 (DMR, 2009, p. 9) and to 10.5% in 2014 (DMR, 2015, p. 28), the employment figures for women were low in each employment functional category (top management [board] level, senior management [EXCO] level, middle management level, junior management level, and in core skills) (DMR, 2015, p. 27).

On 15 June 2017, the Reviewed Broad-based Black Economic Empowerment Charter for the South African Mining and Minerals Industry, 2016 (named the Reviewed BBBEE Mining Charter) was published. However, there was much uncertainty and controversy around the new Charter. On 27 September 2018, the Broad-based Socio-economic Empowerment Charter for the Mining and Minerals Industry, 2018 (Mining Charter 3) was published and came into force on 1 March 2019, almost three

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years after the publication of the first draft (Bulbulia, 2019). Mining Charter 3 requires a minimum of 50% HDSAs at board level with exercisable voting rights (20% should be women), a minimum of 50% at executive management level (20% women), 60% at senior management level (25% women), 60% at middle management level (25% women), and 70% at junior management level (30% women) (South Africa, 2018, pp. 22–23).

## **Gender barriers in the South African mining industry since the inception of the MPRDA**

Although great efforts have been made to accommodate women in the South African mining industry since the inception of the MPRDA in 2002, the literature reviewed indicates the following main barriers that women continue to face.

- Women working in core mining areas, specifically underground, are often seen as sexual objects and experience physical, verbal, and non-verbal sexual conduct as well as *quid pro quo* harassment on a regular basis (Botha, 2016; Botha and Cronjé, 2015; Creamer Media, 2019; Jones and Moalusi, 2019; Minerals Council South Africa, 2019; Nene, 2016; Ntombela, 2014).
- Although mining companies made considerable progress in accommodating women by providing personal protective equipment (*e.g.* overalls, dust masks, and safety boots) designed for women, improvements are still needed in this regard. Furthermore, a need for protective clothing for pregnant women is identified (Botha, 2017; James, 2018; MHSC, 2015).
- Frequently, the physical strength required for many mining tasks precludes women from performing these tasks effectively (Jones and Moalusi, 2019, p. 3 MHSC, 2015, p. 5; Minerals Council South Africa, 2019 p. 3). Difficult jobs such as operating rock drills, locomotives, and dozers may hold physiological risks for women (Botha and Cronjé, 2015, p. 10; Matshingane, 2017, p. 3; Minerals Council South Africa, 2019, p. 3; Chamber of Mines of South Africa, 2017, p. 2).
- A lack of separate, decent, and hygienic toilet facilities underground is often reported (Botha, 2017, p. 22; Matshingane, 2017, p. 5; MHSC, 2015, p. 64; Minerals Council South Africa, 2019, p.3).
- The mining industry often constitutes an unattractive work environment because of issues such as discrimination against women, sexual harassment, and prejudice due to marital status and/or maternity (Botha, 2016; Creamer Media, 2019; Jones and Moalusi, 2019; Mavuso, 2015; MHSC, 2015). A negative work environment contributes towards the number of women leaving their jobs, resulting in slower transformation of the mining industry (Breytenbach, 2017; Mputing, 2017).
- Female workers' negative perceptions with regard to safety and the nature of equipment contribute to turnover once employees consider the accidents or consequences that are likely to occur, thereby causing them to fear injury or fatality (Matshingane, 2017; Mavuso, 2015; Minerals Council South Africa, 2019).
- Women often find it difficult to balance their work and personal lives and/or activities (*e.g.* family, domestic activities, and health). Unfriendly working hours (shift work and working off-hours) and the physicality of mine work complicate this issue (James, 2018; Jones and Moalusi, 2019; Matshingane, 2017; Mavuso, 2015).

- Inadequate training and career development support (*e.g.* bursaries, study leave, and mentoring systems) are frequently reported (Jones and Moalusi, 2019; Matshingane, 2017; Mavuso, 2015; Slater, 2018).

## **Research methodology**

The study followed a positivistic research approach. It was informed by the ontological approach of objectivism and the epistemology of empiricism. A quantitative research design was used. This study encompassed a literature review and an empirical study.

## **Target population and sampling**

The target population consisted of women employed at mines in South Africa who attended the 8th Annual Women in Mining Conference held on 22 February 2017. This study was based on a non-probability convenience sample, because it was 'available to the researcher by virtue of its accessibility' (Bryman *et al.*, 2015, p. 178). The sample consisted of 129 women who attended the Conference.

## **Instrumentation and data collection**

Data was collected by means of self-administered questionnaires. The questionnaires were aimed at obtaining biographical information as well as information on the perceptions of women's workplace experiences in the mining industry, based on a five-point Likert-type scale rating, ranging from 'strongly disagree' to 'strongly agree'.

## **Data analysis and reporting**

The Statistical Package for the Social Sciences (SPSS Version 24) was used to process the data. A factor analysis was conducted to explore the underlying structure of women's workplace experiences in the mining industry. Cronbach's alpha coefficients were used to determine internal reliability. In addition, descriptive statistics, t-tests, analyses of variance (ANOVAs), and correlations were used to analyse the data. To determine whether differences in means were important in practice, Cohen's d-values were used as effect size, where  $d = 0.2$  was considered as small,  $d = 0.5$  as medium, and  $d = 0.8$  as large effects (Cohen, 1988). According to Cohen (1988), correlations of 0.1, 0.3, and 0.5 can be interpreted as small, medium and large correlations, respectively.

## **Ethical considerations**

Permission to conduct the research was obtained from the Intelligence Transfer Centre, which hosts the Annual Women in Mining Conference. The succeeding ethical practices were factored in the study: voluntary participation, anonymity, and informed consent (see Babbie and Mouton, 2011, p. 12).

## **Empirical results**

### **Biographical Information**

Table 1 presents the biographical information of the respondents.

### **Perceptions of women's workplace experiences in the South African mining industry**

#### **Validity and reliability**

A factor analysis was conducted on the 35 Likert-type scale items measuring perceptions of women's workplace experiences in the South African mining industry. Principal component analysis and

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Table I  
**Biographical information**

Item	Category	N	%
Province working in	North West	26	23.2
	Western Cape	0	0.0
	Northern Cape	17	15.2
	Eastern Cape	1	0.9
	KwaZulu-Natal	1	0.9
	Gauteng	25	22.3
	Limpopo	17	15.2
	Mpumalanga	19	17.0
Mining sector	Free State	6	5.4
	Gold	13	10.4
	Platinum	27	21.6
	Coal	26	20.8
	Uranium	0	0
	Copper	2	1.6
Gender	Other	57	45.6
	Male		0
	Female	128	100
Age	Other		0
	< 20 years	1	0.8
	21–30 years	23	18.1
	31–40 years	72	56.7
	41–50 years	27	21.3
Race	51–60 years	4	3.1
	Black	104	83.9
	White	8	6.5
	Coloured	7	5.6
	Indian	3	2.4
Highest qualification	Other	2	1.6
	Matric and below	34	26.6
	Diploma	30	23.4
	Degree	25	19.5
	Honours	20	15.6
Level of employment at the mine	Master's/Doctorate	19	14.8
	Unskilled worker	2	1.6
	Semi-skilled worker	15	12.1
	Skilled worker	26	21.0
	Junior management	27	21.8
	Middle management	36	29.0
Current role in mining	Senior management	16	12.9
	Top (executive) management	2	1.6
	Intern / Graduate / Learner official	7	5.6
	Miner	9	7.3
	Shift boss / Mine overseer	5	4.0
Years working in the mining industry	Manager: Mining	8	6.5
	Other	95	76.6
	< 5 years	25	19.8
	6–10 years	58	46.0
	11–20 years	38	30.2
Income	21–30 years	3	2.4
	30 > years	2	1.6
	< R5 000	1	0.8
	R5 001–R10 000	14	11.5
	R10 001–R20 000	24	19.7
Place of work on mines	R20 000–R40 000	44	36.1
	> R40 000	39	32.0
	Underground	7	5.6
	Work on surface	81	64.3
Open pit or deep mining (underground)	Work underground and on surface	21	16.7
	Work in other areas	17	13.5
Union affiliation	Open pit	55	53.4
	Deep mining (underground)	48	46.6
Union affiliation	Belong to a union	70	56.5
	Do not belong to a union	54	43.5

oblimin rotation were used. The Kaiser-Meyer-Olkin test (KMO) gave a measure of 0.785 and indicated that the sample size was adequate for factor analysis. Values for KMO between 0.7 and 0.8 are excellent (Field, 2005, p. 640). The p-value of Bartlett's test of sphericity returned a value smaller than 0.05, suggesting that the correlation between statements was sufficient for factor analysis (see Field, 2005). Five factors (Transformation, Female abuse, Personal care, Career choice, and Development and training) were extracted through Kaiser's criteria (see Field, 2005) that explained 51.84% of the total variance. The results of the factor analysis are reported in Table II.

The Cronbach's alpha coefficient for the Transformation, Female abuse, Personal care, and Development and training factors calculated well above the required 0.7, and showed high reliability and internal consistency. The Career choice factor showed a Cronbach's alpha coefficient of 0.629, which could be regarded as an acceptable reliability. This might have been caused by the low number of statements, namely two in the factor. The mean inter-item correlation was 0.459, which is sufficient according to Clark and Watson (1995). The inter-item correlations should be in the range of 0.15 to 0.55 to be considered as an indicator for an acceptable level of consistency (Clark and Watson, 1995, p. 8).

For the descriptive statistics, the following response categories were used: 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree. Mean scores below 2.5 indicate that most respondents disagreed with the statements contained in the factors, while mean scores above 2.5 indicate that most respondents agreed with the statements. The mean scores of all the factors measured above 2.5 (Transformation:  $M = 3.114$ ; Female abuse:  $M = 3.068$ ; Personal care:  $M = 3.175$ ; Career choice:  $M = 2.515$ ; Development and training:  $M = 3.237$ ).

### **Correlation between age, highest qualification, level of employment, years working at the mine, income, and workplace experiences**

The Spearman rank correlation test was used to measure the linear association between age, highest qualification, level of employment, years working at the mine, income, and women's workplace experiences in the South African mining industry. The results are reflected in Table III.

Small positive correlations were found between income and *Transformation* ( $p = 0.018$ ,  $r = 0.214$ ) and income and *Development and training* ( $p = 0.028$ ,  $r = 0.202$ ). Medium to large positive correlations were found between *Transformation* and *Personal care* ( $p = 0.000$ ,  $r = 0.486$ ), *Transformation* and *Development and training* ( $p = 0.000$ ,  $r = 0.554$ ), and *Personal care* and *Development and training* ( $p = 0.001$ ,  $r = 0.300$ ). Small negative correlations were found between *Transformation* and *Career choice* ( $p = 0.030$ ,  $r = -0.194$ ); *Personal care* and *Career choice* ( $p = 0.034$ ,  $r = -0.189$ ) and *Female abuse* and *Personal care* ( $p = 0.039$ ,  $r = -0.183$ ). A moderate negative correlation was found between *Transformation* and *Female abuse* ( $p = 0.000$ ,  $r = -0.358$ ).

### **Effect of working in an open pit or deep underground mine) on women's workplace experiences**

From the results of the t-test, it is evident that the p-values for all the factors of women's workplace experiences in the mining industry were higher than 0.05, indicating that there were no statistically significant differences between the means of

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Table II

Pattern matrix: Women's workplace experiences in the South African mining industry

Statement		Factor	Factor	Factor	Factor	Factor
		Transformation	Female abuse	Personal care	Career choice	Development and training
Q2	Management reminds employees about the importance of women in the organisation.	0.851				
Q1	Transformation is at the top of this organisation's agenda.	0.796				
Q3	Management encourages employees to embrace diversity.	0.783				
Q4	I feel that women's inputs are valued in the organisation.	0.732				
Q21 <sup>®</sup>	Taking child responsibility leave is a problem.	0.602				
Q5	The facilities at the organisation are conducive to women to work in.	0.515				
Q20	Male managers understand that I am also a mother with responsibilities.	0.502				
Q29	Management involves women in decision making.	0.398				
Q10	There are good relations between female and male management.	0.391				
Q7	Women get promoted more easily than men.	0.352				
Q11	Male managers dominate the work environment.		0.601			
Q8	Women in management need to work extra hard to prove themselves.		0.577			
Q19	Male workers emotionally abuse me at times.		0.568			
Q17	Male workers harass women.		0.552			
Q6	Men in the workplace think women are weak.		0.503			
Q16 <sup>®</sup>	It is easy for women to communicate with men in the workplace.		0.446			
Q9 <sup>®</sup>	There are good relations between female and male miners.		0.388			
Q18	I am a victim of sexual and/or physical harassment.		0.311			
Q12	The female miners' uniforms are comfortable for them to work in.			0.864		
Q13	Personal protective equipment and clothing have been designed especially for women.			0.839		
Q15	The toilets at the workplace are suitable for women underground.			0.554		
Q23	The organisation has made changes to accommodate women.			0.450		
Q14	The toilets at the workplace are suitable for women on the surface.			0.252		
Q33	I am forced to work at the mines, as the income is good.				0.709	
Q34	Given the chance, I will not work at a mine.				0.680	
Q30	I have a career development plan in place.					-0.697
Q25	My manager is keen to approve studies for women.					-0.680
Q31	I am on a mentorship programme.					-0.651
Q26	The organisation offers training programmes for women.					-0.627
Q24	My manager supports women's development in their careers.					-0.615
Q28	Programmes are in place to address gender inequalities.					-0.293
<b>Cronbach's alpha</b>		<b>0.862</b>	<b>0.722</b>	<b>0.747</b>	<b>0.629</b>	<b>0.778</b>
<b>Factor mean</b>		<b>3.114</b>	<b>3.068</b>	<b>3.175</b>	<b>2.515</b>	<b>3.237</b>
<b>Factor standard deviation</b>		<b>0.869</b>	<b>0.665</b>	<b>0.878</b>	<b>1.203</b>	<b>0.897</b>

Extraction method: principal component analysis  
 Rotation method: oblimin with Kaiser normalization  
 Rotation converged in 22 iterations

respondents working in an open pit or in deep mining. However, the effect size for *Transformation* ( $d = 0.30$ ) and *Personal care* ( $d = 0.35$ ) showed a small effect, indicating that women working in an open pit were slightly more satisfied with *Transformation* ( $M = 3.21$ ) and *Personal care* ( $M = 3.33$ ) than those working in deep (underground) mining (*Transformation*:  $M = 2.93$ ; *Personal care*:  $M = 2.99$ ).

### Effect of affiliation to a union $\gamma$

The results of the t-test indicated no statistically significant differences between the means of respondents that were affiliated to a union and those that were not, as the p-values for all the factors of women's workplace experiences in the mining industry calculated higher than 0.05. The effect sizes for *Transformation*

( $d = 0.31$ ), *Personal care* ( $d = 0.33$ ), and *Development and training* ( $d = 0.24$ ) showed a small effect. Women affiliated to a union were less satisfied with *Transformation* ( $M = 2.96$ ), *Personal care* ( $M = 3.04$ ), and *Development and training* ( $M = 3.13$ ) than those not affiliated (*Transformation*:  $M = 3.25$ ; *Personal care*:  $M = 3.33$ ; *Development and training*:  $M = 3.35$ ).

### Effect of race

The t-test yielded p-values higher than 0.05 for all the factors of women's workplace experiences in the mining industry, indicating no statistically significant differences between the means of 'black' respondents and respondents of 'all other racial groups'. The effect sizes indicated a small effect for *Transformation* ( $d = 0.32$ ), *Female abuse* ( $d = 0.29$ ), and *Career*

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Table III

**Correlation between age, highest qualification, level of employment, years working at the mine, income, and women's workplace experiences in the South African mining industry**

		Age	Highest qualification	Level of employment	Years working at mine	Income	Transformation	Female abuse	Personal care	Career choice	Development and training
Transformation	Correlation coefficient	0.068	0.096	0.168	0.062	0.214* (a)	1.000	-0.358**(b)	0.486**(b)	-0.194*(a)	0.554**(c)
	Sig. (2-tailed)	0.446	0.281	0.062	0.493	0.018		0.000	0.000	0.030	0.000
	N	127	128	124	126	122	129	129	127	126	126
Female abuse	Correlation coefficient	-0.009	0.148	0.133	0.071	0.165	-0.358**(b)	1.000	-0.183*(a)	0.167	-0.103
	Sig. (2-tailed)	0.918	0.095	0.142	0.429	0.070	0.000		0.039	0.062	0.250
	N	127	128	124	126	122	129	129	127	126	126
Personal care	Correlation coefficient	0.044	0.079	0.108	0.102	0.132	0.486**(b)	-0.183*(a)	1.000	-0.189*(a)	0.300**(b)
	Sig. (2-tailed)	0.629	0.380	0.236	0.258	0.151	0.000	0.039		0.034	0.001
	N	125	126	122	124	120	127	127	127	126	126
Career choice	Correlation coefficient	0.027	0.064	-0.056	0.039	0.020	-0.194*(a)	0.167	-0.189*(a)	1.000	-0.103
	Sig. (2-tailed)	0.770	0.477	0.538	0.669	0.830	0.030	0.062	0.034		0.251
	N	124	125	121	123	119	126	126	126	126	126
Development and training	Correlation coefficient	-0.031	0.054	0.150	-0.001	0.202*(a)	0.554**(c)	-0.103	0.300**(b)	-0.103	1.000
	Sig. (2-tailed)	0.736	0.547	0.100	0.988	0.028	0.000	0.250	0.001	0.251	
	N	124	125	121	123	119	126	126	126	126	126

\*\* Correlation is significant at the 0.01 level (2-tailed)

\* Correlation is significant at the 0.05 level (2-tailed)

(a) small effect:  $r = 0.1$ , (b) medium effect:  $r = 0.3$  and (c) large effect:  $r > 0.5$

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choice ( $d = 0.27$ ). Black respondents ( $M = 3.05$ ) were less satisfied with *Transformation* than 'all other racial groups' ( $M = 3.34$ ), agreed more ( $M = 3.11$ ) than 'all other racial groups' ( $M = 2.89$ ) that *Female abuse* is a problem in the workplace, and indicated more ( $M = 2.58$ ) than 'all other racial groups' ( $M = 2.24$ ) that working at the mine is not their preferred *Career choice*.

### Effect of the mining sector

The results of the ANOVA indicated p-values higher than 0.05 for all the factors of women's workplace experiences in the mining industry, indicating no statistically significant differences between the means of the different mining sectors. The results of the effect sizes indicated a small effect for *Transformation*, where the respondents from the platinum mining sector ( $M = 3.26$ ) were slightly more positive about *Transformation* than those from the coal ( $M = 2.98$ ,  $d = 0.28$ ) and the gold mining sectors ( $M = 2.88$ ,  $d = 0.39$ ). The *Female abuse* factor showed a small effect, where the respondents from the platinum mining sector ( $M = 3.14$ ) agreed more than respondents from the coal mining sector ( $M = 2.98$ ,  $d = 0.20$ ) with the statements in the *Female abuse* factor. The effect size for the *Personal care* factor showed a small effect for all the mining sectors, where respondents from the gold mining sector ( $M = 2.85$ ) were less positive about *Personal care* than those from all the other mining sectors (platinum:  $M = 3.35$ ,  $d = 0.48$ ; coal:  $M = 3.13$ ,  $d = 0.27$ ; other:  $M = 3.19$ ,  $d = 0.33$ ). The effect size for the *Development and training* factor indicated a small effect, where the respondents from coal mining sector ( $M = 3.03$ ) were less positive about *Development and training* opportunities than those from all the other mining sectors (gold:  $M = 3.34$ ,  $d = 0.4$ ; platinum:  $M = 3.31$ ,  $d = 0.29$ ; other:  $M = 3.28$ ,  $d = 0.28$ ).

### Effect of place of work

The results of the ANOVA indicated p-values higher than 0.05 for *Female abuse*, *Career choice*, and *Development and training*, indicating no statistically significant differences between the means of the workplace categories. However, the ANOVA indicated that the means of the workplace categories for *Transformation* ( $p = 0.005$ ) and *Personal care* ( $p = 0.027$ ) differed statistically significantly.

The effect sizes for *Transformation* showed a medium to large effect, where respondents who worked underground as well as both underground and on the surface ( $M = 2.68$ ) were less positive about *Transformation* than those who worked on the surface ( $M = 3.21$ ,  $d = 0.61$ ) and in other work areas ( $M = 3.42$ ,  $d = 0.85$ ). The effect size for the *Personal care* factor showed a small to medium effect, where respondents who worked on the surface ( $M = 3.33$ ) were more positive about *Personal care* than respondents who worked underground as well as both underground and on the surface ( $M = 2.83$ ,  $d = 0.57$ ) and in other areas ( $M = 3.03$ ,  $d = 0.35$ ).

### Effect of age

The results of the ANOVA indicated no statistically significant differences between the means for the different age groups; the p-values were higher than 0.05 for all the factors. The effect sizes showed a small effect for *Development and training* ( $d = 0.27$ ), where the age category 31–40 ( $M = 3.32$ ) was more positive about the statements contained in these factors than the 41–60 ( $M = 3.07$ ) age category.

### Effect of highest qualification

The results of the ANOVA indicated p-values higher than 0.05 for

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*Transformation, Personal care, Career choice, and Development and training*, indicating no statistically significant differences between the means of the qualification categories. However, the p-value for *Female abuse* was 0.008, indicating that the means of the qualification categories differed statistically significantly. *Female abuse* showed a medium to large effect, where respondents with a matric or lower qualification ( $M = 2.79$ ) agreed less with the *Female abuse* factor than respondents with a diploma ( $M = 3.20, d = 0.68$ ), degree ( $M = 3.37, d = 0.96$ ), or master's and doctoral qualification ( $M = 3.13, d = 0.44$ ).

## Effect of level of employment

The results of the ANOVA returned p-values higher than 0.05 for *Transformation, Female abuse, Personal care, and Development and training*, indicating no statistically significant differences between the means of the level of employment categories. However, the p-value for *Career choice* measured 0.035, indicating that the means of the level of employment categories differed statistically significantly. From the homogeneous subsets it was evident that the mean of respondents who were employed as senior managers ( $M = 2.02$ ) differed significantly from the those of junior managers ( $M = 3.11$ ). *Career choice* showed small to large effects, where respondents employed at senior management level ( $M = 2.02$ ) disagreed the most with the statements contained in the *Career choice* factor, compared with employed on unskilled and semi-skilled ( $M = 2.44, d = 0.40$ ), skilled ( $M = 2.30, d = 0.40$ ), junior ( $M = 3.11, d = 0.26$ ), and middle management ( $M = 2.57, d = 0.78$ ) levels.

## Effect of years working in the mining industry

The results of the ANOVA indicated p-values higher than 0.05 for all the factors, indicating no statistically significant differences between the means of the different categories. The effect sizes showed a small effect for *Personal care*, where respondents with more than 11 years' ( $M = 3.38$ ) working experience were more positive about *Personal care* than those with fewer years' (fewer than 5 years:  $M = 3.16, d = 0.21$ ; 6–10 years:  $M = 3.02, d = 0.21$ ) experience. *Development and training* showed a small effect, where respondents with fewer than five years' working experience ( $M = 3.35$ ) were more positive about *Development and training* than those with 6 to 10 years' experience ( $M = 3.11, d = 0.25$ ).

## Effect of income

The results of the ANOVA indicated p-values higher than 0.05 for *Female abuse, Personal care, and Career choice*, indicating no statistically significant differences between the means of the different categories. However, the p-values for *Transformation* (0.011) and *Development and training* (0.023) measured below 0.05, indicating that the means of the different categories differed statistically significantly.

The effect sizes showed medium to large effects for *Transformation*, where respondents who earned more than R40 000 ( $M = 3.44$ ) per year were more positive about *Transformation* than all the other income categories (less than R10 000:  $M = 2.72, d = 0.72$ ; R10 000–R20 000:  $M = 3.19, d = 0.72$ ; R20 000–R40 000:  $M = 2.93, d = 0.33$ ). *Development and training* showed medium effects, where respondents who earned more than R40 000 ( $M = 3.57$ ) per year were more positive about *Development and training* than all the other income categories (less than R10 000:  $M = 2.95, d = 0.62$ ; R10 000–R20 000:  $M = 3.27, d = 0.61$ ; R20 000–R40 000:  $M = 3.03, d = 0.34$ ).

## Discussion

A factor analysis was conducted on the scale items measuring women's workplace experiences in the South African mining industry; five factors (*Transformation, Female abuse, Personal care, Career choice, and Development and training*) were extracted. Cronbach's alpha coefficients were used to determine the internal reliability of the scale. Almost all values were above the required 0.70, indicating high reliability and internal consistency. The Cronbach's alpha coefficient of *Career choice* measured 0.629 and the inter-item correlation 0.459, showing an acceptable reliability.

The descriptive statistics showed that, on average, 60% of the respondents agreed with the statements contained in the *Transformation* ( $M = 3.11$ ), *Personal care* ( $M = 3.18$ ), and *Development and training* factors ( $M = 3.24$ ), indicating that the majority of the respondents were satisfied with the way women were valued and embraced in the mining organizations, with the female protective equipment, clothing, and toilet facilities provided as well as with the *Development and training* opportunities offered for women. However, there is still much room for improvement in these areas to enhance women's workplace experiences. The literature reviewed pointed out that women require adequate training and career development support (e.g. bursaries, study leave, and mentoring systems) (Jones and Moalusi, 2019; Matshingane, 2017; Mavuso, 2015; Slater, 2018) as well as provision for their personal needs (e.g. proper, hygienic ablution facilities and correctly fitting personal protective equipment) (Botha, 2017; James, 2018). Regarding *Career choice* ( $M = 2.52$ ), only half of the respondents indicated that they worked at the mining organizations due to income advantages and not by free choice. The *Female abuse* factor ( $M = 3.07$ ) showed an alarming response, as more than 60% of the respondents indicated that women are still subjected to harassment and abuse in the workplace. The literature reviewed confirmed that women who work at and in the mines, specifically underground, are often seen as sexual objects and are exposed to sexual harassment on a regular basis (Botha, 2016; Creamer Media, 2019; Jones and Moalusi, 2019; Minerals Council South Africa, 2019; Nene, 2016).

A number of socio-demographic variables were used to measure their effect on the factors of women's workplace experiences in the industry. These were tested using t-tests, ANOVAs, correlations, and effect sizes.

A correlation test measured the linear association between age, highest qualification, level of employment, years working at the mine, income, and women's workplace experiences in the South African mining industry. Small positive relationships were found between income and *Transformation* ( $p = 0.018, r = 0.214$ ) as well as between income and *Development and training* ( $p = 0.028, r = 0.202$ ), indicating that the higher the respondents' income, the more positive they were about *Transformation* practices in the workplace as well as the *Development and training* opportunities offered. Small to moderate negative relationships were found between *Transformation* and *Career choice* ( $p = 0.030, r = -0.194$ ) and *Transformation* and *Female abuse* ( $p = 0.000, r = -0.358$ ) as well as *Personal care* and *Career choice* ( $p = 0.034, r = -0.189$ ) and *Personal care* and *Female abuse* ( $p = 0.039, r = -0.183$ ), indicating that the more positive respondents were about *Transformation* and *Personal care* in the workplace, the less they indicated that they are forced to work at the mines due to income advantages and the less they

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felt that women are subjected to female abuse in the workplace. Medium to large positive relationships were found between *Transformation* and *Personal care* ( $p = 0.000$ ,  $r = 0.486$ ) as well as *Transformation* and *Development and training* ( $p = 0.000$ ,  $r = 0.554$ ), indicating that the more positive respondents were about *Transformation* in organizations, the more positive they felt about organizations addressing their personal, development and training needs. A moderate positive relationship was found between *Personal care* and *Development and training* ( $p = 0.001$ ,  $r = 0.300$ ), showing that the more positive respondents were about personal needs addressed, the more positive they felt about development and training needs met.

The results of the t-tests indicated no effect between working in an open pit or deep mining (underground), affiliation to a union, race, and the five factors of women's workplace experiences in the South African mining industry. The results showed a small effect for some of the factors. Not surprisingly, the data suggests that women working in an open pit are slightly more satisfied with *Transformation* and *Personal care* than those working in deep mining. The literature review confirmed limitations and deficiencies in terms of decent and hygienic toilet facilities underground (Botha, 2017, pp. 22, 24; Matshingane, 2017, p. 5; MHSC, 2015, p. 64; Minerals Council South Africa, 2019, p. 3). The data also showed that women affiliated to a union were less satisfied with *Transformation*, *Personal care*, and *Development and training* than those not affiliated. In general, employees belong to trade unions to represent their interests and to negotiate working conditions and rewards with employers (Watson, 2017, p. 354). It can therefore be deduced that the respondents who joined a trade union did so based on their dissatisfaction with their working conditions. The data also showed that black respondents agreed more than 'other racial groups' that *Female abuse* is a problem in the workplace. From the biographical information it is evident that 83.9% of the respondents were black, and this could explain this result.

The results of the ANOVA indicated no statistically significant differences between the means of the demographic groups' mining sector, age, and years working in the mining industry and the five factors of women's workplace experiences. The results of the effect sizes showed a small effect for some of the factors, as indicated in the 'Empirical results' section. Furthermore, the ANOVA indicated few significant differences between the means of the demographic groups' place of work, highest qualification, level of employment, income, and some of the factors of women's workplace experiences; the effects ranging from small to large. Statistically significant differences were found between the means of the workplace categories for *Transformation* and *Personal care*, the highest qualification categories for *Female abuse*, the level of employment categories for *Career choice*, and income categories for *Transformation* and *Development and training*. Respondents who worked underground as well as both underground and on the surface were less positive about *Transformation* and *Personal care* than those who worked on the surface and in other work areas. Respondents with a matric or lower qualification agreed less than all the other qualification categories that women are subjected to *Female abuse* in the workplace. Respondents employed at senior management level disagreed the most with the statements contained in the *Career choice* factor, indicating that they worked at the mine due to free choice, and not because the income was good. Respondents who earned more than

R40 000 per year were more positive about *Transformation* and *Development and training* than all the other income categories.

### Conclusion and recommendations

The primary purpose of this study was to explore women's current workplace experiences in the South African mining industry. From the results it is evident that progress has been made in some instances, but in other areas deficiencies are still present. It is imperative that mining organizations attend to the challenges confronting women to enhance their workplace experiences, to ensure successful integration of women in the South African mining industry, and to consequently contribute to effective transformation of the industry. The following recommendations are informed by the literature review and the empirical results.

- Female abuse should not be tolerated and should be eradicated. Improved implementation and operationalization of sexual harassment policies are required to counter sexual harassment practices.
- Adequate and hygienic toilet facilities underground should be provided to improve women's working conditions.
- Ongoing research should be conducted by mining houses, mining organizations, academic bodies, and other interested parties to determine barriers to, and progress in, women's working conditions and workplace experiences.

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