

RESEARCH ARTICLE

Measurement Invariance of the Tilburg Work Identity Scale for Commitment and Reconsideration of Commitment (TWIS-CRC) in Romania, England, the Netherlands, and South Africa

BYRON G. ADAMS

Tilburg University, the Netherlands and University of Johannesburg, South Africa

CARMEN BUZEA

Transilvania University of Brasov, Romania

ANA-MARIA CAZAN

Transilvania University of Brasov, Romania

LUSANDA SEKAJA

University of Johannesburg, South Africa

DELIA STEFENEL

Lucian Blaga University of Sibiu, Romania

MIHAELA GOTEA

Transilvania University of Brasov, Romania

M. CHRISTINA MEYERS

Tilburg University, the Netherlands

Abstract

Work plays a central role in people's lives and their self-concepts. It was our objective in this article to a) explore the factor structure of a newly-developed measure of work identity, the Tilburg Work Identity Scale of Commitment and Reconsideration of Commitment (TWIS-CRC) in a Romanian employee sample, and b) examine whether the measure is invariant at configural, metric, and scalar levels across Romanian, English, Dutch, and South African (Black and White) employees. The theoretically assumed two-factor structure was supported through exploratory factor analysis (EFA) in the first study, with one item (item 10) loading moderately on both subscales. We found similar results in the preliminary EFA, confirming the removal of item 10. The Multigroup Confirmatory Factor Analysis indicated that the measure was fully invariant at the configural level and partially invariant at the metric level across the employee samples. However, no scalar invariance was found. This indicates that the TWIS-CRC as a construct is similar across groups, as are the factor loadings, whereas item intercepts are not. Across employee samples, it is therefore possible to establish how work identity as measured by the TWIS-CRC correlates with other measures such as work engagement and burnout, while we are unable to compare means across groups due to a lack of scalar invariance. Work Identity as measured by the TWIS-CRC is useful for researchers and organizational practitioners who aim to understand the importance of work identity for work motivation and engagement.

Correspondence concerning this article should be addressed to Byron G. Adams, Department Culture Studies, School of Humanities, Tilburg University, P.O. Box 90153, 5000 LE Tilburg the Netherlands. Email: b.g.adams@uvt.nl

Keywords

measurement invariance, work identity, TWIS-CRC, Romania, England, the Netherlands, South Africa

Author's Note

The financial assistance of the National Research Foundation (NRF) and Tilburg University towards this research is hereby acknowledged. Opinions expressed and conclusions arrived at, are those of the authors and are not necessarily to be attributed to these organizations.

People's self-definitions, their identity, or simply 'who they are' are considered important for their psychosocial functioning. According to the tridimensional model of identity (Adams & Van de Vijver, 2015), identity is how people create meaning about themselves within society (Adams & Crafford, 2012) as they negotiate and incorporate personal (intra-individual aspects), relational (intrapersonal and role aspects), and social dimensions (social group membership aspects) (Adams, 2014) into their self-definitions. In the adult life, work identity plays a central role, as Gini (1998, p. 708) pointed out: "Work is that which forms us, gives us a focus, gives us a vehicle for personal expression and offers us a means for personal definition". Furthermore, commitment in the working life, with its various forms, such as commitment to organizations, to occupations, to work itself, to teams, goals or careers has been a core concept in human resource literature, predicting relevant work related behaviors such as turnover or job performance (review in Meyer & Herscovitch, 2001).

In this study, we examined the measurement invariance of the Tilburg Scale for Work Identity Commitment and Reconsideration of Commitment (TWIS-CRC), which is a measure of work identity commitment and reconsideration of work identity commitment in working populations in Romania, England, the Netherlands, and South Africa.

Identity and Work Identity

Identity is how people define themselves in relation to others and within the context in which they find themselves (Bothma, Lloyd,

& Khapova, 2015). When responding to the question "Who are you?", individuals define themselves in many different ways. Different aspects of identity could be informed by features that are either stable (e.g., gender, ethnicity) or fluid (e.g., sports, work). These definitions of self are sometimes related to work goals and aspirations, which give meaning to people's lives (Adams & Crafford, 2012). An important aspect of identity is developed within the context of work, expressed by the work identity concept (Bothma et al., 2015).

Work represents an important source of well-being, health, and self-esteem; providing a sense of existence, income and strengthening communities. It is central to a person's identity (Gini, 1998) as people spend approximately one third of their adult lives working. Work, while related to educational and professional aspects (Pratt, Rockman, & Kaufman, 2006), is where people reconcile their personal values, aspirations, and goals, with social and job roles, and organizational and professional belonging (Clarke, Hyde, & Drennan, 2013; Fagermoem, 1997). As pointed out by Super (1980), the self-concept, life roles and one's career are changing over time, as a result of experience and adaptation of one's self-concept. The work-role involves integration into the work community and holds a salient position between the other roles, due to the fact that individuals choose occupations which permit them to express their self-concepts. As an aspect of identity, work identity could be considered a more fluid aspect of identity due to the fact that people often (but not always) have a choice about the type of work they want to do.

Measuring identity and work identity. Traditional measures of identity stem from the

Eriksonian tradition (Erikson, 1968; Marcia, 1980; Phinney, 1992), in which individuals are taken to experience an existential crisis which drives them to consider identity options, through identity search or exploration. This in-depth search leads them to commit to a particular identity domain (e.g., personal values or goals) or develop a sense of belonging to a particular group (e.g., religious group membership or organizational membership). One recent perspective by Crocetti and colleagues (Crocetti, Rubini, & Meeus, 2008; Crocetti, Schwartz, Fermani, & Meeus, 2010) has extended the identity model to include reconsideration of identity and accounts for the fact that identity is a process which is continually negotiated or renegotiated. They proposed and developed a three-factor identity model, which includes crucial identity processes: commitment (the satisfaction individuals receive from enacting their respective choices), in-depth exploration (the active processing of identity choices which would lead to commitment), and reconsideration of commitment (comparing current commitment with alternatives as they become unsatisfactory).

Based on the earlier Utrecht-Groningen Identity Development Scale (U-GIDS), Meeus (1996) has designed the Utrecht Management of Identity Scale (U-MICS) to assess commitment, in-depth exploration, and reconsideration of commitment. The U-MICS has been recently used to assess adolescent identity across cultures in different ideological domains (e.g., Crocetti, Schwartz, Fermani, & Meeus, 2010; Dimitrova et al., 2015; Karas, Ceiciuch, Negru, & Crocetti, 2014). When applied to the domain of work, the U-MICS generated mixed results. While the study by Karas et al. (2014) found support for the three-factor structure across three samples of emerging adults (Italian, Polish, and Romanian), the study by Magerman (2014), involving Black, Coloured, and White South African employees, found that in-depth exploration and commitment merged into a single subscale which was distinct from reconsideration of identity commitment. A possible explanation might be that in-depth exploration has little relevance for adults

already working, and that rather their reconsideration of alternatives may be more important at this stage. Meyer and Allen (1991) developed a three-component model of commitment which comprises affective commitment, continuance commitment and normative commitment. This widespread model integrates cognitive and affective work related dimensions, such as emotional attachment, awareness of the leaving costs, and the feeling of obligation to be constant.

In light of this, we developed a work identity measure which focuses primarily on work identity commitment and reconsideration of work identity commitment. Work Identity Commitment refers to the firm decisions that individuals have made with regard to how important work is for their self-concept, as well as the extent to which they are committed and experience a sense of belonging to their work. Work Identity Reconsideration of Commitment is the extent to which individuals reevaluate their commitment and are open to other possibilities in terms of work (Crocetti et al., 2010; Erikson, 1968; Marcia, 1980). Due to the fact that individuals would have done some exploration of the type of work they wanted to do before working in their current positions, we have excluded identity search and exploration. We would argue that reconsideration of commitment would be more useful and important in adult life.

Measurement Invariance and Levels of Invariance

In order to make psychologically meaningful group comparisons across the different contexts presented in this study, we need to establish whether our measure of work identity is free of bias. One of the ways to assess whether bias is present in a measure is the evaluation of measurement invariance. Measurement invariance is a psychometric procedure for establishing the equivalence of a particular measure at construct, item and method levels (Van de Schoot, Lugtig, & Hox, 2012). This allows researchers to ensure that a measure may be used in both descriptive and inferential analysis across different groups.

One of the most popular ways in which one could establish measurement invariance is Multigroup Confirmatory Factor Analysis (MGCFA) (Milfont & Fischer, 2010).

Within MGCFA, there are at least three levels of invariance a measure must adhere to before meaningful comparisons may be made across groups: configural invariance, metric invariance, and scalar invariance (Van de Schoot et al., 2012). Configural invariance, which is the establishment of the baseline model, provides indication that the general factor structure of the measure is the same across different groups. At this level, the construct is measured similarly in different samples in terms of one or more latent factors. Metric invariance (weak invariance) indicates that the factor loadings of items are similar, (i.e., load in the same way in assumed factor) across groups. At this level, we are able to assess whether a measure correlates with other measures across samples. Scalar (strong) invariance indicates that item intercepts are equal intercepts across groups. At this level, means may be compared across samples. This allows for more meaningful comparisons across groups (Yap et al., 2014).

The Present Study

The objective of this study is to establish measurement invariance of the TWIS-CRC across four distinct contexts from different world regions: England and the Netherlands (in Western Europe), Romania (in Eastern Europe), and South Africa (in sub-Saharan Africa). Examining the measurement invariance of a newly-developed scale on work identity is useful as work identity might have different meanings in different cultural contexts. We commonly assume that people have choices about the work they do, which means that work identity is often considered a fluid aspect of identity, due to the fact that people can choose their work. However, having the opportunity to choose a job may be restricted to industrialized countries. In developing countries or for minority or immigrant groups, individuals may have fewer options due to having to work as a means to survive (Lu, Samaratunge, & Härtel, 2012;

Nekby & Rödin, 2009). Thus, the distinct cultural background, along with differences regarding the ideology on labor force, employment and social protection, enables a comparison of work-identity commitment. To the best of our knowledge there are no studies that assess the measurement invariance of work identity across countries, or evaluate work identity across countries. Therefore, the objective of the present research is twofold. In Study 1, we evaluate the factorial structure of the newly developed work identity measure, the TWIS-CRC, in a sample of Romanian employees. In Study 2 we aim to establish measurement invariance of the TWIS-CRC across five groups, Romanian, English, Dutch as well as Black and White South African employees.

Study 1

Method

Procedure and participants. Data were collected from employees in Romania using paper and pencil questionnaires as part of a larger Experiences @ Work Project, which aims to examine the importance of identity for employee psychosocial functioning. While the total sample was 580 (62.8% females, $M_{age} = 34.83$ years, $SD = 10.91$), we divided the Romanian sample into two random halves, one half to be used for the exploratory factor analysis in Study 1 and the second half to be used in the MGCFA in Study 2. The first half of the sample comprised 298 employees of which 15 participants were excluded as they were not ethnic Romanian. The sample for the first study comprised 283 (62.5% females, $M_{age} = 35.96$ years, $SD = 11.14$) Romanian employees.

Measures

Sociodemographic information. Participants were asked to provide their age, gender, ethnic group, education level, and in addition indicate their current and general work experience in years and categorize their current work (see Table 1).

Work identity. We measured work identity using a scale developed particularly for this

study, named the Tilburg Work Identity Scale of Commitment and Reconsideration of Commitment (TWIS-CRC). This measure assesses work identity commitment within the framework of the tridimensional model of identity, which accounts for the personal (5 items; e.g., “I am optimistic because of my work”), relational (3 items; e.g., “I have good relationships with people at work”) and social (2 items; e.g., “I am a valued member in the organization I work for”) dimensions considered to be important for identity

(Adams & Van de Vijver, 2015). In addition, due to identity being a continually negotiated process and work in particular being such a fluid aspect of people’s identity, we included three items (adapted to work) from the U-MICS (Crocetti et al., 2010) to evaluate the reconsideration of work identity (e.g., “I am looking for a different line of work”). Therefore, the TWIS-CRC comprises 13 items presented in Table 2, rated on a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*).

Table 1. *Work Experience, Educational Levels and General Work Categorization for Romanians in Study 1*

Current Work Experience in Years (<i>SD</i>)	6.57 (6.74)
General Work Experience in Years (<i>SD</i>)	14.95 (11.04)
<i>Educational Level (%)</i>	
Low Education	0.71
Middle Education	50.88
High Education	48.41
<i>General Work Categorizations (%)</i>	
Administrative and Support Services	8.13
Agriculture, Forestry, Fishing, and Hunting	1.41
Arts, Entertainment, and Recreation	1.41
Construction	2.83
Educational Services	10.60
Finance and Insurance	2.47
Government	1.41
Health Care and Social Assistance	8.48
Hospitality/ Accommodation and Food	7.07
Information	0.71
Management of Companies and Enterprises	3.18
Manufacturing	13.43
Mining, Quarrying, and Oil and Gas Extraction	2.47
Professional, Scientific, and Technical Services	2.83
Public Administration	3.18
Real Estate, Rental, and Leasing	0.71
Retail Trade	12.37
Transportation and Warehousing	4.24
Utilities	2.12
Waste Management and Sanitation Services	0.35
Wholesale Trade	2.83
Other	6.71

Table 2. Items of the Scale for Work Identity Commitment and Reconsideration of Commitment (TWIS-CRC) Subscales, Factor Loadings as Presented by the Pattern Matrix, and Extraction Communalities

Item no.	Item	Subscales	Factor 1	Factor 2	Communalities
1	I am proud of my work.	WIC	.224	.609	.543
2	My work is important for who I am.	WIC	.236	.564	.493
3	I am optimistic because of my work.	WIC	.159	.596	.465
4	I perform my work tasks confidently.	WIC	-.154	.711	.431
5	My work role is important.	WIC	.005	.806	.653
6	I have good relationships with people at work.	WIC	-.079	.523	.242
7	I feel as if I belong when I am at work.	WIC	.163	.628	.513
8	The tasks I perform at work are important.	WIC	-.043	.784	.587
9	I am a valued member in the organization I work for.	WIC	-.013	.699	.481
10	<i>There is a future for me in my current line of work.</i>	WIC/WIRC	.425	.374	.463
11	I often think it would be better to change my line of work.	WIRC	-.861	-.020	.758
12	I often think different work would make my life more interesting.	WIRC	-.943	.013	.878
13	I am looking for a different line of work.	WIRC	-.885	.005	.780

Note. WIC = Work Identity Commitment items, WIRC = Work Identity Reconsideration of Commitment items

Results

Preliminary analysis. We conducted preliminary analysis using SPSS (SPSS Inc, 2010) on the TWIS-CRC to impute missing values and assess normality (Skewness and Kurtosis) at item level. With respect to missing data, we used an Expectation-Maximization algorithm (Dempster, Laird, & Rubin, 1977) to impute missing data (only 3 responses per item). Little's MCAR test was significant (Chi-square $\chi^2(35) = 55.31$, $p = .016$). As χ^2 is sensitive to sample size, we assessed the normed chi-square ($\chi^2/df = 1.58$), which was acceptable at less than 2 (Bollen, 1989). The missing data was assumed to be completely at random and data were imputed. We then assessed normality by evaluating the Skewness and Kurtosis at item level. As values remained with the range of $-2 < \text{Skewness} < 2$ and $-4 < \text{Kurtosis} < 4$, the items were deemed to be adequate for further analysis.

Exploratory factor analysis. We conducted an Exploratory Factor Analysis (EFA) using SPSS (SPSS Inc, 2010) to assess whether we could obtain Work Identity Commitment and Work Identity Reconsideration of Commitment as a two-factor solution. We used Maximum Likelihood extraction and because we expected the extracted factors to be related we

used Oblimin rotation. The Kaiser-Meyer-Olkin (KMO) (KMO values $> .6$; Kaiser, 1970, 1974) and Bartlett's test of sphericity (Chi-square [χ^2] significant at $p < .05$; Bartlett, 1954) indicated that the data were suitable for factor analysis (KMO = .89; Bartlett's test of sphericity ($\chi^2(78) = 2233.83$, $p < .001$). Eigenvalues and an evaluation of the scree plot indicated a two-factor solution explaining 47.27% and 14.65% of the variance respectively (Tabachnick & Fidell, 2001). We conducted parallel analysis using the Parallel Analysis Engine (Patil, Singh, Mishra, & Donovan, 2007), which confirmed the two-factor solution (O'Conner & Brian, 2000). The comparison of eigenvalues as presented in the scree plot with the parallel analysis is illustrated in Figure 1.

Regarding where items load on the factors, as can be seen in Table 2, the first 9 items clearly loaded on the Work Identity Commitment subscale and the last three items on the Work Identity Reconsideration of Commitment. Item 10 – “There is a future for me in my current line of work” – loaded moderately on both subscales, and was removed. We ran the EFA without item 10 to establish whether there would be a difference in the variance explained; here we found that 47.36% and 15.55% of the variance was explained respectively by each subscale. We computed internal consistencies without item

10 of each subscale with Cronbach Alpha (α) of above .70, indicating a reliable measure (Tabachnick & Fidell, 2001): Work Identity Commitment $\alpha = .89$, and Work Identity Reconsideration of Commitment $\alpha = .93$. The

correlation between Work Identity Commitment and Work Identity Reconsideration of Commitment was $r = -.48$, $p < .001$.

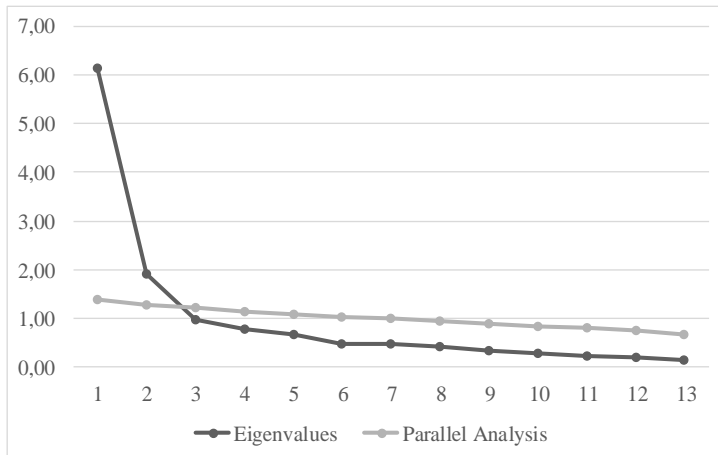


Figure 1. Eigenvalues and parallel analysis

Discussion

In this study, we examined the factor structure of the newly-developed TWIS-CRC in a Romanian sample through EFA. The TWIS-CRC is a measure of work identity. The results of the first study showed that the newly-developed Tilburg Work Identity Scale of Commitment and Reconsideration of Commitment (TWIS-CRC) is a two-factor measure. The three items selected and adapted from the U-MICS (Crocetti et al., 2010) loaded highly on the Work Identity Reconsideration of Commitment factor, while nine items loaded well on the Work Identity Commitment factor. One item (item 10 – “There is a future for me in my current line of work”) loaded moderately on both factors. As the decision to eliminate this item led to the most efficient factorial solution, a 12-item version is suggested, based on this first study. The internal consistencies (Cronbach α values) for the two subscales were excellent (Tabachnick & Fidell, 2001).

Study 2

In this study we examine measurement invariance of the TWIS-CRC across five distinct groups in four contexts: Romanian, English, Dutch, Black and White South Africans. Our objective is to establish whether this measure of work identity may be used to make meaningful comparisons across groups/contexts.

Method

Procedure and participants. In this study we combined the second half of the Romanian data with data collected from employees in England, the Netherlands, and South Africa, also as part of a larger Experiences @ Work Project. As with the Romanian measure, measures were adapted and translated for administration in Dutch, in the Netherlands. In England and South Africa measures were administered in English. While South Africa is a multicultural and multilingual society with 11 official languages and other languages spoken by both native South Africans and

immigrants, English is the *lingua franca* used within the context of work and organizations.

The total sample consisted of 784 (61.4% females, Mage = 34.09 years, SD = 11.09) working adults. It comprised Romanians (n = 264, 62.5% females, Mage = 33.64 years, SD = 10.62), English (n = 73, 60.3% females, Mage = 30.86 years, SD = 5.96), Dutch (n = 213, 51.2% females, Mage = 38.42 years, SD = 13.75), Black South Africans (n = 117, 66.7% females, Mage = 30.31 years, SD = 6.55), and White South Africans (n = 117, 72.6% females, Mage = 32.97 years, SD = 10.32).

Measures. Participants completed the same measures as in Study 1.

Sociodemographic information. We assessed group differences on sociodemographic variables. Analysis of variance (ANOVA) indicated there were significant differences across age: $F(4, 769) =$

14.52, $p < .001$, $\eta^2 = .07$, current work experience: $F(4, 769) = 10.25$, $p < .001$, $\eta^2 = .05$, and general work experience $F(4, 769) = 20.65$, $p < .001$, $\eta^2 = .10$. Dutch employees were older, had more current and general work experience. Chi-square analysis indicated that there were significant differences in gender ($\chi^2(4, N = 784) = 17.18$, $p = .002$) and level of Education ($\chi^2(8, N = 781) = 92.76$, $p < .001$). There were more Dutch females and more White South African males and White South Africans were more highly educated whereas the English were less educated. Table 3 provides a breakdown of all variables.

Work identity. Although the 12-item TWIS-CRC had been recommended in Study 1, we administrated the 13-item measure to the groups in Study 2. Therefore, we ran another preliminary EFA to evaluate whether the removal of this item would still be recommended.

Table 3. *Work Experience, Educational Levels and General Work Categorization for Across Groups in Study 2*

	Romanian	English	Dutch	Black South African	White South African
Current Work Experience in Years (SD)	5.35 (5.95)	4.66 (5.35)	8.39 (9.09)	4.11 (3.92)	5.82 (7.52)
General Work Experience in Years (SD)	12.24 (10.07)	10.27 (6.73)	18.03 (13.00)	8.48 (6.54)	11.69 (10.21)
<i>Educational Level (%)</i>					
Low Education	1.52	15.28	7.98	-	0.85
Middle Education	46.59	15.28	24.41	28.70	16.24
High Education	51.89	69.44	67.61	71.30	82.91
<i>General Work Categorizations (%)</i>					
Administrative and Support Services	7.34	8.22	4.69	13.64	4.27
Agriculture, Forestry, Fishing and Hunting	0.39	-	0.94	0.91	1.71
Arts, Entertainment, and Recreation	3.09	2.74	7.04	1.82	3.42
Construction	1.93	-	2.82	0.91	5.98
Educational Services	8.88	4.11	4.69	11.82	15.38
Finance and Insurance	2.32	10.96	18.31	24.55	11.11
Government	6.56	1.37	12.68	10.91	2.56
Health Care and Social Assistance	1.93	5.48	9.86	2.73	5.98
Hospitality/Accommodation and Food Services	11.97	17.81	3.29	0.91	2.56
Information	6.95	2.74	6.10	-	1.71
Management of Companies and Enterprises	1.93	-	0.94	1.82	0.85
Manufacturing	1.93	1.37	9.86	0.91	8.55
Mining, Quarrying, Oil and Gas Extraction	15.83	2.74	0.47	4.55	1.71
Professional, Scientific, and Technical Services	2.70	6.85	7.04	2.73	10.26
Public Administration	3.09	-	0.47	0.91	0.85
Real Estate, Rental and Leasing	3.86	-	0.47	-	0.85
Retail Trade	0.39	1.37	3.76	0.91	3.42
Transportation and Warehousing	11.97	1.37	0.47	4.55	4.27
Utilities	3.47	4.11	0.47	3.64	0.85
Waste Management and Sanitation Services	1.54	-	-	-	-
Wholesale Trade	-	-	3.29	-	1.71
Other	1.93	28.77	2.35	11.82	11.97

Results

Preliminary analysis. We conducted the same preliminary analysis as in Study 1 to impute missing values (only 16 responses missing). Little's MCAR test was significant (Chi-square $\chi^2(117) = 182.29$, $p < .001$), with the $\chi^2/df = 1.56$ (Bollen, 1989). Items were normally distributed around the mean. We conducted a similar EFA, as in Study 1, to replicate the factor structure obtained in the previous study, in the total sample. The KMO (KMO = .91) and Bartlett's test of sphericity

($\chi^2(78) = 5411.20$, $p < .001$) were acceptable. A two-factor structure was confirmed (through eigenvalues, scree plot, and a parallel analysis), explaining 47.05% and 12.92% of the variance respectively (O'Conner & Brian, 2000; Patil et al., 2007; Tabachnick & Fidell, 2001). As item 10 again loaded moderately on both subscales, we decided to remove it from further analysis and worked with a 12-item version of the measure. Table 4 presents the Cronbach Alpha values for the two subscales in each sample without item 10; these values were very good for both scales in all samples.

Table 4. Cronbach Alphas for TWIS-CRC Subscales across Countries/Groups

TWIS-CRC Item	WIC α	WIRC α
Romania	.88	.92
England	.87	.89
Netherlands	.84	.86
South African Black	.90	.91
South African White	.90	.90

Note.*** $p < .001$, α = Cronbach's Alpha coefficients.

WIC α = Cronbach Alphas for Work Identity Commitment items, WIRC α = Cronbach Alphas for Work Identity Reconsideration of Commitment items

Multigroup Confirmatory Factor Analysis: Statistical analysis. We ran a MGCFA of the TWIS-CRC using AMOS. We were interested in assessing three models indicating the three levels of invariance (configural, metric, and scalar). These models are nested, which means that we compare a less restricted model with a more restricted model in a stepwise manner in the analysis. Initial model evaluation is assessed using several fit indices. The normed chi-square (χ^2/df) indicates reasonable fit when less than five and good fit when less than two (Bollen, 1989). The Tucker-Lewis Index (TLI) and the Comparative Fit Index (CFI) indicate reasonable fit when higher than .90 and good fit when higher than .95. The Root Mean Square of Approximation (RMSEA) indicates reasonable fit at less than .08 and good fit at less than .06 (Hu & Bentler, 1999). Finally, the Akaike Information Criterion (AIC; Akaike, 1987) and the Browne-Cudeck Criterion

(BCC; Browne & Cudeck, 1989) can be used to compare different models within each sample. The more parsimonious model is indicated by the lowest values (Kline, 1998).

When assessing nested models, some additional criteria provide information about model fit and, in this case, measurement invariance. A change in the χ^2 between models should not be significant from the less restrictive to more restrictive model. However, due to the χ^2 being sensitive to sample size, a decrease in the normed χ^2 provides additional information on model fit. As a measure less sensitive to sample size, the change in CFI from a less restrictive to a more restrictive model should be equal to or less than .01 (Milfont & Fischer, 2010); with the AIC and BCC, generally reserved for non-nested models, providing some insight into parsimony of the nested models.

Multigroup Confirmatory Factor Analysis: Results. While initial model fit for

the original model tested was reasonable $\chi^2(265, N = 784) = 769.79, p < .001, \chi^2/df = 2.91, CFI = .90, RMSEA = .05$, the model fit improved after we consulted modification indices and correlated errors for items 1 and 2 as well as items 6 and 7. In the case of items 1 and 2, some form of individual pride associated with work is presented, whereas in items 6 and 7, a sense of belonging and connectedness is presented. These modifications improved model fit so that full configural invariance was achieved across groups. Fit indices specified lack of metric invariance, $|\Delta CFI| = .015$. In lieu of this full metric invariance, partial metric invariance was considered. Partial metric invariance allows for the releasing of one or more item factor loadings, with at least two needing to

remain constrained in order to still be able to compare means across different groups. We assessed each factor loading independently in the model and the item factor loading for item 7 was released. This particular item, which loaded somewhat lower on the WIC (Work Identity Commitment) factor in the Dutch group expresses an intense emotional attachment towards one's organization assuming long term behavioral consequences. Partial metric invariance was obtained with the $|\Delta CFI| = .009$ (See Table 5). Due to fit indices indicating a lack of scalar invariance, $|\Delta CFI| = .056$, we further tested for partial scalar invariance, which we were unable to obtain. Figure 2 presents factor loadings and correlations for the two subscales.

Table 5. *Measurement Invariance*

	χ^2/df	TLI	CFI	ΔCFI	RMSEA	$\Delta\chi^2$	Δdf	AIC	BCC
Configural Invariance Model	2.51***	.90	.92	-	.04	-	-	1028.69	1075.45
Metric Invariance Model	2.54***	.90	.91	.015	.04	111.15***	40	1059.83	1097.00
Partial Metric Invariance Model	2.46***	.90	.92	.009	.04	32.65***	4	1035.18	1073.32
Scalar Invariance Model	3.09***	.86	.86	.056	.05	296.50***	44	1268.33	1294.95

Note. TLI = Tucker-Lewis Index, CFI = Comparative Fit Index, RMSEA = Root Mean Square of Approximation, AIC = Akaike Information Criterion, BCC = Browne-Cudeck Criterion. The Partial Scalar Invariance Model should be compared with the Metric Invariance Model.

* $p < .05$. ** $p < .01$. *** $p < .001$.

Discussion

In the second study we examined the measurement invariance of the two-factor TWIS-CRC, which was theoretically postulated and empirically confirmed in the first study. We assessed three levels of invariance using MGCFA in AMOS: configural invariance, metric invariance, and scalar invariance, across Romanian, English, Dutch, and Black and White South African employees. First, the findings support a 12-item TWIS-CRC, which was in line with findings from Study 1, where the twofold structure of TWIS-CRC was confirmed in a Romanian sample to contain two subscales: Work Identity Commitment which comprises nine items and Work Identity Reconsideration

of Commitment which comprises three items. Second, the correlated errors between items 1 and 2 and items 6 and 7 possibly stem from these items sharing some unexplained variance. Third, we found that the internal consistencies were excellent for each subscale in each of the countries (Tabachnick & Fidell, 2001). Lastly, full configural invariance and partial metric invariance (with the removal of the constraint for item 7 "I feel as if I belong when I am at work" across groups) was found.

We could not establish scalar invariance across the national samples. In order to establish which groups may be the cause of the invariance we visually inspected the intercepts in the configural model (which provided the unconstrained estimates for each group). It was evident that the largest differences in

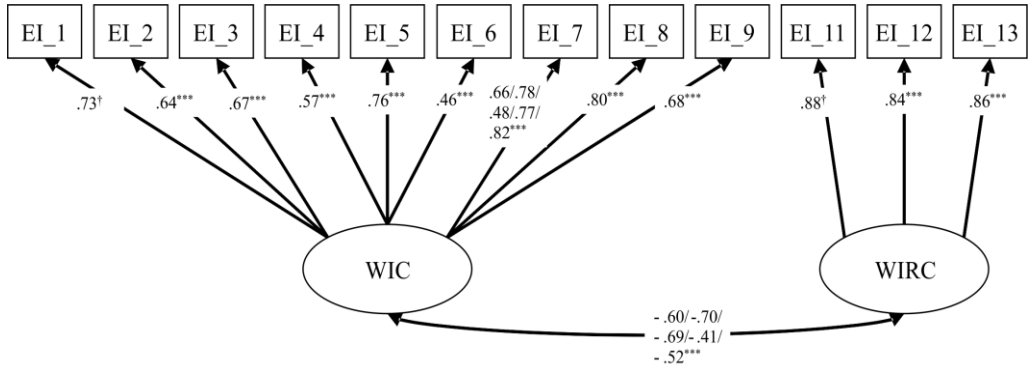


Figure 2. Proposed 12 item model of the TWIS-CRC

Notes. WIC = Work Identity Commitment items, WIRC = Work Identity Reconsideration of Commitment items. Mean factor loadings are presented for all items except item 7 which was not invariant across groups/countries. Item 7 factor loadings and subscale correlations are presented in the following order: Romania/England/The Netherlands/Black South African/White South African.

* $p < .05$. ** $p < .01$. *** $p < .001$, † Constraint set to 1 in unstandardized solution

intercepts were in the Work Identity Reconsideration of Commitment factor. Here, the difference in intercepts ($> .5$) of the Dutch group differed from both South African groups as well as the English group. This may be due to the older age of the Dutch sample and their greater overall work experience. Having been able to establish themselves in their current jobs and the possible satisfaction they may receive from this work, Dutch participants may not be too quick to engage in (re)negotiation of their current work identity. While we are unable to make meaningful comparisons of means across samples, we are still able to assess the correlates, and regress antecedents and outcomes with the TWIS-CRC.

General Discussion

We examined the factor structure of a new measure of work identity, the TWIS-CRC using EFA with a sample of Romanian employees (Study 1), and then assessed the measurement invariance using MGCFA of this measure across Romanian, English, Dutch and South African (Black and White) employees (Study 2). In Study 1 we found that

through EFA, the TWIS-CRC has the expected two-factor structure in the Romanian sample, with subscales Work Identity Commitment and Work Identity Reconsideration of Commitment. One item (item 10) needed to be removed as it loaded moderately on both subscales. In Study 2, we found a similar factor structure across a sample of Romanian, English, Dutch, and South African (Black and White) employees, also indicating the necessity to remove item 10. This two-factor structure was found to be fully invariant at the configural level indicating that the construct is similar across groups. We also achieved partial metric invariance, which means we are able to examine the nomological network in terms of correlations, predictors and consequence of work identity across cultural or national samples (Yap et al., 2014). In both studies internal consistencies were excellent (Cronbach $\alpha > .84$), confirming the reliability of both subscales and their respective work identity dimensions.

The assessment of work identity using the TWIS-CRC in the Romanian employee sample (Study 1) and across the Romanian, English, Dutch, and Black and White South

African employee samples (Study 2) facilitates and contributes towards a better conceptual and methodological understanding of work identity, as measured by the TWIS-CRC. First, we are in the development phase of a new measure to be used by researchers, organizational psychologists, and human resource professionals for assessing and understanding work identity in line with the tridimensional model (personal identity, relational identity, and social identity) as proposed by Adams and Van de Vijver (2015). Work identity is a newly emerging ideological domain of identity which is understudied in different national contexts, with the exception of South Africa, where attempts have been made to explore work identity more comprehensively within the multicultural context of the country (Jansen & Roodt, 2015).

Second, the TWIS-CRC measures two aspects of the identity process, which stems from the modified Eriksonian-Marcian identity theoretical perspectives (Crotteti et al., 2010; Erikson, 1968; Marcia, 1980): Work Identity Commitment and Work Identity Reconsideration of Commitment. It therefore focuses on the individual's commitment to work as an ideological domain and the reconsideration of this commitment. We would argue that the consideration of these two aspects might be beneficial to a better understanding of employees' perspectives. Finally, taking into account the methodological nature of the paper, the proposed analytic plan might be useful for researchers and professionals looking to assess psychometric properties of various scales when applied in multinational organizational settings.

The issue of work identity is important for both researchers and organizational practitioners across nations. Identity aspects are generally argued to be positively associated with psychological well-being (Fagermoen, 1997; Karas et al., 2014), and therefore important for recruitment, selection, work motivation, and work engagement. Due to globalization, migration of workers across countries increases, the working environments have and will become increasingly more diverse, which makes work identity an important issue not only for human resource

professionals, but also for non-governmental organizations (NGOs) and policy-makers.

Limitations and Future Research

Our study is not without limitations. First, while we find evidence that the TWIS-CRC is a reliable measure, we acknowledge that this study was not a full validation of the TWIS-CRC. We would recommend that future studies examine the convergent and divergent validity of the measure across the contexts in which we have studied it. This is particularly important since work identity as a construct is understudied in these cultural contexts and requires valid and reliable measures. Second, since we were dealing with samples from various contexts and we were unable to compare means, future studies should assess where the differences in scalar invariance would be present, to adapt measures within contexts, and to allow for meaningful comparisons of means across groups.

Third, while we were able to access two different groups in South Africa, multiple ethnic minorities were not included in this study. In addition, the South African Black and White groups are also sufficiently heterogeneous that, in the future, they warrant an investigation on identity based on the specific ethnocultural groups to which they belong. It is important for future studies on work identity to examine the importance of work identity within these multicultural groups. Finally, future studies should investigate the importance of background variables such as age, gender, personality and intercultural interactions that can potentially influence work identity, as these were not accounted for in the current study. With the Work Identity Reconsideration of Commitment aspects meaning something different for Dutch participants, the importance of the developmental trajectory, years of experience, and context may play an important role in how well individuals identify with their work.

Conclusion

Work plays an important role in the daily lives of most people, and is central to an individual's self-definitions and self-concept.

It is quite evident why it would be so important for psychological well-being. However, the decisions individuals make regarding their work may, on the one hand, be rather pragmatic, in that individuals would make professional and educational decisions in line with current survival needs. On the other hand, these decisions are also argued to be related to individuals' goals, aligned with personal values and objectives (personal identity), important roles and relationships (relational identity), and certain social groups (social identity). Hence, work identity as an ideological domain which draws from the three-dimensional model of identity, is important for understanding psychosocial functioning of employees. Therefore, the TWIS-CRC may be a useful tool for examining the nomological network which surrounds work identity within and across multicultural contexts.

References

- Adams, B. G. (2014). *I think therefore I am...I think? On the diversity and complexity of identity* (Published doctoral thesis). University of Tilburg, Tilburg, the Netherlands.
- Adams, B. G., & Crafford, A. (2012). Identity at work: Exploring strategies for Identity Work. *South African Journal of Industrial Psychology*, 38, 1–11. Doi:10.4102/sajip.v38i1.904
- Adams, B. G., & Van de Vijver, F. J. R. (2015). The many faces of expatriate identity. *International Journal of Intercultural Relations*, 49, 322–331. doi:10.1016/j.ijintrel.2015.05.009
- Akaike, H. (1987). Factor analysis and AIC. *Psychometrika*, 52(3), 317–332. doi:10.1007/BF02294359
- Andr n, D. & Roman, M. (2014). *Should I stay or should I go? Romanian migrants during transition and enlargements*. Discussion Papers 8690. Institute for the Study of Labor (IZA). Retrieved from <http://ftp.iza.org/dp8690.pdf>
- Ashmore, R. D., Deaux, K., & McLaughlin-Volpe, T. (2004). An organizing framework for collective identity: Articulation and significance of multidimensionality. *Psychological Bulletin*, 130, 80–114. Doi:10.1037/0033-2909.130.1.80
- Bartlett, M. S. (1954). A note on multiplying factors for various chi-squared approximations. *Journal of the Royal Statistical Society, Series B (Methodological)*, 16, 296–298.
- Bollen, K. A. (1989). *Structural equations with latent variables*. New York, NY: Wiley.
- Bothma, F. C., Lloyd, S., & Khapova, S. (2015). Work identity: Clarifying the concept. In P.G. W. Jansen & G. Roodt (Eds.), *Conceptualising and measuring work identity: South African perspectives and findings* (pp. 23–51). Dordrecht, the Netherlands: Springer. doi:10.1007/978-94-017-9242-4
- Breslau, J., Lane, M., Sampson, N., & Kessler, R. C. (2008). Mental disorders and subsequent educational attainment in a US national sample. *Journal of Psychiatric Research*, 42, 708–716. doi:10.1016/j.jpsychires.2008.01.016
- Browne, M. W., & Cudeck, R. (1989). Single sample cross-validation indices for covariance structures. *Multivariate Behavioral Research* 24, 445–455. doi:10.1207/s15327906mbr2404_4
- Clarke, M., Hyde, A., & Drennan, J. (2013). Professional identity in higher education. In B. M. Kehm & U. Teichler (Eds.), *The academic profession in Europe: New tasks and new challenges, the changing academy – The changing academic profession in International Comparative Perspective 5* (pp. 7–21). Dordrecht, the Netherlands: Springer. doi:10.1007/978-94-007-4614-5_2
- Crocetti, E., Schwartz, S., Fermani, A., & Meeus, W. (2010). The Utrecht Management of Identity Commitments Scale (U-MICS): Italian validation and cross-national comparisons. *European Journal of Psychological Assessment*, 26, 169–183. doi:10.1027/1015-5759/a000024
- Dempster, A. P., Laird, N. M. & Rubin, D. B. (1977). Maximum likelihood from incomplete data via the EM algorithm. *Journal of the Royal Statistical Society. Series B (Methodological)*, 39, 1–38.
- Dimitrova, R., Crocetti, E., Buzea, C., Jordanov, V., Kotic, M., Tair, E., Tausova, J., Van Cittert, N. & Uka, F. (2015). The Utrecht-Management of Identity Commitments Scale (U-MICS): Measurement invariance and cross-national comparisons of youth from seven European countries. *European Journal of Psychological Assessment*. Advance online publication. doi:10.1027/1015-5759/a000241
- Erikson, E. H. (1968). *Identity, youth and crisis*. New York, NY: Norton.
- Fagermoen, M. S. (1997). Professional identity: Values embedded in meaningful nursing practice. *Journal of Nursing Practice*, 25, 434–441. doi:10.1046/j.1365-2648.1997.1997025434.x
- Gini, A. (1998). Work, identity and self: How we are formed by the work we do. *Journal of Business Ethics*, 17, 707–714. doi:10.1023/A:1017967009252
- Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, 6, 1–55. doi:10.1080/10705519909540118
- Kaiser, H. F. (1970). A second-generation little jiffy. *Psychometrika*, 35, 401–415. doi:10.1007/BF02291817
- Kaiser, H. F. (1974). An index of factorial simplicity. *Psychometrika*, 39(1), 31–36. doi:10.1007/BF02291575
- Karas, D., Ceiciuch, J., Negru, O., & Crocetti, E. (2014). Relationships between identity and well-being in Italian, Polish, and Romanian emerging adults. *Social Indicators Research*, 121, 727–743. doi:10.1007/s11205-014-0668-9
- Kline, R. B. (1998). *Principles and practice of structural equation modeling*. New York, NY: Guilford Press.

- Lu, Y., Samaratunge, R., & Härtel, C. E. J. (2012). The relationship between acculturation strategy and job satisfaction for professional Chinese immigrants in the Australian workplace. *International Journal of Intercultural Relations*, *36*, 669–681. doi:10.1016/j.ijintrel.2012.04.003
- Magerman, L. (2014). *Identity and wellbeing at work: A comparison of the Coloured group with other ethno-cultural groups in South Africa* (Unpublished master's dissertation). University of Johannesburg, Johannesburg, South Africa.
- Marcia, J. E. (1983). Some directions for the investigation of ego development in early adolescence. *Journal of Early Adolescence*, *3*, 215–223. doi:10.1177/0272431683033004
- Meeus, W. (2011). The study of adolescent identity formation 2000–2010: A review of longitudinal research. *Journal of Research on Adolescence*, *21*, 75–94. doi:10.1111/j.1532-7795.2010.00716.x
- Meyer, J. P., & Herscovitch, L. (2001). Commitment in the workplace: Toward a general model. *Human Resource Management Review*, *11*, 299–326. doi:10.1016/S1053-4822(00)00053-X
- Meyer, J. P., & Allen, N. J. (1991). A three-component conceptualization of organizational commitment. *Human Resource Management Review*, *1*, 61–89. doi:10.1016/1053-4822(91)90011-Z
- Milfont, T. L., & Fischer, R. (2010). Testing measurement invariance across groups: Applications in cross-cultural research. *International Journal of Psychological Research*, *3*(1), 111–130.
- O'Connor, B. P. (2000). SPSS and SAS programs for determining the number of components using parallel analysis and Velicer's MAP Test. *Behavior Research Methods, Instruments and Computers*, *32*, 396–402. doi:10.3758/BF03200807.
- Patil, V. H., Singh, S. N., Mishra, S., & Donovan, D. T. (2007). *Parallel analysis engine to aid determining number of factors to retain* [Computer software]. Retrieved from <http://smishra.faculty.ku.edu/parallelengine.htm>
- Phinney, J. S., Horenczyk, G., Liebkind, K., & Vedder, P. (2001). Ethnic identity, immigration, and well-being: An interactional perspective. *Journal of Social Issues*, *57*, 493–510. Doi:10.1111/0022-4537.00225
- Pratt, M. G., Rockman, K. W., & Kaufman, J. B. (2006). Constructing professional identity: The role of work and identity learning cycles in customization of identity among medical residents. *Academy of Management Journal*, *46*, 235–262. doi:10.2307/20159762
- SPSS Inc. (2010). *SPSS 18.0 for Windows*. Chicago, IL: Author.
- Super, D. E. (1980). A life span, life-space approach to career development. *Journal of Vocational Behaviour*, *16*, 282–298. doi:10.1016/0001-8791(80)90056-1
- Tabachnick, B. G., & Fidell, L. S. (2001). *Using multivariate statistics*. Boston, MA: Allyn and Bacon.
- Van de Schoot, R., Lugtig, P., & Hox, J. (2012). A checklist for testing measurement invariance. *European Journal of Developmental Psychology*, *9*, 486–492. doi:10.1080/17405629.2012.686740
- Yap, S. C., Donnellan, M. B., Schwartz, S. J., Kim, S. Y., Castillo, L. G., Zamboanga, B. L., Weisskirch, R. S., ... Vazsonyi, A. T. (2014). Investigating the structure and measurement invariance of the Multigroup Ethnic Identity Measure in a multiethnic sample of college students. *Journal of Counseling Psychology*, *61*, 437–446. doi:10.1037/a0036253