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Original paper

**The shortened Corporate Ethical Virtues scale: Measurement invariance and mean differences across two occupational groups**

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CEV-32 scale group invariance

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**Abstract**

So far, the field of business ethics lacks validated measures for assessing virtues at the organizational level. The aim of this study is to investigate the measurement invariance of a shortened Corporate Ethical Virtues scale. In this manner, we contribute to validating an instrument that is both psychometrically sound and efficient to use. We conducted two survey studies of two independent groups (managers and school psychologists). Confirmatory factor analysis supported the eight-factor model of the scale, and we found it to be invariant in two different occupational groups. The managers gave higher appraisals of ethical culture than the psychologists did in seven out of the eight dimensions. We found that despite the contextual differences, the shortened scale measures the eight dimensions of organizational ethical virtues, as intended. Thus, the use of this more compact scale can be recommended for future studies, which will hopefully stimulate more research on ethical culture in various work contexts.

## **1. Introduction**

There has been a turn towards positive organizational ethics in business ethics research, which has brought the role of virtues under growing scientific attention (for a review, see Ferrero & Sison, 2014, and for a special issue published earlier in this journal, see Beadle, Sison, & Fontrodona, 2015). However, there is still a lack of validated measures to carry out studies that use the virtue approach. For example, Morales-Sánchez and Cabello-Medina (2015) recently pointed out that there have been many theoretical attempts to understand virtues and their applicability, but that few studies have proposed scales to assess these virtues. Furthermore, the few scales that are available focus on individual virtues (Libby & Thorne, 2007; Racelis, 2013; Riggio, Zhu, Reina, & Maroosis, 2010; Shanahan & Hyman, 2003), although it is also important to investigate them at the organizational level (Moore, 2015). Moreover, the basis for all quantitative research should be the ability to conceptualize relevant phenomena by using valid measures. Thus, to be able to achieve reliable and applicable study results, we need instruments that are both psychometrically sound and efficient to use (see Mayer, 2014).

Kaptein's Corporate Ethical Virtues scale (CEV; Kaptein, 2008) is one of the few scales that can assess and measure virtues at the organizational level. The CEV model provides a theory-based conceptualization of the content of virtues towards which organizations should strive. The author also developed an evidence-based instrument to measure these virtues. Thus, the model takes a step forward from the gaps in previous research, and it has both practical and theoretical advantages due to its normativity and multidimensionality. DeBode, Armenakis, Field, and Walker (2013) developed a shortened 32-item version of the original, 58-item CEV scale, as the original one can be laborious for respondents to complete and unappealing for researchers to use as part of a longer

questionnaire. Both increase the likelihood of attrition, which leads to problems of achieving sufficient response rates and thus to less reliable and less comprehensive results.

However, this shortened scale has not yet been tested for its measurement equivalence between different populations except one study that was carried out among U.S. employees (DeBode et al., 2013). This is a significant shortcoming in terms of the scale's future utilization, as it is critical in organizational research to ensure that the respondents from different contexts "interpret a given measure in a conceptually similar manner" (Vandenberg & Lance, 2000, p. 5). Our contribution to the field of business ethics, and especially to studies on ethical culture, is to further validate the CEV-32 scale. We do this by testing the measurement invariance of the scale on two Finnish samples.

### **1.1 Measuring organizational virtues**

Based on Ferraro and Sison's (2014) review of virtue ethics research, only three attempts have been made to measure organizational virtues. The psychometrical properties of two of these measures (Cameron, Bright, & Caza, 2004; Shanahan & Hyman, 2003) have not been extensively tested (two exceptions are Rego, Ribeiro, & Cunha, 2010 and Rego, Ribeiro, Cunha, & Jesuino, 2011). We focus on the third, which is Kaptein's (2008) conception of ethical virtues in organizations. Kaptein (2008) employs Solomon's (see e.g., Solomon, 2004) Aristotelian approach to business, based on which he developed the CEV model (Kaptein, 2008, 2011, 2017), which focuses on virtues as the basis of an ethical culture.

According to Kaptein (2008; 2017), eight virtues represent the organizational conditions that can stimulate the ethical conduct of managers and employees. *Clarity* refers to the concrete, comprehensive, and understandable ethical standards and normative expectations toward employees. *Congruency of supervisors* and *congruency of senior management* pertain to the good ethical role modeling and integrity of managers. *Feasibility* refers to the adequate resources and the practical conditions that make ethical actions

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possible. *Supportability* includes the shared support, trust, and commitment to common values in the organization. *Transparency* refers to the visibility of (un)ethical behavior and its consequences to others. *Discussability* means the possibility of raising and discussing ethical issues at work, and *sanctionability* is the reinforcement of ethical conduct by rewarding ethical behaviors and punishing unethical ones. (A more detailed discussion of the background theory and content of these virtues can be found in Kaptein, 2008, 2011.) Kaptein (2008) also developed a 58-item CEV measure that can be used to assess these eight virtues in organizations. However, research has proposed different sets of virtues that can be regarded to be most central to ethical organizations (e.g., Murphy, 1999) besides those in the CEV model, but these “sets are substantive (i.e., more climate related) and organization-specific instead of procedural and generic” (Kaptein, 2008, p. 944).

The CEV scale has received empirical evidence for broad generalizability and support for both convergent and discriminant validity. This scale has been used in different national contexts: the Netherlands (Kaptein, 2008), Finland (Huhtala, Feldt, Lämsä, Mauno, & Kinnunen, 2011; Kangas, Feldt, Huhtala, & Rantanen, 2014; Kangas, Muotka, Huhtala, Mäkikangas, & Feldt, 2015; Riivari & Lämsä, 2014; Riivari, Lämsä, Kujala, & Heiskanen, 2012) and Lithuania (Novelskaite & Pucetaite, 2014), both in longitudinal (Huhtala, Kaptein, & Feldt, 2016; Kangas, Kaptein, Huhtala, Lämsä, Pihlajasaari, & Feldt, 2016) and in cross-sectional studies (e.g., Huhtala, Tolvanen, Mauno, & Feldt, 2014; Kaptein, 2011), and the structure of the original scale has been widely supported by these studies (see Table 1).

[Insert Table 1 about here]

DeBode et al. (2013) developed a shortened version of Kaptein’s (2008) CEV-58 scale. They performed a confirmatory factor analysis (CFA) on the original 58 CEV items and kept the four highest loading items for all eight dimensions, resulting in a 32-item scale. In their three interconnected studies, DeBode et al. (2013) found support for the psychometric

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properties of the CEV-32 scale in terms of both reliability and structural validity. After the shortened scale was introduced, only two studies have empirically tested its factor structure. Novelskaite and Pucetaite (2014) tested the structural properties of the scale by using exploratory factor analysis (EFA). They found an equivocal factor structure (with five factors instead of eight) in contrast to the findings by DeBode et al. (2013). However, it must be noted that EFA cannot test the theoretically expected structure with the given data, and therefore the overall fit of the eight-factor structure remained untested. More recently, Huhtala and Feldt (2016) used CFA to test the hypothesized correlated eight-factor model of the CEV-32 and found statistical support for it.

We further aim to contribute to this promising but underexamined structure of the CEV-32 by testing the hypothesized eight-factor structure and its measurement invariance in two occupational groups by using CFA. CFA is a highly-recommended method in testing a predefined factor structure of a certain scale, when the factor structure is based on theory and/or on previous analytic research (Brown, 2014). One of the benefits of using CFA is that it can also judge the goodness of fit of the hypothesized factor structure against several fit indices instead of using only one statistical test. CFA also allows for the simultaneous estimation of factor loadings across groups and provides a statistical test of the equal-loadings hypothesis. We also contribute to the field by testing the scale in a European context as the only previous study (DeBode et al., 2013) tested its generalizability across organizations using only U.S. samples.

We examine the consistency of individuals' perceptions across two samples: managers (from the technical and economic fields, mostly working in the private sector) and school psychologists. Managers make crucial decisions within organizations and can have a significant impact on the organizational values due to their leading position (Paine, 1997; Schein, 2004; Weaver, 2006). They can also experience intense involvement with their



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organization, leading to intertwined individual and organizational identities. These close ties make it psychologically difficult for managers to criticize their organization, which can lead to managers having more positive perceptions of their organization's ethical culture (Treviño, Weaver, & Brown, 2008). In contrast, school psychologists work in the public sector and often lack possibilities to influence their organization. For example, school policies are based on administrative decisions that are often made without the input of psychologists (Worrell, Skaggs, & Brown, 2006). They can also experience dissatisfaction with their work stemming from poor opportunities for career advancement within their field (Worrell et al., 2006). Dissatisfied employees can experience cynicism and psychological distance towards their employer, leading to a lack of identification with their organization (Treviño et al., 2008). Thus, psychologists may have less positive perceptions of organizational ethics than managers (Ardichvili, Jondle, & Kowske, 2012; Treviño et al., 2008).

Finally, we can assume that ethical culture evaluations differ between the private and the public sector, as managers represent mostly the former and psychologists the latter in our study. Although comparative studies on sector differences are still scarce, we know that there are numerous features that differentiate them; for example, public sector organizations emphasize different values than private sector companies do (Posner & Schmidt, 1996; Van der Wal, De Graaf, & Lasthuizen, 2008). Psychologists may perceive ethical values to be the core feature of organizations for which it should strive and therefore may evaluate the virtues more critically. These could then lead to lower mean ratings.

These two very different occupational groups provide a heterogeneous sample for testing the CEV-32 factor invariance, which is also a strength of our research setting. If the structure of the scale does not fluctuate between the groups, but instead its stability is empirically supported despite these significant differences, we gain robust evidence for the validity of the scale. If the group invariance is supported, our aim is to study the potential

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differences in the ethical virtue evaluations between the managers and psychologists. This informs us about whether the scale captures differences in the evaluations of ethical culture between the two groups, and we know that the differences are not due to the instability of the measure. Based on these theoretical premises, we present the following research hypotheses:

*Hypothesis 1:* The theorized correlating eight-factor model of the CEV-32 scale fits the two samples (i.e., managers and school psychologists).

*Hypothesis 2:* The factor loadings of the correlated eight-factor model are invariant between the two samples.

*Hypothesis 3:* The CEV-32 indicates that managers give higher mean ratings of ethical culture than school psychologists do.

## **2. Method**

### **2.1 Participants and procedure**

This study is based on two individual samples. Sample 1 consisted of 256 Finnish school psychologists who took part in an electronic survey in the spring of 2014. We sent an electronic link to the questionnaire to all members of the Finnish Psychological Association (FPA) who had provided their email address to the FPA register and had reported school psychology as their occupational field. In Finland over 90 percent of all the certified psychologists belong to the FPA (2015), so this sampling approach provided a representative sample of the target group. Of the 538 psychologists we contacted, 270 responded to the questionnaire (response rate 50%). We used 256 of these responses (i.e., participants who answered the ethical culture items). We analyzed the representativeness of our sample in terms of age and gender, which were the only available background information on all the contacted psychologists. The attrition analyses comparing the study participants ( $n = 256$ )

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with the full sample ( $n = 538$ ) showed that there were no differences between them in terms of age ( $\chi^2(8) = 10.48, ns$ ) or gender ( $\chi^2(1) = 1.96, ns$ ).

Most of the psychologists were women (94%) with an average age of 39 years (range 25–64,  $SD = 9.84$ ). In Finland, all licensed psychologists have an MSc in Psychology (FPA, 2015). In addition, 61 percent of the current sample completed supplementary training (e.g., in family counseling). Eighty-one percent of the participants worked in municipal educational administration and 13 percent in municipal social administration (6% worked in other areas, e.g., in special education schools or in child and family services). Most worked full time (80%) and had a permanent contract (82%). They had worked with the same employer for six years on average (range 0–38,  $SD = 7.36$ ), and worked an average of 37 hours a week (range 8–50,  $SD = 4.64$ ).

Sample 2 consisted of 237 managers who participated in the final phase of a longitudinal survey study that began in 2009 (baseline in 2009, T2 = 2011, T3 = 2013, T4 = 2015). Altogether, 237 managers were included in the current study: they had returned the questionnaire at T4 and had answered the ethical culture items. The original sample included managers who worked in technical and commercial fields ( $N = 3000$ ), and they were randomly selected from the membership registers of two Finnish labor unions (The Finnish Association of Business School Graduates,  $n = 1500$  and The Finnish Association of Graduate Engineers,  $n = 1500$ ). In 2009, 67 percent of employees in Finland were members of labor unions organized according to industry (Ahtiainen, 2011). Thus, our approach provided a relatively representative sample of Finnish managers who had graduated from business and engineering schools. With regard the overall representativeness of our sample: 902 managers participated at the study baseline, yielding a response rate of 34 percent after removing 369 empty forms (i.e., respondents who were not part of the target group of the study, e.g., currently unemployed) from the original sample (for more detailed background

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information, see Huhtala et al., 2011). The attrition analyses comparing the participants at T4 with the rest of the sample at T1 showed that the respondents at T4 were, on average, one year younger than the those who had not continued with the study ( $t(900) = 2.11, p < .05$ ), and that women were somewhat overrepresented among the participants at T4 ( $\chi^2(1) = 9.05, p < .01$ ).

In the Sample 2, 62 percent of the respondents were men, with an average age of 51 years (range 31–73,  $SD = 8.22$ ); 77 percent worked in the private sector and 40 percent in industry. This sample was also highly educated, as all participants had a graduate degree and 7 percent had a Licentiate or PhD degree. The participants worked in higher (17%), middle (65%), and lower (18%) management, worked an average of 44 hours per week (range 9–98,  $SD = 8.46$ ), and had an average of nine subordinates (range 1–80,  $SD = 12.52$ ). Most worked full time (93%) and had worked with the same employer for ten years on average (range 0–44,  $SD = 9.45$ ).

## **2.2 Measures**

We measured *ethical culture* using the CEV-32 questionnaire (DeBode et al., 2013; Kaptein, 2008). The scale includes eight dimensions, each of which is measured with four items (all items are described in Appendix 1). Participants rated these items on a Likert scale from 1 (*strongly disagree*) to 6 (*strongly agree*). All the items from the feasibility dimension were originally negatively worded and scored in reverse (Kaptein, 2008). In the shortened version the items were reworded to reflect a positive context (DeBode et al., 2013). Thus, a higher score (range 1–6) refers to a higher level of ethicality for each dimension.

## **2.3 Analyses**

Because the CEV scale has a well-developed underlying theory (Kaptein, 2008) and the original model has received strong empirical support for its structure, we used confirmatory factor analysis (CFA) as the main statistical method (Brown, 2014). We performed the CFAs

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using the Mplus Statistical Package (Version 7; Muthén & Muthén, 1998–2015) to test the measurement invariance of the CEV-32 scale between the two groups. We first tested two configural invariance models where all parameter estimates were allowed to vary across the manager and school psychologist samples: a one-factor model (all items loading to one factor) and an eight-factor model (four items loading per factor). Next, we set the factor loadings to be invariant across the samples to investigate the factorial metric invariance of the scale. Finally, we applied analysis of variance (ANOVA) to test the mean differences of the virtues between the two groups using the SPSS statistical program.

We determined the goodness of fit of all the tested CFA models based on the following goodness-of-fit indices: the  $\chi^2$ -test, the Root Mean Square Error of Approximation (RMSEA), the Tucker-Lewis Index (TLI), and the Comparative Fit Index (CFI). A nonsignificant  $\chi^2$  test indicates a good fit, RMSEA values of  $\leq 0.05$  indicate a good fit, values of 0.06–0.08 a reasonable fit, and values of  $\geq 0.10$  a poor fit. The TLI and CFI values range between 0–1; values of  $\geq 0.90$  are considered to indicate an acceptable fit of the model (Marsh, Hau, & Wen, 2004). We used the Satorra-Bentler scaled difference chi-square test (Satorra & Bentler, 1999) to compare the most restricted model with the less restricted one.

### 3. Results

The freely estimated one-factor model showed a poor fit with the data:  $\chi^2(928) = 4258.43, p < .001$ , RMSEA = .12, SRMR = .09, CFI = .64, TLI = .62. Testing the freely estimated eight-factor model for the CEV-32 yielded satisfactory fit indices:  $\chi^2(872) = 1723.30, p < .001$ , RMSEA = .06, SRMR = .06, CFI = .91, TLI = .90. This supports Hypothesis 1. The Satorra-Bentler scaled  $\chi^2$ -difference test resulted in choosing the eight-factor model over the one-factor model ( $\chi^2(56) = 1535.86, p < .001$ ). Next, the constrained eight-factor model was also found to fit the data well ( $\chi^2(896) = 1757.01, p < .001$ , RMSEA = .06, SRMR = .06, CFI =

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.91, TLI = .90), and the Satorra-Bentler scaled  $\chi^2$ -difference test did not show a significant loss-of-fit for the invariant model compared to the freely estimated model ( $\chi^2 (24) = 35.92, p = .056$ ). This supports Hypothesis 2. As a conclusion, we chose the invariant eight-factor model to be our final model for characterizing the factor structure of the CEV-32 in the manager and psychologist samples.

Table 2 shows the factor loadings of the invariant eight-factor model. All factor loadings achieved an acceptable level above the recommended cutoff value of  $\geq .50$  (Hair, Black, Babin, Anderson, & Tatham, 2010, p. 708), except for one feasibility item, which had a factor loading of .42 in the school psychologist sample. However, even though the loading was slightly lower than preferred, it was over the commonly used threshold of .40 (Brown, 2014), and no other statistical evidence suggested that the item was problematic (the model had acceptable fit without any modification indices concerning that item). In addition, the invariance of the factor loading across the two groups was supported, which further suggested keeping the item in the model. Therefore, the item was retained to support content validity.

The factor intercorrelations (shown in Table 3) varied from .52 to .92 among the managers and from .44 to .90 among the school psychologists. The highest intercorrelations in both samples were found between the factors of discussability and sanctionability, whereas the correlations between congruency of senior management and the other seven other virtues were smaller in the psychologist sample than in the manager sample. For example, the correlation coefficient between congruency of senior management and feasibility was .72 for the managers and .44 for the school psychologists.

Table 4 shows the significant mean differences in the ethical culture evaluations between the two occupational groups. The managers gave significantly higher mean evaluations than the psychologists for seven out of eight virtues, the congruency of supervisors being the only exception. Thus, Hypothesis 3 was partly supported. The largest

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mean differences between these groups were found for clarity (5.13 versus 4.22) and for the congruency of senior management (4.60 versus 3.65)

[Insert Tables 2, 3, and 4 about here]

#### **4. Discussion**

The aim of this study was to provide more empirical evidence on the measurement properties of the recently developed shortened version (CEV-32; DeBode et al., 2013) of the ethical culture questionnaire (CEV-58; Kaptein, 2008). As expected, our study supports the eight-factor model, and we found it to be invariant in two occupational groups (managers and psychologists). This means that despite the contextual differences, the CEV-32 measures the eight dimensions of organizational ethical virtues (Kaptein, 2008). Thus, the use of this more compact scale can be recommended for future studies.

The eight dimensions representing the different ethical virtues were found to be the underlying structure of the scale. In line with previous studies that used CFA to test the structure of the CEV-32 (DeBode et al., 2013; Huhtala & Feldt, 2016), and with studies that used the 58-item measure (see Table 1), the theoretically based correlated eight-factor structure of the CEV-32 showed a good fit with the data (supporting Hypothesis 1). It also showed a significantly better fit than the alternative one-factor structure. The results showed no significant cross-loadings or residual covariances that would have indicated any need to modify the factor model. The correlations between the factors ranged from .44 to .92, indicating that the virtues can also be used separately to identify different dimensions of overall ethical culture. In sum, ethical organizational culture can be interpreted as comprising eight distinct, though correlated, dimensions, i.e., virtues.

We also found support for our Hypothesis 2 that the correlated eight-factor structure of the CEV-32 shows factorial group invariance, which means that the structure of the CEV-32 is similar across the groups of managers and psychologists. Thus, the scale measures

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ethical virtues similarly despite the different occupations, work contexts, and demographics in these groups. We found some interesting differences between the intercorrelations of the CEV factors. Because we were able to establish the measurement metric invariance of the model, these differences are not due to the instability of the scale, but rather stem from real life differences between the psychologists and managers. The most striking difference was that all the factor correlations with congruency of senior management were higher among the managers. Especially the correlation between congruency of senior management and feasibility was substantially lower for the psychologists, which possibly indicates that they do not experience the top managements' actions to be related to their own possibilities to perform their work with high ethical standards. This could be due to the remoteness of the public sector's top management and to other factors having a higher impact on the psychologists' ethical feasibility (e.g., resources which are not dependent on the organization's management but rather on broader issues, such as the municipal economy). In contrast, the managers may view the good moral example of their leaders as being more directly related to their own possibility to have high feasibility (having resources and enabling conditions for ethical behavior).

We can conclude that the invariant CEV-32 scale provides a measure that can reliably detect differences in ethical culture evaluations between different occupational groups. We assumed that the managers and school psychologists would differ in their perceptions of virtues, and the invariant measure enabled us to test whether this was the case. We found partial support for our Hypothesis 3 that the managers give higher appraisals of the ethical virtues in their work communities than the school psychologists for seven out of the eight dimensions (all except the congruency of supervisors). Thus, as expected, managers may have a more optimistic view of the organization's ethical culture because of their high organizational status in the private sector, and because their managerial role and identity can



be intertwined with the organization's image (Treviño et al., 2008). However, evaluating the ethical example set by one's supervisor (the virtue of congruency of supervisors) was not related to these differences between the managers and the psychologists in our study. To summarize, we found that the CEV-32 can detect differences between two occupational samples, which means that the virtues are sufficiently strong and identifiably different to produce significant discrimination among the two groups.

#### **4.1 Limitations of the study**

Our study has at least four main limitations, which should be acknowledged when making interpretations based on our findings. Firstly, our samples represented highly educated employees and managers from one national context, thus our results can best be generalized to Finnish white-collar workers. Secondly, especially the gender distribution could confound our results regarding the mean differences between these groups. This could be the case even though our study showed that the scale invariance was supported regardless of the demographic differences between the two samples. The sample of managers, who were working in leading positions mostly in the private sector, is male dominant. The sample of psychologists, who were doing clinical work in the public sector, is highly female dominant. That is, the differences between ethical culture evaluations can be explained by the participants' hierarchical position and occupational field, but gender might also have affected these group level differences (female participants providing lower mean scores).

Thirdly, our study used a cross-sectional design, which means that the longitudinal invariance of the CEV-32 scale remains to be tested in later studies. Sample 2 in the current study was part of a longitudinal research project, but the shortened version of the CEV scale was only included at the final time point of the data collection. However, the original 58-item CEV scale has been shown to be time invariant in one previous study (Huhtala et al., 2016). This also gives a promising offset for validating the shortened version. If the time invariance

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of the CEV-32 is supported, then the measure can be reliably used to study stability and changes in ethical culture over time. Fourthly, although we compared the mean differences in the ethical culture perceptions between managers and nonmanagers, we do not imply that these results are applicable to hierarchical differences within one organization. Our samples included individual participants who represented several organizations.

## **4.2 Conclusions**

It is debatable whether organizational culture is a quantitatively measurable construct (see e.g., Cameron & Quinn 2006). However, if we want to predict and associate cultural phenomena in organizations with other important constructs, we need to accept a way of quantifying and measuring culture. As Hofstede (1986) put it, “there is a strong need for speculating less and measuring more” (p. 256). To date, ethical culture has been studied by using multiple fragmented concepts and measures (Mayer, 2014). To build a sounder and broader empirical research base, we need established and validated tools of assessment for ethical culture. Our study contributed to the ethical culture literature by bringing psychometric support for the CEV scale (Kaptein, 2008). We found the shortened 32-item version of this instrument (DeBode et al., 2013) to be invariant between two occupational groups. Thus, our results take one step further in providing a reliable and valid way to operationalize ethical virtues in organizations. Hopefully, this will stimulate more research on ethical culture in different organizations and among various work contexts.

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Table 1. A review of studies testing the measurement properties of the CEV-58 (Kaptein, 2008) scale.

Author(s), Year	Participants & study design	Measurement property	Analyses	Supported	Other findings
Kaptein (2008)	Study 1: 24 business students and 621 managers and employees in a questionnaire (pre-test) study	Content validity: Item generation, selection, and reduction, item interpretability	Author generated 96 items based on existing theory and empirical research. Items were revised based on participants' comments on item interpretation and complexity, and descriptive statistics of items (levels of variance, skewedness, and kurtosis).	n.a.	After eliminating 23 items, 72 items remained.
	Study 2: 382 employees in a questionnaire study	Internal consistency (eight-factor solution)	EFA	yes	Items were eliminated based on low factor loadings, 58 items remained.
	Study 3: 725 employees in a questionnaire study	Discriminant and convergent validity	CFA	yes	The hypothesized second-order factor structure (eight individual factors loading on a common ethical culture factor) was supported.
Kaptein (2011)	341 triads with one manager and two employees in a questionnaire study	Convergent and divergent validity	CFA	yes	The model with all separate dimensions for ethical climate, ethical culture, and ethics program was found to fit the data best.

Table continues.

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Author(s), Year	Participants & Study design	Measurement property	Analyses	Supported	Other findings
Huhtala et al. (2011)	902 managers in a questionnaire study	Construct validity	CFA	yes	The hypothesized second-order factor structure (eight individual factors loading on a common ethical culture factor) was supported.
Riivari et al. (2012)	147 employees in a questionnaire study	Construct validity	CFA	yes	All eight dimensions (measured with sum score variables) loaded on the common CEV factor.
Kangas et al. (2014)	3,702 managers and employees from four organizations in a questionnaire study	Factorial group invariance	CFA	yes	The second-order factor structure was supported and found invariant across four samples.
Huhtala et al. (2014)	2,146 employees from one organization in a questionnaire study	Multilevel metric invariance	SEM	yes	Dimensions of ethical culture were shared within the work units: 12–27 percent of the total variance was explained by departmental homogeneity.
Huhtala et al. (2016)	368 managers in a longitudinal questionnaire study	Longitudinal measurement equivalence	CFA	yes	Configural, metric, and scalar invariance were supported: the eight-factor model was found to be invariant across two years.

Table 2. Standardized factor loadings for the 32-Item CEV scale.

Factor	Item number <sup>1</sup>	Factor loadings for managers	Factor loadings for school psychologists
Clarity	1	.78	.77
	7	.82	.82
	8	.88	.88
	10	.89	.86
Congruency of supervisors	11	.89	.89
	12	.86	.83
	14	.91	.92
	16	.92	.95
Congruency of senior management	17	.60	.88
	18	.93	.95
	19	.86	.89
	20	.81	.76
Feasibility	21	.72	.64
	22	.90	.80
	25	.86	.42
	26	.81	.65
Supportability	29	.79	.72
	30	.82	.78
	31	.83	.75
	32	.84	.80
Transparency	33	.59	.66
	35	.51	.57
	38	.85	.89
	39	.77	.80
Discussability	42	.87	.86
	43	.88	.83
	44	.82	.81
	48	.90	.86
Sanctionability	51	.77	.66
	55	.59	.57
	56	.61	.64
	57	.84	.74

<sup>1</sup>The items are numbered according to their item numbers as presented in Kaptein's (2008) original 58-item of the CEV.

Table 3. Factor intercorrelations (correlated eight-factor model): managers in the upper diagonal, school psychologists in the lower diagonal.

	1	2	3	4	5	6	7	8
1. Clarity	-	.59***	.69***	.54***	.52***	.66***	.68***	.67***
2. Congruency of supervisors	.46***	-	.68***	.65***	.57***	.71***	.68***	.70***
3. Congruency of senior management	.47***	.58***	-	.72***	.76***	.79***	.79***	.86***
4. Feasibility	.63***	.48***	.44***	-	.59***	.65***	.73***	.76***
5. Supportability	.58***	.54***	.56***	.52***	-	.80***	.75***	.78***
6. Transparency	.60***	.45***	.62***	.52***	.62***	-	.88***	.88***
7. Discussability	.59***	.57***	.67***	.57***	.80***	.77***	-	.92***
8. Sanctionability	.61***	.55***	.72***	.61***	.72***	.77***	.90***	-

\*\*\*  $p < .001$

Table 4. Differences in ethical culture evaluations between managers and school psychologists (1-ANOVA;  $N = 493$ ).

	Managers ( $n = 237$ )	School psychologists ( $n = 256$ )	$F$ -test	Cronbach's alpha ( $\alpha$ )	$\alpha$ (managers/school psychologists)
	M (Sd)	M (Sd)			
Clarity	5.13 (0.89)	4.22 (1.15)	94.75***	.92	.91/.90
Congruency of supervisors	4.71 (1.07)	4.52 (1.17)	3.44 <i>ns</i>	.94	.94/.94
Congruency of senior management	4.60 (1.11)	3.65 (1.13)	88.24***	.91	.85/.92
Feasibility	4.94 (0.92)	4.28 (0.98)	58.89***	.78	.79/.75
Supportability	4.38 (0.94)	4.09 (0.94)	10.64**	.86	.89/.84
Transparency	4.42 (0.84)	3.76 (0.94)	65.93***	.84	.87/.75
Discussability	4.82 (0.94)	4.14 (1.00)	58.19***	.92	.92/.90
Sanctionability	4.21 (0.92)	3.62 (0.81)	54.70***	.79	.80/.75

\*\* $p < .01$ ; \*\*\* $p < .001$

Appendix 1. Corporate Ethical Virtues Scale short-form items (DeBode et al. 2013, Kaptein 2008).

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Dimension	Item <sup>1</sup>
Clarity	1. The organization makes it sufficiently clear to me how I should conduct myself appropriately toward others within the organization.
	7. The organization makes it sufficiently clear to me how I should deal with confidential information responsibly.
	8. The organization makes it sufficiently clear to me how I should deal with external persons and organizations responsibly.
	10. In my immediate working environment, it is sufficiently clear how we are expected to conduct ourselves in a responsible way.
Congruency of Supervisors	11. My supervisor sets a good example in terms of ethical behaviour.
	12. My supervisor communicates the importance of ethics and integrity clearly and convincingly.
	14. My supervisor does as s/he says.
	16. My supervisor is honest and reliable.
Congruency of Management	17. The conduct of the Board and (senior) management reflects a shared set of norms and values.
	18. The Board and (senior) management sets a good example in terms of ethical behaviour.
	19. The Board and (senior) management communicates the importance of ethics and integrity clearly and convincingly.
	20. The Board and (senior) management would never authorise unethical or illegal conduct to meet business goals.
Feasibility	21. I am not asked to do things that conflict with my conscience in my immediate working environment.
	22. I do not have to sacrifice my personal norms and values in order to be successful in my organization.
	25. I have adequate resources at my disposal to carry out my tasks responsibly.
	26. I am not put under pressure to break the rules in my job.

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Supportability	29. In my immediate working environment, everyone has the best interests of the organization at heart. 30. In my immediate working environment, a mutual relationship of trust prevails between employees and management. 31. In my immediate working environment, everyone takes the existing norms and standards seriously. 32. In my immediate working environment, everyone treats one another with respect.
Transparency	33. If a colleague does something which is not permitted, my manager will find out about it. 35. If my manager does something which is not permitted, someone in the organization will find out about it. 38. In my immediate working environment, adequate checks are carried out to detect violations and unethical conduct. 39. Management is aware of the type of incidents and unethical conduct that occur in my immediate working environment.
Discussability	42. In my immediate working environment, there is adequate opportunity to discuss unethical conduct. 43. In my immediate working environment, reports of unethical conduct are taken seriously. 44. In my immediate working environment, there is ample opportunity for discussing moral dilemmas. 48. In my immediate working environment, there is adequate opportunity to correct unethical conduct.
Sanctionability	51. In my immediate working environment, ethical conduct is valued highly. 55. In my immediate working environment, ethical conduct is rewarded. 56. In my immediate working environment, employees will be disciplined if they behave unethically. 57. If I reported unethical conduct to management, I believe those involved would be disciplined fairly, regardless of their position.

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<sup>1</sup>The items are numbered according to their item numbers as presented in Kaptein's (2008) original 58-item CEV-scale.