



ORIGINAL ARTICLE

# Causality Orientations in the Work Setting: Scale Development and Validation

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The purpose of this study was to develop and validate the Causality Orientations at Work Scale, which is based on self-determination theory. Bank employees (N = 201) and dental hygienists (N = 299) completed measures of autonomy-, control-, and impersonal orientations, as well as criterion-related measures including need satisfaction, autonomous work motivation, controlled work motivation, and work-related outcomes. Consistent with self-determination theory, results showed support for a three-factor structure representing autonomy, control, and impersonal causality orientations. This structure was supported for both samples for all levels of measurement invariance, and the three subscales proved to have satisfactory reliability. Moreover, the pattern of results with common correlates and outcomes supported the predictive/criterion validity of the new scale. The current study introduces a valid measurement instrument to assess a core construct of self-determination theory. This instrument will facilitate future studies in organizational psychology regarding all three causality orientations as a part of the motivational process based on the theoretical framework of self-determination theory.

**Keywords:** causality orientations; self-determination theory; factorial validity; multi-group analysis

## Introduction

Individual differences have long been acknowledged as being central to the study of motivation. Self-determination theory (SDT; Deci and Ryan, 2000; Ryan and Deci, 2017), which is a meta-theory of human motivation, focuses on the satisfaction of basic human psychological needs and the quality of motivation to explain human growth, functioning, and wellness. Consistent with the organismic-dialectic approach of SDT, motivation is seen as a function of both the social context and people's individual differences. These individual differences have been internalized into self-regulatory orientations in response to persistent social-contextual influences.

Causality orientations theory (COT) was formulated as part of the SDT meta-theory to account for such individual differences. Specifically, COT concerns individual differences or 'surface traits' in motivational orientations or general regulatory styles. These orientations index aspects of personality related to people's tendencies to experience or interpret events in a social context in different ways and to behave accordingly (Gagné and Deci, 2005; Reeve, Jang and Jang, 2018; Vansteenkiste, Niemiec and Soenens, 2010). Hence, the nature of one's causality orientations can influence one's motivational processes.

Numerous studies have supported the application of SDT to the work context (for a review, see Deci, Olafsen and Ryan, 2017; Olafsen and Deci, in press). However, despite

the theoretical contribution of individual differences in SDT to predicting work motivation, work behavior, work attitudes, and employee work-related health, only a handful of studies have been conducted on the topic of causality orientations in the work setting. In these studies, the General Causality Orientations Scale (GCOS; Deci and Ryan, 1985) has been used most frequently. This scale assesses causality orientations based on situations drawn from interpersonal, work, and informal contexts. Domain specific scales have been recommended for more specific and accurate measurements of causality orientations (Deci and Ryan, 1985), as they can focus on narrower classes of situations and be more suitable for predicting specific behaviors in given contexts (e.g., work). In particular, to better understand the underlying processes of motivated behavior in the work domain, it is important to provide an assessment tool that measures motivational aspects related to the individual characteristics of SDT within this context. The aim of the current study is to extend the literature on SDT in the work domain by developing a valid measure of these individual characteristics for work settings. A valid measurement tool that emphasizes all types of causality orientations is important for future studies focusing on individual differences in the initiation and maintenance of work motivation. Thus, the present study contributes to our current and future understanding of causality orientations at work.

## Causality Orientations

COT considers individual differences in terms of three causality orientations: autonomy, control, and

impersonal causality orientations (Ryan and Deci, 2017). Someone with a predominantly autonomy orientation is characterized by self-determination and choice. Such individuals would orient toward the environment by creating options and possibilities for choice in accordance with their personality, and they are more likely to interpret social contexts as more need supportive. They tend to be identified, integrated, and intrinsically motivated, and they respond to the context surrounding them with interest. People with a predominately control orientation focus on external rewards and pressures. They orient toward external contingencies and feel pressured to satisfy important others and to comply with their advice and suggestions. They organize their behavior based on deadlines and rewards, interpret events as controlling, and tend to feel introjected and externally motivated. People with a predominantly impersonal orientation feel unable to influence the environment or obtain desired outcomes, and they tend to be amotivated.

COT proposes that people differ in the relative strengths of these three orientations, but everyone possesses each of the orientations to some degree (Deci and Ryan, 1985, 2017). This means that we all engage with our surroundings from autonomy, control, and impersonal orientations to some degree. Each orientation represents an individual-difference variable, which means that it is not intended to categorize people as one or the other orientation. Rather, it is assumed that each individual has a set of these related characteristics, each with its own strength. Thus, when assessing causality orientations to predict behaviors and experiences, each of these orientations is needed. Although these causality orientations are considered to be cross-domain, they can be activated by social-contextual factors. This means that one's causality orientation can vary in relation to different people and contexts (Ryan and Deci, 2017), such as work.

### ***Causality orientations and their consequences at work***

Research on individual differences in causality orientations in work contexts has tended to focus on the autonomy orientation. In one of the first studies on this topic, Lam and Gurland (2008) found that an autonomy causality orientation was associated with autonomous work motivation, which in turn influenced job satisfaction and job commitment. Other research has indicated that autonomy causality orientations are positively associated with need satisfaction and adaptive functioning, such as job performance and psychological adjustment (Baard, Deci and Ryan, 2004) and job interview success among business school students (Tay, Ang and Van Dyne, 2006). In a series of studies, Liu and colleagues have shown that autonomy orientation was positively associated with personal learning, job involvement, and organizational citizenship behavior (Liu and Fu, 2011), harmonious passion, job creativity, and psychological empowerment (Liu, Chen and Yao, 2011; Liu et al., 2011), as well as negatively related to voluntary turnover (Liu et al., 2011). A more recent study has linked autonomy orientation to work engagement (Malinowska and Tokarz, 2020). Finally, an intervention study that taught teachers to be

more need supportive and less controlling found that an autonomy orientation predicted positive changes over a semester in need supportive teaching, whereas a control orientation predicted positive changes in a controlling teaching style (Reeve et al., 2018). A controlled causality orientation has also been associated with more extrinsic work motivation (Lam and Gurland, 2008), but it has not been significantly associated with work engagement (Malinowska and Tokarz, 2020). The only study of impersonal orientation in the work setting found a negative relation between an impersonal orientation and work engagement (Malinowska and Tokarz, 2020). In sum, this limited body of research shows that holding a predominantly autonomy orientation is associated with positive indicators of behavior, attitudes, and wellness in the work domain, whereas research focused on controlled and impersonal orientations is seldom reported.

In most cases, studies of COT in work contexts have used the GCOS (Deci and Ryan, 1985). This scale consists of 36 items that measures the 3 causality orientations in 12 vignettes. The instrument was initially validated on the basis of item interrelations. Although good validity indices and adequate stability have been reported, the factor structure of this instrument has not been tested. Moreover, because the GCOS vignettes include situations from various contexts, researchers have called for domain specific scales (Deci and Ryan, 1985), which have been successfully developed in other contexts, such as for the exercise context (Rose, Markland and Parfitt, 2001). Research on causality orientations in the work context would benefit from a valid measurement scale, preferably a domain-specific scale, to enable predictions of the three causality orientations simultaneously.

### ***The present study***

Causality orientations are part of the basic SDT model in the work domain (Deci et al., 2017), and they can contribute insights into employees' motivation, work functioning, and wellness. However, as seen in the literature reviewed above, the autonomy causality orientation has been examined in most of the studies of work settings, whereas studies of the control and impersonal orientations are very rarely reported. If we assume a dimensional view of personality, it is important to study all three orientations simultaneously (Deci and Ryan, 1985). For instance, research on the relation between autonomy and control orientations indicates the need for multivariate studies, as near zero correlations between these orientations suggest that they are orthogonal (Deci and Ryan, 1985; Rose et al., 2001). That is, people with a strong autonomy orientation may have either a strong or a weak control orientation, suggesting quite different functional implications as a higher control orientation has been associated with a more controlled motivation (Lam and Gurland, 2008). Thus, context specific measures of causality orientations in the work domain are important, as the three causality orientations can differ in strength in different life contexts. Hence, a measure of causality orientations at work would be expected to yield more valid and accurate predictions

of work-related behavior (Deci and Ryan, 1985; Rose et al., 2001; Vallerand, 2000).

The present study contributes to our knowledge about causality orientations in the work context by developing and validating a measurement instrument for the three causality orientations in the work setting—the Causality Orientations at Work Scale (COWS). We developed this instrument in five phases. In phases 1 and 2 we generated item pool and conducted content analyses. In phase 3, we selected a final set of items based on exploratory factor analyses, confirmatory factor analyses, and a test of reliability. Phase 4 was across-validation assessment with a second sample to establish measurement invariance, and in phase 5, we analyzed the criterion-related validity of the scale in relation to common correlates in the SDT framework. In particular, we expected autonomy orientation to relate positively to satisfaction of the three basic psychological needs for autonomy, competence, and relatedness (Baard et al., 2004), as well as related positively to autonomous work motivation, affective commitment, and work engagement (Baard et al., 2004; Lam and Gurland, 2008; Malinowska and Tokarz, 2020). We expected the autonomy orientation to be negatively associated with controlled work motivation, turnover intentions, and burnout (Liu et al., 2011). In contrast with the autonomous orientation, we expected the control and impersonal orientations to have opposite associations with these variables (Lam and Gurland, 2008; Malinowska and Tokarz, 2020).

## Method and Results

### *Procedures and participants*

Two samples (total N = 500) were used in phases 3 to 5 of the study. Sample 1 consisted of 201 bank employees from 9 banks in a Norwegian bank alliance (response rate = 45.4%). Sample 2 consisted of 299 of the 999 dental hygienists registered in the Norwegian Dental Hygienist Federation (response rate = 29.9%). Demographics for the two samples are presented in **Table 1**. We obtained approval from the Norwegian Center for Research Data (project numbers 53459 and 53264) prior to e-mail recruitment of participants and data collection, and all of the participants provided informed consent to participate before they completed the online questionnaire. They were informed that participation was voluntary and that they could withdraw participation at any time during the project and have their responses deleted.

### *Measures*

#### *Need satisfaction*

We assessed satisfaction of basic psychological needs for autonomy and competence in Sample 1 (bank employees), and autonomy, competence, and relatedness in Sample 2 (dental hygienists) with the Basic Psychological Need Satisfaction and Need Frustration Scale (B. Chen et al., 2015). We used a work-context adapted and validated Norwegian translation of the scale (Olafsen and Halvari, in progress). The instrument has subscales for autonomy satisfaction (four items; e.g., ‘I feel a sense of choice and freedom in the things I undertake at work’); competence

satisfaction (four items; e.g., ‘I feel confident that I can do things well at work’); and relatedness satisfaction (four items; e.g., ‘I feel that the people I care about also care about me at work’). Participants rated the items on a 7-point scale ranging from 1 (completely untrue) to 7 (completely true), and ratings were averaged within each subscale.

#### *Work motivation*

Both samples completed the Multidimensional Work Motivation Scale (Gagné et al., 2015). Participants responded to the following stem: ‘I put effort into my job...’, to assess external regulation (six items; e.g., ‘Because others will reward me financially only if I put enough effort in my job’), introjected regulation (four items; e.g., ‘Because I have to prove to myself that I can’), identified regulation (three items; e.g., ‘Because putting efforts in this job has personal significance to me’), and intrinsic motivation (three items; e.g., ‘Because what I do in my work is exciting’). Participants rated the items on a 7-point scale ranging from 1 (not at all for this reason) to 7 (exactly for this reason), and responses were averaged within each subscale. External and introjected regulations were summed to form controlled motivation, and identified and intrinsic regulations were summed to form autonomous motivation, as recommended in the literature (Deci and Ryan, 2000). We then used autonomous and controlled motivation in the data analyses.

#### *Organizational commitment*

We assessed affective commitment in both samples with a scale developed by Meyer and Allen (1991). The participants indicated their affective commitment via six items (e.g., ‘I would be very happy to spend the rest of my

**Table 1:** Demographic characteristics of the participants in the two samples.

	Sample 1	Sample 2
<b>N</b>	201	299
<b>Gender</b>		
<b>Female</b>	62.7%	98%
<b>Male</b>	37.3%	2%
<b>Age</b>		
<b>Range (years)</b>	25–64	22–66
<b>Mean (years)</b>	45.18	42.71
<b>Standard deviation (years)</b>	10.33	12.63
<b>Education</b>		
<b>High school (%)</b>	0.0	0.7
<b>Basic education<sup>1</sup> (%)</b>	13.9	5.4
<b>Bachelor’s degree<sup>2</sup> (%)</b>	77.6	91.9
<b>Master’s degree (%)</b>	8.5	2.0

<sup>1</sup> Sample 1: Bank academy, lower degree. Sample 2: 1 year university education. <sup>2</sup> Sample 1: Bank academy, higher degree. Sample 2: Bachelor’s degree.

career with this organization') on a scale ranging from 1 (never) to 7 (all the time).

#### Turnover intention

We assessed turnover intentions in both samples with three items concerning the participants' current thinking about turnover (O'Driscoll and Beehr, 1994; e.g., I am thinking of leaving this job) and three items about turnover during the past year (Luchak and Gellatly, 2007; e.g., during the past year I have regularly had an intention to leave). Participants responded on a 7-point scale ranging from 1 (never) to 7 (always).

#### Work engagement

We assessed work engagement of the participants in Sample 2 with the short version of the Utrecht Work Engagement Scale (Schaufeli, Bakker and Salanova, 2006). We measured vigor (three items; e.g., 'At my work, I feel bursting with energy'), dedication (three items; e.g., 'I am proud of the work that I do'), and absorption (three items; e.g., 'I get carried away when I am working') on a scale ranging from 1 (never) to 7 (daily).

#### Burnout

We assessed burnout in Sample 2 with the Maslach Burnout Inventory (Maslach, Jackson and Leiter, 1996). We measured emotional exhaustion (five items; e.g., I feel emotionally drained from my work), inefficacy (six items; e.g., I feel exhilarated when I accomplish something at work), and cynicism (five items; e.g., I doubt the significance of my work) on a scale ranging from 1 (never) to 7 (every day).

#### Data analysis

We used exploratory factor analysis (EFA) in SPSS v. 25 and confirmatory factor analysis (CFA) in Mplus (Muthén and Muthén, 1998–2015) to validate the measurement scale for causality orientations in the workplace. We used correlations to evaluate the criterion-related validity of the scale. We used all 33 items in the first EFA, and 3 dimensions (autonomy, control, and impersonal orientations) emerged as expected. We removed 5 vignettes (15 items) with low factor loadings, leaving 6 vignettes (18 items). The CFA confirmed the factor structure of the EFA in Sample 1, and this was replicated in Sample 2 (see description of phases 3 and 4 below for details). We conducted multigroup CFA, which was performed in Mplus to test for measurement invariance (MI) between the two samples. This four-step MI procedure included configural, metric, scalar, and residual tests (Putnick and Bornstein, 2016). The test of configural invariance shows whether the suggested factor structure fits in both samples; the test of metric invariance shows whether the item loadings are equivalent in both samples; the test of scalar invariance shows whether the item intercepts are equivalent in both samples; and the test of residual invariance shows whether the item residuals are equivalent in both samples (Putnick and Bornstein, 2016).

Given the multivariate normality problems of the observed variables, we used the Satorra–Bentler (S–B)

scale  $\chi^2$  and robust standard errors adjustment to the maximum likelihood estimator in the CFAs. For fit indices, we used Satorra–Bentler ( $SB\chi^2$ ) goodness-of-fit test statistics in conjunction with other practical tests of fit that are less dependent on N (Cheung and Rensvold, 2002): (a) the root-mean-square error of approximation index (RMSEA; Steiger, 1990); (b) the comparative fit index (CFI; Bentler, 1990); and (c) the standardized root-mean-square residual (SRMR; Klein, 2015). For the RMSEA and SRMR, values below 0.08 were deemed acceptable (Hu and Bentler, 1999), whereas for the CFI (Bentler, 1990), values  $> 0.90$  were considered to show a good fit of the model to the data. We used the  $SB\chi^2$  difference ( $SB\chi^2_{diff2}$ ; Satorra and Bentler, 2010) to compare the relative fits of nested models to test MI (i.e., the model that imposed more equality constraints). However, because  $\chi^2$  is overly sensitive to small, unimportant deviations from expected values in large samples (F. F. Chen, 2007; French and Finch, 2006; Meade, Johnson and Braddy, 2008), we used change in CFI, RMSEA, and SRMR as the final evaluation criteria for MI. In particular, we considered MI to be acceptable if change in the CFI was  $< 0.01$  coupled with changes in the RMSEA  $< 0.015$  and in the SRMR  $< 0.030$  (metric invariance) or  $< 0.015$  (scalar and strict invariance) (Little, 2013). If the constrained model was acceptable based on these parameters, we used it as the new reference model. If the constrained model was rejected, we evaluated a less restrictive model of partial invariance in which, in accordance with modification indices, equality constraints on one or more items were released. If the model of partial invariance was acceptable using these criteria, we used it as the new reference model; otherwise, fitting more constrained models was suspended, and the previous reference model was interpreted as the final model expressing the highest hierarchical level of MI for each scale in the two samples.

#### Phase 1: Item generation

Based on existing scales, the GCOS (Deci and Ryan, 1985) and the Exercise Causality Orientations Scale (Rose et al., 2001), and our own generated item pool from the theoretical definitions of causality orientations, we adapted and developed 11 scenarios or vignettes with 3 responses each, for a total of 33 response alternatives (see **Table 2**). The scenarios were intended to represent the breadth of possible problems and challenges in the work context. The various vignettes described manager behavior related to employee performance (e.g., scenario 3) and employee behaviors related to autonomy (e.g., scenario 7), competence (e.g., scenario 9), and relatedness (e.g., scenario 11). We intended these vignettes to cover behaviors that are important for the satisfaction of the three basic psychological needs that serve as nourishment for human motivation, growth, and well-being across cultures (Deci and Ryan, 2000). We included items that describe an autonomy orientation toward feelings and thoughts of 'interest,' 'importance,' and 'self-initiation of problem solving,' as emphasized in the literature (Deci and Ryan, 1985, 2000). For the control orientation, we included items that described feelings of being 'pressured

**Table 2:** Results from explorative maximum likelihood factor analysis with oblimin rotation.

Scenario/Item number	Scenario/Item	Impersonal orientation	Control orientation	Autonomy orientation
1	Imagine: You are asked to participate in a new work-project that you are unfamiliar with. How likely is it that you think/feel:			
1.1 Autonomy	Think it will be interesting to try something new	-0.19	0.11	<b>0.43</b>
1.2 Control	Feel that I have to do it to satisfy my manager	0.31	<b>0.42</b>	0.04
1.3 Impersonal	Feel that usually I don't like new things, so why should I try?	<b>0.24</b>	0.40	-0.02
2	Imagine: Your manager has informed you that you should set goals for your work. You will probably:			
2.1 Autonomy	Set your own challenging goals	-0.20	-0.12	<b>0.61</b>
2.2 Control	Feel pressured to set yourself goals	0.17	<b>0.54</b>	0.09
2.3 Impersonal	Not want to set goals because it is not certain you will achieve them	<b>0.68</b>	0.31	-0.34
3	Imagine: Your manager has informed about you the use of new procedures at work that can improve performance. The first thing you think is:			
3.1 Autonomy	This will be interesting and important for me to try	-0.31/-0.34	-0.10/-0.17	<b>0.66/0.63</b>
3.2 Control	I will feel pressure within me to do as the manager says.	0.35/0.34	<b>0.76/0.74</b>	-0.13/-0.20
3.3 Impersonal	It will probably be futile for me to do it	<b>0.64/0.62</b>	0.41/0.41	-0.37/-0.43
4	Imagine: Your manager suggests new routines to improve work performance. You will probably think/feel:			
4.1 Autonomy	It will be important for me to try this to see if it improves my work	-0.31	-0.02	<b>0.59</b>
4.2 Control	I have to do this to satisfy my manager	0.36	<b>0.74</b>	0.03
4.3 Impersonal	I will be afraid I won't be able to manage the tasks	<b>0.39</b>	0.56	-0.02
5	Imagine: Your work has not been performed to its usual standard. To do something about this, you will probably:			
5.1 Autonomy	Find out where the problem lies so you can set yourself new goals	-0.26	0.04	<b>0.78</b>
5.2 Control	Go to your manager so he/she can decide what you should do	-0.02	<b>0.29</b>	0.38
5.3 Impersonal	Ignore the problem, as it is difficult to do something about work performance	<b>0.76</b>	0.34	-0.31
6	Imagine: You are in your manager's office and you discover that there is something he/she is not satisfied with regarding your work. Your first reaction will probably be:			
6.1 Autonomy	I want to talk with my manager to figure out what I can do to carry out of my job in the best way possible	-0.34	0.03	<b>0.83</b>
6.2 Control	I will get a bad conscience and feel that I have to improve	0.14	<b>0.57</b>	0.22
6.3 Impersonal	To feel that it is hard to do something about this; what has happened, has happened	<b>0.64</b>	0.27	-0.24
7	Imagine: Your manager wants you be more self-driven and independent in your job. The first thing you think will probably be:			
7.1 Autonomy	This will be important for me to try, to see if it works	-0.37/-0.33	-0.03/-0.09	<b>0.72/0.74</b>
7.2 Control	Feel pressure to do as my manager says	0.12/0.10	<b>0.78/0.80</b>	0.03/0.03
7.3 Impersonal	It is hard to do something about things like independence, I am who I am	<b>0.72/0.67</b>	0.34/0.34	-0.38/-0.41

(Contd.)

Scenario/Item number	Scenario/Item	Impersonal orientation	Control orientation	Autonomy orientation
8	Imagine: Your manager has asked you to do something about your interest in work, which has been a bit low lately. You will probably think/feel:			
8.1 Autonomy	I want to talk to my manager to see if we can find a good solution	-0.35/-0.38	0.04/-0.03	<b>0.76/0.76</b>
8.2 Control	Feel pressured to do something so my manager is satisfied	0.22/0.19	<b>0.80/0.82</b>	-0.03/-0.03
8.3 Impersonal	Think that to be honest, I cannot really change my basic interest in work	<b>0.76/0.70</b>	0.32/0.31	-0.41/-0.45
9	Imagine: Your manager has asked you to take a course to strengthen your work competence. You will probably think/feel:			
9.1 Autonomy	Think that this will be interesting and exciting	-0.28/-0.29	0.01/-0.04	<b>0.63/0.58</b>
9.2 Control	Feel I have to do it to satisfy my manager	0.37/0.36	<b>0.74/0.73</b>	-0.06/-0.12
9.3 Impersonal	Feel that I have a certain competence, but there is not much I can do to change it	<b>0.75/0.73</b>	0.26/0.28	-0.29/-0.33
10	Imagine: Your manager has suggested that you work with a more experienced employee to increase your job skills. You will probably think/feel:			
10.1 Autonomy	Think that this will be important for me	-0.33/-0.40	-0.01/-0.11	<b>0.71/0.76</b>
10.2 Control	Feel pressured to do it to keep my work tasks and job	0.36/0.38	<b>0.72/0.75</b>	0.01/-0.11
10.3 Impersonal	Think, to be honest, I cannot change my skill level	<b>0.80/0.88</b>	0.21/0.23	-0.34/-0.43
11	Imagine: Your manager has asked you to cooperate more with your colleagues at work. You will probably think/feel/do:			
11.1 Autonomy	Find out who I should collaborate with and contact them	-0.36/-0.43	0.07/-0.02	<b>0.71/0.74</b>
11.2 Control	Feel pressure to cooperate on something I prefer to do alone	0.38/0.39	<b>0.59/0.60</b>	-0.08/-0.19
11.3 Impersonal	Feel that, frankly, I cannot do much to change my social attitude	<b>0.80/0.84</b>	0.25/0.27	-0.33/-0.44

Note: Factor loadings before slash are from 33 items (11 vignettes), and factor loadings after the slash are from 18 items (6 vignettes).

by the manager,' 'having a bad conscience,' and 'complying with manager expectations.' The impersonal orientation items described 'avoidance' and feelings of 'perceived incompetence' (Deci and Ryan, 2000).

**Phase 2: Assessment of content validity**

Five SDT experts/researchers evaluated the content validity of the scale by assessing the degree to which the item content was representative of the theoretical constructs (autonomy, control, and impersonal orientations; Dunn, Bouffard and Rogers, 1999). The group discussed the items associated with each scenario and adjusted them until they reached agreement about the content relevance.

**Phase 3: Item selection and factorial validity**

Exploratory factor analyses

We conducted an *a priori* maximum likelihood factor analysis with oblique rotation of the 33 items, which yielded 3 unique factors that explained 52.01% of the variance. We labelled these factors: (1) impersonal orientation (11 items; eigenvalue: 9.13; 27.66% of variance), (2) control orientation (11 items; eigenvalue: 5.70; 17.26% of variance), and (3) autonomy orientation (11 items; eigenvalue: 2.34; 7.09% of variance). Next, we omitted vignettes 1–2 and 4–6 because they indicated

factor loadings lower than 0.55. We then performed a new maximum likelihood factor analysis with oblique rotation of the remaining 18 items from vignettes 3 and 7–11, which yielded 3 unique factors that explained 62.23% of the variance. We labelled these factors: (1) impersonal orientation (6 items; eigenvalue: 6.22; 34.54% of variance), (2) control orientation (6 items; eigenvalue: 3.32; 18.46% of variance), and (3) autonomy orientation (6 items; eigenvalue: 1.66; 9.23% of variance). See **Table 2** for factor loadings for both the 11 vignette and the 6 vignette solutions.

Confirmatory factor analysis

The fit of the three-factor model<sup>1</sup> with the 6 vignettes (18 items) retained from the EFA had acceptable fit indices:  $\chi^2$  (*df* = 127) = 175.868, *p* < 0.001; CFI = 0.962; SRMR = 0.057; and RMSEA = 0.045, 90% confidence interval (CI) (0.027, 0.060). All items had significant loadings (ranging from 0.59 to 0.81, *p* < 0.001, with an average loading of 0.72) on their intended latent factor (see **Table 3**).

Internal consistency

We calculated Cronbach's alpha (Cronbach, 1951) for the three sub-dimensions of the scale, including six items each. The results showed acceptable values for

all of the dimensions: autonomy orientation,  $\alpha = 0.85$ ; control orientation,  $\alpha = 0.88$ ; and impersonal orientation,  $\alpha = 0.88$ .

#### Phase 4: Cross-validation

To examine whether the results from the CFA<sup>2</sup> were replicable, we tested the measurement model in another sample (Sample 2). A three-factor model with the 6 vignettes/18 items retained from the EFA had acceptable fit indices:  $\chi^2 (df = 129) = 188.377, p < 0.001$ ; CFI = 0.954; SRMR = 0.060; and RMSEA = 0.042, 90% CI (0.028, 0.054). All items had significant loadings (ranging from 0.50 to 0.78,  $p < 0.001$ , with an average loading of 0.68) on their intended latent factor. The alphas for the three dimensions were also adequate: autonomy orientation,  $\alpha = 0.80$ ; control orientation,  $\alpha = 0.88$ ; and impersonal orientation,  $\alpha = 0.80$ .

#### Configural invariance test

We tested the configural MI of the measurement scale in the two samples with a simultaneous multigroup CFA model. This model (Model A) imposed no equality constraints on

parameter estimates across groups. The results indicated an acceptable fit for the model:  $\chi^2 (df = 258) = 390.678, p < 0.001$ ; CFI = 0.949; SRMR = 0.061; and RMSEA = 0.048, 90% CI (0.038, 0.057).

#### Metric invariance test

We tested the same model simultaneously in both samples, constraining the corresponding factor loadings to be equal across groups (Model B). The results indicated an acceptable fit for the model:  $\chi^2 (df = 273) = 412.371, p < 0.001$ ; CFI = 0.946; SRMR = 0.067; and RMSEA = 0.047, 90% CI (0.038, 0.056). The constraints did not cause a significant reduction in fit compared to Model A:  $S-B \chi^2_{diff} = 21.45 (\Delta df = 15), p > 0.05$ . The change in the CFI was  $< 0.01$ ; the change in the RMSEA was  $< 0.015$ ; and the change in the SRMR was  $< 0.030$ .

#### Scalar invariance test

We tested the same model simultaneously in both samples, constraining the corresponding item slopes and all the intercepts of the observed items to be equal across groups (Model C). The results indicated an acceptable fit for the

**Table 3:** Results from the CFA in the two samples.

Scenario/Item number	Factor loading		t-values	
	Sample 1	Sample 2	Sample 1	Sample 2
3				
3.1 Autonomy	0.62	0.58	7.008	10.592
3.2 Control	0.74	0.70	17.760	17.931
3.3 Impersonal	0.67	0.53	13.516	6.865
7				
7.1 Autonomy	0.73	0.68	11.552	12.404
7.2 Control	0.69	0.70	14.889	15.975
7.3 Impersonal	0.77	0.50	15.617	7.799
8				
8.1 Autonomy	0.77	0.63	10.289	11.890
8.2 Control	0.73	0.78	16.082	21.680
8.3 Impersonal	0.75	0.57	10.540	9.550
9				
9.1 Autonomy	0.59	0.69	6.674	8.349
9.2 Control	0.77	0.77	20.393	25.864
9.3 Impersonal	0.69	0.76	12.487	16.501
10				
10.1 Autonomy	0.76	0.66	15.801	13.502
10.2 Control	0.81	0.77	25.311	19.606
10.3 Impersonal	0.75	0.65	19.207	12.841
11				
11.1 Autonomy	0.75	0.70	14.733	16.272
11.2 Control	0.65	0.65	12.483	15.683
11.3 Impersonal	0.77	0.72	14.219	16.386

model:  $\chi^2 (df = 288) = 481.787, p < 0.001$ ; CFI = 0.925; SRMR = 0.071; and RMSEA = 0.054, 90% CI (0.046, 0.063). However, the constraints did cause a significant reduction in fit compared with Model B:  $S-B \chi^2_{diff} = 84.74 (\Delta df = 15), p < 0.001$ . The change in the CFI was  $> 0.01$ , whereas the changes in the RMSEA and the SRMR were  $< 0.015$ . The modification indices suggested freely estimating the intercept of item 11 for control orientation. The new partial scalar invariance model (Model C2) showed an acceptable fit to the data:  $\chi^2 (df = 287) = 459.078, p < 0.001$ ; CFI = 0.934; SRMR = 0.069; and RMSEA = 0.051, 90% CI (0.042, 0.060). Even though the constraints caused a significant reduction in fit compared with Model B:  $S-B \chi^2_{diff} = 55.20 (\Delta df = 14), p < 0.01$ , we considered this to be acceptable, as the change in the CFI was  $< 0.01$  and the changes in the RMSEA and the SRMR was  $< 0.015$ .

**Invariant uniqueness test**

We analyzed a model with cross-group equality constraints between the two samples of bank employees and dental hygienists on all like items' residual variance (Model D). The results indicated an acceptable fit for the model:  $\chi^2 (df = 304) = 534.200, p < 0.001$ ; CFI = 0.911; SRMR = 0.086; and RMSEA = 0.058, 90% CI (0.050, 0.066). However, the constraints caused a significant reduction in fit:  $S-B \chi^2_{diff} = 55.64 (\Delta df = 18), p < 0.001$  with the change in the CFI  $> 0.01$ , the change in the SRMR  $> 0.015$ , and the change in the RMSEA  $< 0.015$ . The modification indices suggested freely estimating the residual of item 9 for autonomy orientation. The new partial invariant uniqueness model (Model D2) showed an acceptable fit to the data:

$\chi^2 (df = 303) = 475.817, p < 0.001$ ; CFI = 0.933; SRMR = 0.073; and RMSEA = 0.050, 90% CI (0.041, 0.059). Even though the constraints caused a significant reduction in fit compared with Model C2 ( $S-B \chi^2_{diff} = 28.06 (\Delta df = 17), p < 0.05$ ), we considered this acceptable, as the change in the CFI was  $< 0.01$  and the changes in the RMSEA and the SRMR was  $< 0.015$ .

**Phase 5: Criterion-related validity**

The correlations between the three causality orientations and the criterion-related variables are presented in **Table 4**. As expected, autonomy orientation was positively related to satisfaction of the needs for autonomy, competence, relatedness, autonomous work motivation, affective commitment, and work engagement, whereas it was negatively related to turnover intentions and burnout. The control orientation negatively associated with need satisfaction, affective commitment, and work engagement, and it was significantly positively associated with controlled work motivation, turnover intentions, and burnout. The impersonal orientation was negatively related to satisfaction of basic psychological needs, autonomous work motivation, and work engagement, and it was positively correlated with burnout.

**Discussion**

Causality orientations reflect basic assumptions about the initiation and maintenance of work behavior that are assumed to guide the motivational process as illustrated within the basic SDT model in the workplace (Deci et al., 2017). Thus, the assessment of work-related causality

**Table 4:** Zero-order correlations among causality orientations and work-related correlates.

Variable	Sample 1					Sample 2				
	M	SD	AO	CO	IO	M	SD	AO	CO	IO
Autonomy orientation (AO)	5.77	1.06	–			6.18	0.82	–		
Control orientation (CO)	3.85	1.34	–0.07	–		3.57	1.55	–0.17**	–	
Impersonal orientation (IO)	2.32	1.05	–0.41***	0.43***	–	1.95	0.92	–0.55***	0.37***	–
Autonomy need satisfaction	4.96	1.09	0.32***	–0.08	–0.18*	5.46	1.06	0.31***	–0.34***	–0.16**
Competence need satisfaction	6.12	0.71	0.38***	–0.14*	–0.31**	6.22	0.66	0.34***	–0.20***	–0.29***
Relatedness need satisfaction	–	–	–	–	–	5.80	0.98	0.28***	–0.23***	–0.13*
Autonomous work motivation	5.15	1.06	0.22**	–0.06	–0.21**	5.83	0.92	0.42***	–0.26***	–0.35***
Controlled work motivation	3.72	0.96	0.10	0.18*	–0.12	2.79	0.82	0.03	0.37***	0.07
Affective commitment	4.33	1.10	0.40***	0.03	–0.08	5.65	1.05	0.23**	–0.23**	–0.21**
Turnover intentions	2.51	1.34	–0.16*	0.03	0.15*	2.29	1.39	–0.17**	0.28***	0.10
Work engagement	–	–	–	–	–	5.67	1.12	0.29***	–0.26***	–0.18**
Burnout	–	–	–	–	–	3.31	1.40	–0.13*	0.32**	0.14*
Gender <sup>1</sup>	0.63	0.48	0.22**	–0.03	–0.11	1.98	0.14	–	–	–
Age	45.18	10.33	0.01	0.01	0.12	42.71	12.63	–0.14*	–0.05	0.08

Note: M = Mean, SD = Standard Deviation, \*\*\*  $p < 0.001$ , \*\*  $p < 0.01$ , \*  $p < 0.05$ . Skew values varied for Sample 1 from –0.30 to 0.75, except for a value of –1.61 for autonomy orientation. For Sample 2 skew values varied from –1.26 to 1.18. For gender: 1 = males; 2 = females. <sup>1</sup> Correlations between gender and causality orientations are Spearman's point biserial, which are omitted for the dental hygienists because there were only six males in the sample.



orientations helps us better understand motivational processes and outcomes in the work domain. However, few studies have examined the implications of such causality orientations, and there is a lack of a valid domain-specific measurement tool. Thus, using an SDT framework, the purpose of the present study was to develop and validate the COWS.

Results from two samples of 500 (total) employees provided acceptable support for the psychometric properties of the proposed scale. Consistent with SDT, the results showed support for a three-factor structure representing autonomy, control, and impersonal causality orientations. This structure was supported for both samples at all levels of MI, and the three subscales proved to have satisfactory reliability. With these results, the present study contributes to establish an important tool for a central SDT concept that has received relatively little attention in the literature. A valid measurement instrument, such as the COWS, enables future SDT studies of causality orientations as a part of the motivational process studied in organizational psychology. We hope to encourage studies that examine all three causality orientations, as the current literature seems to be limited to the studies of autonomy orientation (Baard et al., 2004; Liu et al., 2011). It is promising that, in line with our expectations and previous theory and research (Baard et al., 2004; Lam and Gurland, 2008; Liu et al., 2011; Ryan and Deci, 2017), autonomy orientation was positively related to positive work correlates (i.e., basic psychological need satisfaction, autonomous work motivation, affective commitment, and work engagement) and negatively related or unrelated to negative work correlates (i.e., controlled work motivation, turnover intentions, and burnout). Conversely, the control orientation correlated negatively with competence need satisfaction and work engagement and positively with controlled work motivation and burnout. Also, as expected according to theory and research (Malinowska and Tokarz, 2020; Ryan and Deci, 2017), the impersonal orientation was negatively correlated with all three needs, autonomous work motivation, and work engagement and positively correlated with burnout (see **Table 4**).

In sum, the associations of the three causality orientations with common antecedents and outcomes in the SDT work domain literature supported the criterion validity of the scale. Because past research has focused on autonomy orientation and the positive motivational processes and outcomes at work (Deci et al., 2017), the development and validation of the COWS lays the groundwork for future studies of negative motivational processes and work outcomes by enabling valid measurements of the control and impersonal causality orientations.

The three causality orientations are relatively independent or orthogonal and raise the possibility that an individual can have a strong autonomy orientation and a strong or weak control orientation at the same time, and vice versa. Similar relations may be possible for other constellations of the causality orientations. The results supporting this view are consistent with developments of the general and the exercise causality orientations scales (Deci and Ryan, 1985; Rose et al., 2001). This is

documented by correlations between autonomy and control orientations among the bank employees ( $-0.07$ ) and the dental hygienists ( $-0.17$ ). The autonomy and impersonal orientations were negatively correlated ( $-0.41$  and  $-0.55$ , respectively), whereas control and impersonal orientations were positively correlated ( $0.43$  and  $0.37$ , respectively). These results indicate that the causality orientation constructs do not share much variance, and the EFA and CFA indicated that they are divergent and separate variables. Hence, with respect to implications for future research, an autonomy orientation at work may predict need satisfaction at work, autonomous work motivation, and adaptive work outcomes positively, as well as maladaptive work outcomes negatively. Conversely, control and impersonal orientations may negatively predict need satisfaction at work, autonomous work motivation, and adaptive work outcomes. In particular, the control and impersonal orientations may predict work engagement negatively and burnout positively (see **Table 4**).

We started the validation process for the COWS with 11 scenarios, which we reduced to 6 scenarios. The 5 omitted scenarios probably had low factor loadings because the behaviors they described were too general relative to the more specific behaviors described in retained scenarios. Thus, the validated COWS includes 6 scenarios; 2 related to autonomy behaviors (scenarios 7 and 8), 2 related to competence or performance behaviors (scenarios 3 and 9), and 2 related to relatedness behaviors (scenarios 10 and 11). The retained scenarios are intended to represent the breadth of possible problems, challenges, and behaviors that are important in the work context across cultures (Deci et al., 2017; Deci and Ryan, 2000).

#### **Practical implications**

Employees' autonomy orientation is shown to be positively, whereas control and impersonal orientations are negatively, associated with need satisfaction at work. Theoretically, causality orientations and need satisfaction are supposed to be reciprocally related (Ryan and Deci, 2017). Hence, work environments supporting employees' needs for autonomy, competence, and relatedness may be key underlying drivers of an effective organization through its positive influence on employees' autonomy orientation, autonomous work motivation, well-being, and performance (Baard et al., 2004; Deci et al., 2017; Paaue, 2009; Stenius et al., 2017).

First, the need for autonomy refers to the feeling of choice, volition, responsibility, and partaking in decision-making at work. This need can be satisfied by well-implemented job designs, balance between job demands and resources available, work organization, manager and peer autonomy support, and clear agreements of goals and mandates (Deci et al., 2017). Second, the need for competence refers to the feeling of being effective and capable in interactions with the work environment. Competence need satisfaction would be facilitated by training, continuing education, and developmental opportunities, a climate encouraging the use of skills and competencies, positive feedback valuing employees'

skills and competencies, behaviors helping employees to structure their ideas and perspectives, and clear organizational and employee goals to disseminate and share competence (Ryan and Deci, 2017). Third, the need for relatedness refers to the feeling of being connected to others and cared for, and the feeling of caring for other individuals and groups. Hence, managers and employees have a mutual role in cooperation and helping behavior to perform on the behalf of the organization. In this process, acknowledging each other's perspectives, thoughts, feelings, and behaviors are key elements satisfying their need for relatedness (Ryan and Deci, 2017). In sum, a need satisfying work environment may over time make employees more autonomy-oriented and less control- and impersonal-oriented and, in turn, more autonomously motivated at work, more affectively committed to the organization, more engaged at work, less preoccupied with turnover intentions, and less burnout experiences (see **Table 4**).

#### **Limitations and future research directions**

This study has some notable limitations. First, because the data were derived from cross-sectional self-report measures, the results may have been influenced by common method variance (Podsakoff et al., 2003; Podsakoff, MacKenzie and Podsakoff, 2012). Thus, work-related outcome measures from other sources, and observations, would have strengthened the study. On the other hand, we used validated measures in this study, and if the self-report measures have good construct validity, other methods are not necessarily better (Conway and Lance, 2010). Second, prospective and/or longitudinal designs with temporal separation between the independent and dependent variables are recommended in future studies, because such designs decrease common method bias (Podsakoff et al., 2012). Third, temporal separation of measures is also important because it fulfills one of the three criteria for making causal claims (i.e., x must precede y temporally; Antonakis et al., 2010). The second criterion is significant associations between the measures (Bollen, 1989), and the third criterion is isolation—that is a design that rules out the possibility that the relation between the independent and dependent variables is not explained by other variables (Antonakis et al., 2010). Only one of the three criteria was met in this study, thus, causality cannot be inferred. Because true experimental designs are difficult with regard to causality orientations, future research would be strengthened by using quasi-experimental designs, which can examine different outcomes (e.g., management change, performance, turnover, burnout) as effects of different experimental work conditions and causality orientations (DeRue et al., 2012). We also recommend prospective cohort and longitudinal studies with well-designed control variables (Podsakoff et al., 2012). Fourth, although the samples for this validation of the COWS were drawn from quite different sectors (banking and health care), CFA and multigroup CFA testing invariance were supported. This is promising, but tests of the scale in other sectorial samples are needed before conclusions

regarding representativeness can be drawn. In particular, larger and more divergent samples would be needed in future research to ensure that this scale works well in other occupational samples.

#### **Notes**

- <sup>1</sup> Modification indices suggested residual covariances between some of the indicators for the six factors should be added. In sample 1, we added 5 residual covariances (Control orientation 8 WITH Control orientation 7; Impersonal orientation 11 WITH Impersonal orientation 10; Impersonal orientation 9 WITH Impersonal orientation 10; Impersonal orientation 11 WITH Control orientation 11; Impersonal orientation 3 WITH Autonomy orientation 3). We included these residual covariances in the test of measurement invariance and represented group-specific parameters, meaning that partial measurement invariance is tested.
- <sup>2</sup> Modification indices suggested residual covariances between some of the indicators for the six factors should be added. In sample 2, we added 3 residual covariances (Covariance for impersonal orientation 11 WITH Covariance for control orientation 11; Covariance for impersonal orientation 3 WITH Covariance for autonomy orientation 3; Covariance for control orientation 8 WITH Covariance for control orientation 7). We included these residual covariances in the test of measurement invariance and represented group-specific parameters, meaning that partial measurement invariance is tested.

#### **Competing Interests**

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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